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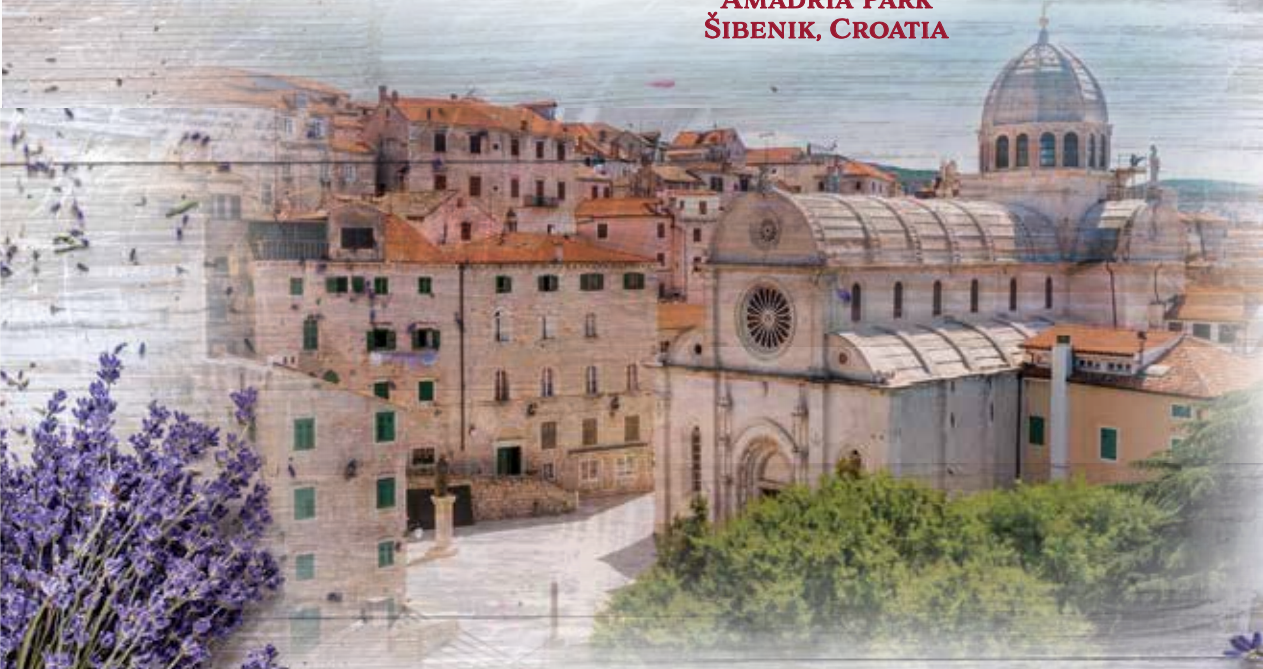

BOOK OF ABSTRACTS

3/2025

Fizikalna i rehabilitacijska medicina

Physical and Rehabilitation Medicine

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CONTENT

Dear Colleagues, dear Friends,

our voyage started several years ago and we are proud to have been persistent in our intention to sail through the Mediterranean sea to the Adriatic sea and Dalmatian coast. Welcome/Bienvenue to the 16th MFPRM Congress and to the beautiful city of Šibenik in Croatia. Warm hospitality, mediterranean environment and social and professional interaction are at the very heart of this congress.

Following success of the previous MFPRM Congress in Rome in 2023, all of us in the MFPRM Executive committee have been challenged to maintain the overall quality of congress and maybe even to set the bar a bit higher. After months of email and zoom meetings and consultations, we are proud of this project and final product we are offering to all of you: twelve scientific session, nine workshops covering variety of PRM areas, interactive panels/roundtables and over three hundred submitted abstracts which were reviewed and prepared for either oral or poster presentations. All of this will enable better dissemination of knowledge and clinical experience among us and will serve as a solid base for future interaction and cooperation between experienced researchers and clinicians.

We are also happy to introduce a novel session dedicated to the young PRM physicans (both residents and specialists) whose agenda is defined by themselves and reflects current state in PRM and potential challenges from their perspective. Equally important, we want to connect PRM specialists and rehabilitation teams professionals of the Mediterranean Countries in Europe, Middle East and Africa in high-quality scientific sessions.

After several hours of continuous listening and/or discussing, we are inviting you for some good social time as the surrounding environment of the conference venue is really beautiful and relaxing – true Mediterranean smells, sounds and beautiful nature.

We are welcoming our PRM colleagues from different countries and various professional backgrounds – academicians, clinicians, researchers, trainees – working in various PRM areas as well as other health professionals included in the rehabilitation team.

Šibenik and Croatia are looking forward to welcoming you!

Associate Prof. Frane Grubišić

Vice-President of the MFPRM
President of the 16th MF PRM Congress

Prof. Calogero Foti

President of the MFPRM

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INVITED SPEAKERS

INVITED SPEAKERS

INTERVENTIONAL ULTRASOUND IN PRM

ULTRASOUND-GUIDED OR ULTRASOUND GUIDES MUSCULOSKELETAL INTERVENTIONS

Levent Özçakar

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In this lecture, the contribution of ultrasound as regards musculoskeletal interventions will be discussed. Its guidance not only for precise targeting but also for prompt decision making before the procedure will be emphasized. For sure, its role in close follow up after the intervention will also be exemplified.

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INTERVENTIONS FOR SPASTICITY

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Spasticity is an abnormal muscle hyperactivity seen in the patients with certain neurologic disorders. Exercises, orthoses, transcutaneous electrical nerve stimulation, extracorporeal shock wave therapy, repetitive peripheral magnetic stimulation, non-invasive brain stimulation, dry needling, intrathecal baclofen, whole-body vibration therapy, localized muscle vibration, botulinum toxin (BoTX) injection and neurolysis are used for the management of patients with spasticity. BoTX injection and neurolysis are the interventions commonly used in this regard. Intramuscular BoTX injection There are some issues that need to be clarified regarding intramuscular injection of BoTX. Some of them are about the proper muscle side and part into which toxin should be injected, and about the requirement of guidance and technique during the application. BoTX acts in the cytosol of the motor nerve terminal via inhibiting acetylcholine release from the presynaptic membrane of the neuromuscular junction (NMJ). It is only internalized from the presynaptic membranes of NMJ.1 Therefore, the effect of BoTX injection on spasticity/dystonia largely depends on the amount of toxin transported to NMJs. NMJs in a skeletal muscle are generally clustered in one or more restricted areas defined as innervation zone(s) (IZs).

BoTX injections targeting this specific muscle areas are recommended to achieve an optimal therapeutic goal with lower doses and fewer side effects.2 BoTX injections are performed blindly or using guides like electrical stimulation, electromyography (EMG) or ultrasound. Moreover, instrumented guidance of injection is strongly recommended for the treatment of spasticity/dystonia in both adults and children. Ultrasound guided BoTX injections seem to be superior to EMG in targeting the proper muscle and avoiding the neurovascular structures from injury.3 On the other hand, abnormal electrical signals from dystonic/spastic muscles can be recorded using EMG. This provides an advantage in the diagnostic stage to detect the involved muscles. IZ(s) of the skeletal muscles lie(s) perpendicular to the muscle fibers' alignment through which the distribution of BoTX diluted with saline is significantly restricted.4 Therefore, Kaymak et al.5 recommended the "seeding technique" to ensure that BoTX molecules are homogeneously distributed through the IZ, before they reach the other parts of the muscle which contain fewer or no NMJ. In summary, BoTX injections should be applied to the innervation zones using the seeding technique with the guidance of ultrasound.3 Neurolysis Phenol neurolysis to nerve trunk and/or intramuscular motor branches may result in greater spasticity reduction with longer effective duration, as compared to BoXT therapy. The possibility of long-term side effects, especially neuropathic pain following mixed nerve injections, needs to be considered.6 Selective peripheral neurolysis targeting motor nerve/branches with high frequency ultrasound was also recommended to decrease the side effects via protecting the sensory fibers of peripheral nerve from damage.7

Keywords: Spasticity, botulinum toxin, neurolysis

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ULTRASOUND-GUIDED PAIN INTERVENTIONS

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Ultrasound (US) has become an essential modality in physical medicine and rehabilitation, offering real-time, dynamic imaging that enhances the safety, accuracy, and effectiveness of pain interventions (1). This lecture offers physiatrists a focused review of key ultrasound-guided techniques commonly used in the management of musculoskeletal and neuropathic pain. It highlights practical pearls for procedures such as peripheral nerve blocks, peritendinous, intrabursal, and intra-articular peripheral joint and spinal injections. Special attention is given to clinical indications, safety considerations, and the expanding body of evidence supporting the superiority of US guidance over traditional landmark-based approaches.

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ULTRASOUND GUIDED PLATELET RICH PLASMA INJECTION: HOW TO PROCEED TO OPTIMIZE THE RESULT

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Ultrasound-guided Platelet-Rich Plasma (PRP) injections have emerged as a valuable regenerative treatment modality in Physical and Rehabilitation Medicine (PRM) for managing musculoskeletal conditions such as tendinopathies, and osteoarthritis. To optimize clinical outcomes, PRM specialists must integrate evidence-based protocols with their functional rehabilitation expertise. Patient selection remains critical; best results are observed in chronic, non-responding tendinopathies and mild-to-moderate degenerative joint disease. A thorough clinical and functional assessment, complemented by musculoskeletal ultrasound, ensures accurate diagnosis and exclusion of structural contraindications. Ultrasound not only guides the injection but also enhances diagnostic precision by identifying the exact lesion site and tissue characteristics. PRP preparation should follow a validated protocol, with careful consideration of platelet concentration and leukocyte content, depending on the target tissue. For example, leukocyte-poor PRP is preferred in intra-articular injections to limit inflammatory response, while leukocyte-rich PRP may be used in chronic tendinopathies. Ultrasound guidance significantly improves accuracy of needle placement, ensuring the biologic agent is delivered precisely to the pathological site. Techniques such as tendon fenestration or peppering may enhance the biological response in chronic cases by promoting microtrauma-induced healing. Sterile technique, real-time imaging, and anatomical expertise are essential to reduce complications and maximize efficacy. Rehabilitation planning post-injection is essential to harness the regenerative potential of PRP. An individualized program focusing on tissue-specific loading, gradual return to activity, and avoidance of NSAIDs in the early healing phase will support optimal functional recovery. Patient education on realistic expectations and gradual improvement over weeks is also key to clinical success. In summary, ultrasound-guided PRP injections offer PRM specialists a powerful adjunct in managing chronic musculoskeletal conditions. Optimal results are achieved through

Keywords: PRP, Ultrasound,Tendinopathy, Osteoarthits,Regenerative

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INVITED SPEAKERS

UROLOGY AND GYNECOLOGY/OBSTETRICS REHABILITATION

 https://doi.org/10.21751/FRM-39-3-4-5

PELVIC REHABILITATION AFTER RADICAL PROSTATECTOMY

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Radical prostatectomy (RP) remains the gold standard for managing localized prostate cancer (PCa) in patients with good overall health and longer life expectancy.[1] However, two of the most significant and common complications following RP—urinary incontinence (UI) and erectile dysfunction (ED)—can severely impact the quality of life (QoL). Reported rates of these side effects vary widely in the literature, often due to differing definitions, timing, and methods of assessment (patient-reported vs. physician-reported outcomes).[2 3] These complications not only diminish patient satisfaction but also impose additional burdens, including prolonged recovery time, increased healthcare costs, and time off work, affecting both individuals and society at large. The continence mechanism involves a complex interplay between the bladder, bladder neck, urethra, and the surrounding musculoskeletal and neural structures. Aging itself may impair this functional unit, meaning many patients already have compromised urinary function prior to surgery.

Postoperative continence outcomes are further influenced by several local anatomical and surgical factors. Among these, urethral length, preservation of the neurovascular bundle (NVB), and surgical technique are especially critical. Numerous studies have confirmed that urethral anatomy plays a significant role in post-RP UI. A range of treatment strategies is employed to mitigate these side effects, including conservative, pharmacological, and surgical interventions. Conservative management often starts with pelvic floor muscle training (PFMT), either alone or in combination with adjunctive modalities such as biofeedback, transcutaneous or intracavitary electrical stimulation, and functional magnetic stimulation (FMS). Mechanical devices (e.g., penile clamps) and various medications may also be used. PFMT is the most commonly recommended first-line conservative approach for restoring pelvic floor and bladder function after RP.[3] However, existing studies present conflicting evidence regarding its effectiveness and optimal application protocol.In recent years, the role of FMS has garnered interest in the management of UI post-RP. Although the number of published studies is limited, available data generally suggest that FMS—either as a standalone treatment or in conjunction with other modalities—offers promising benefits. These include faster recovery of continence, increased maximal urethral closure pressure, suppression of detrusor overactivity, and improved bladder capacity.

Despite technological advances in PCa treatment that have reduced the relative incidence of post-RP UI, the absolute number of affected patients is expected to rise in parallel with the increasing number of prostatectomies performed annually. While most patients eventually regain continence, the recovery timeline can vary considerably—from as little as two months to over a year. Given this variability, it is

crucial to explore and offer evidence-based, noninvasive therapies that may accelerate recovery. Doing so not only improves patient QoL but also yields economic benefits for the healthcare system.

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CLEAN INTERMITTENT SELF CATHETERISATION IN NEUROGENIC BLADDER UPDATE AND ROLE OF GENERAL PRACTIONNER

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Introduction Intermittent catheterization was initially proposed for the first time by Guttman in a sterile manner during the Second World War. This was modified by Lapides in 1972, introducing the concept of clean intermittent catheterization (CIC). It is based on the principle of ensuring safe bladder emptying, several times a day . CIC has multiple indications for bladder-sphincter disorders, whether neurological or not. CIC is nowdays the man tool of managment of retention . CIC is currently the first solution in cases of chronic urinary retention in prostates Role of General Practionner (GP) For this technique to be performed by the patient himself or by a third party, it requires training for both parties. It also requires long-term monitoring of the effectiveness of emptying and detect any complications that may arise due to catheterization or other factors. One of the links in the chain of follow up is or should be the general practitioner(GP). Therefore, we conducted a prospective study with 500 GPs in 2021. 20 questions were asked by mail. 220 out of 500 questionnaires were analyzed : -Only 5% of GPs correctly defined intermittent catheterization.

The reasons or purposes of catheterization: 90% reported that it serves to protect the upper urinary tract and 80% that it ensures bladder emptying. -80% of physicians reported the correct frequency of catheterization per day. -55% thought they would prescribe sterile gloves for catheterization and 57% would use an antiseptic for cleaning. -Urinary tract infection was considered the leading complication (87%), 36% of GPs consider CBUE necessary, and 65% may prescribe antibiotic therapy for bacteriuria without signs of infection. Conclusion: General practitioners need to improve their knowledge of CIC, its modalities, indications, and how to treat associated urinary tract infections (8). CIC Guidlines((1-5-6-7) Assessing the patient's motor and cognitive abilities to perform his CIC is the first Neurourological assessment, voiding calendar, and urodynamic are basic tools. Certain very simple tests performed by paramedical staff, such as the pencil and paper test (3), give us a quick idea of the patient's capabilities to perform his catheterization . The foundation for the success and effectiveness of Clean,Intermittent Self-Catheterization is education (2-4) of the patient, the trainers, whether it be the nurse, physiotherapist, GP or family member in charge of catheterization .The training sessions should be repeated as possible. -Compliance(2) of patient is an important factor . -Continuous monitoring by the rehabilitation physician and/or the nurse and general practitioner remains essential as a team work . -The frequency of self-catheterization per day is 3 to 5, depending on urine output and voiding schedule, while respecting sleep. - The volume of drainage should not exceed 400 to 500 ml. -The most common complication of CIC is infection.

Bacteriuria does not necessarily require antibiotic treatment. -Long-term antibiotic treatment promotes the development of resistance. -A history of prolonged indwelling catheterization is a risk factor for chronic infections. -Prostatitis comes first, followed by epidjdymitis and urethritis. -Urethral strictures and false passages increase over time. The use of lubricated catheters can improve this situation. To compare with indwelling catheter,there are other advantages with CIC : -Fewer barriers to intimacy and sexual activity when compared to other catheters (IUCs or external collection devices).

Improves quality of life, body image, self-esteem, and peer relationships; - it promotes independence and control of bladder when schedule is tailored to individual lifestyle. Conclusion The CIC or Self CIC,is the gold standard technique for managing chronic retention . The best preventive measure remains proper education for all those involved in CIC and, essentially, the patient's compliance and involvement.

Keywords: Clean Intermittent catheterization neurogenic bladder GP

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EMG OF ANAL AND URETHRAL SPHINCTER

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Electromioneurography is a diagnostic neurophysiological method used to assess the functional state of the examined muscles, as well as their innervating nerves (1). Electromyoneurography of the sphincter is a diagnostic neurophysiological method that assesses the functional state of the sphincter muscles (most often the external anal and/or urethral sphincter) as well as their innervating nerves, especially the pudendal nerve (2). Clinical indications for EMNG of the sphincter are fecal and/or urinary incontinence, chronic constipation, erectile dysfunction, chronic pelvic pain. The causes of the above-mentioned dysfunctions can be suprapontine damage, cerebrovascular diseases, Parkinson's disease, multiple sclerosis, suprasacral spinal lesions, spina bifida, sacral lesions, multiple system atrophy, injury to the peripheral nervous system - pudendal nerve, postpartum sphincter dysfunction (3).

Electromyographic examination begins with a targeted clinical examination (history and status) to find out when and under what circumstances the disturbances occur, intensify, and what calms them down. To find out whether body position during the day - night, diet (diet - intake of soluble and insoluble fibers - intake of fluids), taking medications (anticholinergics) affect the regulation of stool, urination, pain. Are there symptoms of autonomic dysreflexia, spastic abdominal muscles, increased body temperature, change in body weight, trauma to the brain, spinal cord, pelvis and peripheral nerves of the pelvis, surgical interventions of the head, spine, pelvis, time elapsed since birth associated with dysfunction of urination, stool, erection, pelvic pain. In addition to the history, clinical status is also important to evaluate sensory and motor impairments – assessment of the abdominal wall through percussion and palpation. Clinical assessment of touch, pain, temperature of the skin and muscles of the pelvic floor and genitals is mandatory.

Check anocutaneous reflexes of the perianal skin and muscles as well as the bulbocavernosus reflex, which will facilitate planning and understanding of EMG-g findings is mandatory (3). Clinically, the bulbocavernous reflex is caused by stimulation (squeezing) of the dorsal nerve of the penis or clitoris, and the expected response is contraction of the external and internal anal sphincter. In the EMG analysis of the bulbocavernous reflex, the latency is measured, which is on average from 26.8 to 39.4ms, and the mean value of the amplitude is from 4.2 to 43.4 microvolts, measured from the peak to the peak of the potential (4). We perform electromyography of the external anal sphincters bilaterally, by inserting a coaxial needle electrode at the anocutaneous border at 3 and 9 o'clock at a depth of 0.5 to 2.5 cm and analyze the electromyographic pattern in relaxation, and when it is possible to register basal sphincter activity or spontaneous sphincter activity (fibrillation, positive sharp waves). Voluntary activity can be an interfering / intermediate pattern or a pattern of individual neuromotor potentials. It is possible to analyze motor unit action potentials (MUAP) which, if pathological, correlate with

nerve damage or dysfunction. Latency longer than 10 ms is pathological, and longer than 16 ms correlates 100% with multiple systemic atrophy as a cause of stool and urinary incontinence, but is poorly sensitive (in 55% of patients with multiple system atrophy - MSA) (5, 6). EMG of the external urethral sphincter is a neurophysiological method for assessing electrical activity in the external striated urinary sphincter, and thus possible damage to the pudendal nerve, as a cause of urinary incontinence. A coaxial needle electrode is usually used for the examination, the examination is performed bilaterally, and can be quite painful for the patient (7). Electromyoneurography of the urethral and anal sphincters is a useful neurophysiological method in assessing damage to the pudendal nerve as the evaluated pelvic floor muscles.

Keywords: EMG, sphincter, bulbocavernosus refleks.

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DIASTASIS RECTI ABDOMINIS REHABILITATION IN THE POSTPARTUM PERIOD

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Diastasis recti abdominis (DRA) is a connective tissue condition characterized by separation of the two rectus abdominalis (RA) muscles along the linea alba (LA) primarly affecting women ante and post-natally. Prevalence varies between 66 and 100% in the final trimester of pregnancy. Natural resolution occures during the first 8 weeks postpartum, but recovery might still be going in the following months. DRA is present in 36% of women at 12 months postnatally. Diagnosis and assessement are preformed via inter-recti distance (IRD) measurement by palpation, calipers and most reliable by ultrasound. Currently there is no consensus about cut-off points for diagnosis (according to some researchers ultrasound measurments of 2.2-2.3 cm at the umbilicus). Clinical signs in DRA are abdominal bulging (visceral protrusion between rectus bellies) and abdominal invagination (linea alba posterior distorsion). DRA can cause modification in muscle pull angles, change body mechanics and impair the ability of the abdominal muscle to generate force and the ability of the fascia to transfer loads across the midline. There is a weak evidence on the effect of DRA on trunk and pelvic dysfunctions. DRA management should be primarly conservative (recommended for at least 6 months) in which physiotherapy is the gold standard.

Surgical interventions (reduction of the IRD through plication of the linea alba and anterior rectus sheath with or without a mesh) are option for severe cases where conservative treatments fail or concomitant symptomatic hernia is present. DRA exercises focus on deep and superficial muscles, pelvic floor muscles, respiratory maneuvres, functional exercises (planks, bridges, squats), alternative interventions (yoga, suspension training, abdominal hypopresive exercise-AHE) and adjunct modalities. Abdominal muscle training utilizing exercises for RA muscles (crunches, curl-ups, sit-ups, posterior pelvic tilts) and exercises for oblique abdominals (trunk/Russian twist, twisted curl-ups), eccentric contractions (reverse sit-ups, reverse trunk-twists), exercises activating transversus abdominis (TrA) muscle (abdominal drawing-in maneuvers/static abdominal contractions). DRA reduction during curl-up in women with vaginal deliveries and in those with Cesarean sections was found to be similar. Researchers investigating TrA contractions via ultrasound, using the abdominal drawing-in maneuver (ADIM) on DRA patients, found an immediate IRD increase, attributed to the muscle's transverse fibers and pull angle and tension of the LA minimizing distortion. In a good-quality RCT TrA exercises from various positions in DRA women showed a signifcant IRD decrease after 12 weeks, compared with only the taping or the control group. In observational studies, IRD increased with TrA pre-activation during curl-up compared with no pre-activation. Lee and Hodges observed an IRD increase during ADIM compared with curlup and noted LA distortion (anteriorly or posteriorly) during curl-up, which was reduced with deep and superfcial abdominal co-contractions. A good-quality RCT

included a modifed eccentric-based sit-up from an upright seated position, which improved muscle strength and reduced abdominal bulging. Theodorsen et al. found that both TrA and pelvic floor muscle training (PFM) increased IRDs, whereas TrA and PFM co-contracting resulted in the largest IRD increases. IRD decreased signifcantly across groups performing functional exercises. Alternative exercises, such as electromyographic-biofeedback PFM exercises, suspension training, yoga, AHEs, and low-impact aerobic and resistance training were of a fair-quality trials and/or without significant differences. There is not enough evidence to support the use of elastic tape in DRA rehabilitation. Exercise therapy might be an efective approach for treating DRA and improving overall function. However, most studies are of low methodological quality, great heterogeneity regarding DRA severity and location, IRD measurment methods, cut-off points, sample sizes, time postpartum, exercise program duration and frequency thus providing very low quality scientific evidence to recommend specific exercise programs in the treatment of DRA postpartum.

Keywords: Diastasis recti abdominis, Rehabilitation, Postpartum

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INVITED SPEAKERS

CHILDREN REHABILITATION

ELECTRODIAGNOSTIC PRINCIPLES IN PEDIATRIC PERIPHERAL NERVE LESIONS

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Electrodiagnostics is considered as an additional evaluation method that follows clinical neurological examination for the evaluation of neuromuscular diseases (1). Electrodiagnostic evaluations are composed of electroneurography (ENG) or nerve conduction studies (NCS) where motor, sensory or mixed nerves are assessed and electromyography (EMG) where muscle activity is analyzed by insertional needle electrode (2). This diagnostic method is valuable in peripheral nerves lesions detection as well as the level, severity degree and type (demyelinating and/or axonal) of such lesions. Furthermore, it is used in muscle pathology assessment and in cases with impaired neuromuscular transmission.

Electrodiagnostic evaluations are also valuable in recovery assessment of the pediatric patients with neuromuscular diseases. Sensory nerve conduction velocities (SNCV) can be performed orthodromically or antidromically, where in cases with antidromically measurements, the amplitudes are higher. Motor nerve conduction velocities (MNCV) are usually performed with stimulation on two and more sites along the nerve. Late responses are also evaluated, where proximal segments of nerve are assessed. The evaluated parameters during the NCS assessment include response latencies, amplitudes, duration, area and nerve conduction velocities (NCV) (3,4). Amplitudes can be reduced in axonal pathology and in cases with present demyelinating process (conduction block and/or dispersed response (temporal dispersion of impulses)) of the tested nerve segment. Nerve conduction velocities can be decreased in cases with axonal pathology where mild decrease can be expected if the axons with fastest conduction velocity are affected as well as in cases with demyelinating process of the tested nerve segment. The second phase of electrodiagnostic testing is EMG, where needle electrode is placed into the specific muscle.

Several stages are analyzed during the EMG including insertional and spontaneous activity when needle electrode is placed into relaxed muscle. Further stage is when muscle is minimally actively contracted where motor unit action potentials (MUAP) are analyzed including amplitude, duration and number of phases. Finally in the last stage of maximal muscle contraction, the examiner analyses firing frequency and number of MUAPs (5). It should be pointed out that the number of spontaneous pathological activity does not represent the number of axons that are damaged but rather presence of axonal degeneration, while reduction of MUAP's number and compound muscle action potential amplitude resembles axonal loss. Considering pediatric population, the EMG diagnostics should be done with a minimum steps bearing in mind test objectives in terms of diagnosis or for directing other evaluations (6). Optimal time for electrodiagnostic evaluation depends on clinical presentation, severity of lesion and child's age. After seven to ten days post nerve injury, it is possible to differentiate

whether the lesion is of neuropraxic type or as axonotmesis and neurotmesis. Further, three to four weeks after the nerve injury more information about level of the lesion, severity of the one and spontaneous pathological activity analysis can be obtained. Two to six months after the injury, electrodiagnostic testing can provide valuable information about the presence of potential nerve recovery (7).

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CHILDREN WITH IMPAIRED COORDINATION

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Abstract Coordination in children refers to the ability to control and synchronize body movements, involving sensory information, motor skills, and cognitive processing. Good coordination is vital for physical, cognitive, and emotional development. Impaired coordination, where children struggle with typical movements like walking, writing, or catching a ball, can result from physical injuries, intellectual disabilities, diseases, or neurological disorders.

A common diagnosis for impaired coordination is Developmental Coordination Disorder (DCD). Developmental Coordination Disorder (DCD) DCD is a neurodevelopmental condition characterized by significant motor coordination difficulties that aren't due to other medical conditions, such as cerebral palsy or intellectual disabilities. Affecting about 5–6% of children, DCD is more common in boys. The exact cause of DCD is unknown, but it is believed to stem from a delay or disruption in the brain's development, particularly in areas responsible for motor control and coordination. Symptoms of DCD Symptoms of DCD vary, but common ones include: Gross and fine motor difficulties; Poor balance and posture; Difficulty planning and sequencing movements; Social and emotional challenges Diagnosis and Treatment DCD diagnosis requires a comprehensive assessment by a team of healthcare professionals.

Treatment typically involves early intervention, often with physical therapists, occupational therapists, and special education teachers. While DCD has no cure, early support can improve motor skills over time. Other Causes of Coordination Disruption Other factors, such as systemic diseases (e.g., diabetes), autoimmune disorders, and bone fractures, can also disrupt a child's coordination and development. Conclusion DCD is a complex disorder that significantly impacts daily life. Early diagnosis, motor skill assessments, and therapeutic interventions can help children manage their symptoms. Regardless of the cause, a multidisciplinary approach focusing on motor skills, managing co-occurring conditions, and emotional support can greatly improve a child's quality of life.

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MANAGEMENT OF CHRONIC PRIMARY PAIN SYNDROMES IN CHILDREN AND ADOLESCENTS

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Chronic pain is quite common in children but has become increasingly prevalent, especially among adolescent girls, over the last three decades (1-3). About 5% of schoolchildren experience high-impact chronic pain (4), which profoundly disrupts their physical, emotional, and social functioning (5-7). Despite its impact, chronic pain in children and adolescents remains largely underrecognized and undertreated, even in pediatric hospital settings (8). Without specialized management and interdisciplinary rehabilitation, the prognosis for these children can be quite poor. Additionally, there is a notable shortage of pediatric interdisciplinary chronic pain management programs, which further complicates the situation.

For the first time, ICD-11 classifies different chronic pain conditions, including chronic primary pain conditions. This is an important step towards recognition and specialized treatment and rehabilitation. This lecture will focus on key disabling chronic primary pain syndromes in children and adolescents, including juvenile fibromyalgia and complex regional pain syndrome. We will explore essential aspects of managing these conditions, including diagnostics, patient education, and the roles of pharmacotherapy, exercise and physiotherapy, occupational therapy, psychological interventions, and peer support. Each of these components plays a vital role in the effective management of chronic primary pain conditions, aiming to improve the quality of life. There is a great need for physicians specializing in Physical and Rehabilitation Medicine to become actively involved in this growing field of rehabilitation.

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PEDIATRIC CANCER SURVIVORS AND LIFE-LONG REHABILITATION CARE

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Introduction Cancer is the leading cause of disease-related mortality among children and adolescents. In 2022, an estimated 14,000 children and adolescents (0–14 years old) in Europe were diagnosed with cancer, and 2,000 die annually. Although more than 81% survive, many live with long-term physical and psychological effects. Leukemia, lymphomas, and brain tumors are the most common types. The causes of most childhood cancers remain unclear, and there are regional variations in incidence1.

Over 80% of children with cancer now survive into adulthood due to advances in multimodal therapies and supportive care since 1970. Yet, many experience persistent physical, cognitive, and psychosocial issues. Rehabilitation is critical in addressing these late effects and maintaining quality of life through a multidisciplinary, lifelong approach. The Childhood Cancer Survivor Study (CCSS), the largest cohort of 5-year survivors in North America, shows that most long-term care is provided by primary care physicians. However, follow-up visits decline over time. While pediatricians play a key role, Physical Medicine and Rehabilitation (PM&R) physicians are uniquely equipped to manage late effects through comprehensive, multidisciplinary rehabilitation, helping survivors achieve optimal function and well-being2 and so they are equally essential. Long-Term Effects of Paediatric Cancer Treatment In recent decades, numerous sizable cohorts of childhood cancer survivors have been established in Europe and North America to support studies on long-term health outcomes. Survivors often experience various physical and mental health issues, including endocrine abnormalities, musculoskeletal impairments, cardiovascular dysfunction, and neuromuscular deficiencies. Cognitive effects such as learning difficulties, memory loss, and poor concentration are especially common among those exposed to high-dose chemotherapy or cranial radiation. Psychosocial challenges, including anxiety, depression, PTSD, and problems with social reintegration, may also impact long-term well-being3.

Rehabilitation Strategies Comprehensive PRM rehabilitation is vital for minimizing complications and enhancing survivors' long-term function. Strategies include physical, occupational, cognitive, speech, psychological, and lifestyle interventions. 1. Physical & Occupational Rehabilitation Physical limitations may arise due to tumor location, immobility, chemotherapy-induced neuropathy, or treatment-related deformities. Physiotherapy addresses fatigue, gait issues, and weakness. Occupational therapy supports daily activities. Strength training, balance exercises, and assistive devices (orthotics, prosthetics) improve mobility. Cardiac and pulmonary rehab is essential for those at risk of cardiotoxicity or pulmonary fibrosis4. 2. Cognitive and Educational Rehabilitation Neurocognitive impairments often require specialized therapies. Cognitive remediation enhances executive function, attention, and memory. Individualized Education Plans (IEPs) and classroom accommodations—extra test time, note-taking

aids, assistive tech—support academic performance5. 3. Psychosocial Rehabilitation Cancer treatment can disrupt emotional development and social connection. Cognitive Behavioral Therapy (CBT) reduces emotional distress. Peer support groups and mentorships build resilience and social skills. Family-focused interventions, foster emotional support and adaptive coping6. 4.

Lifestyle and Wellness Rehabilitation Survivors face elevated risks of obesity, metabolic syndrome, and secondary malignancies. Nutritional counseling promotes healthy eating; structured exercise improves cardiovascular health and reduces fatigue. Behavioral support aids in smoking cessation and limiting alcohol intake—key to preventing late complications. Transitioning to adult healthcare is crucial as survivors mature. Conclusion: Pediatric cancer survivors need interdisciplinary rehabilitation for the rest of their lives. Combining an Individual Rehabilitation plan with all therapies needed to improve their general independence and well-being. Future developments in rehabilitation techniques will keep enhancing survivors' quality of life and long-term health results.

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INVITED SPEAKERS

NEUROREHABILITATION

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SHAPING FUTURES: PROGNOSIS, RECOVERY, AND THE VITAL ROLE OF REHABILITATION IN POST-CARDIAC ARREST CARE

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Recent advances in cardiopulmonary resuscitation such as targeted temperature management, and intensive care protocols have significantly improved survival rates following cardiac arrest. However, with increasing survival comes a parallel rise in cases of hypoxic-ischemic brain injury, a leading cause of morbidity and long-term disability in these patients. This presentation aims to provide a comprehensive overview of the pathophysiology, clinical manifestations, prognostication challenges, and rehabilitation approaches associated with brain injury after cardiac arrest. Cerebral ischemia during cardiac arrest leads to a cascade of metabolic disturbances. Within seconds of circulatory arrest, oxygen depletion impairs neuronal function, and within minutes, glucose is exhausted, resulting in the failure of ATP-dependent ion pumps. This dysfunction promotes massive influxes of calcium and the release of glutamate, which in turn activates NMDA receptors, exacerbating excitotoxic injury.

The intracellular calcium burden triggers mitochondrial dysfunction and the production of reactive oxygen species, initiating cell death pathways. Secondary injury processes—such as cerebral edema, impaired autoregulation, and hypotension—can occur hours to days later, further amplifying neuronal damage. Clinically, the brain regions most vulnerable to hypoxia include the hippocampus, thalamus, cerebral cortex, and basal ganglia. Neurological sequelae vary widely, ranging from subtle memory and executive function impairments to coma and persistent disorders of consciousness. Movement disorders (e.g., myoclonus, Parkinsonism), seizures, paroxysmal autonomic instability and spasticity may also develop, complicating both acute management and long-term recovery. Prognostication in this population remains challenging, particularly in the context of therapeutic hypothermia, which may mask clinical signs due to sedation and delayed metabolism of medications.

Current recommendations suggest waiting at least 72 hours after achieving normothermia to perform neurological assessment, including brainstem reflex testing, EEG, and neuroimaging. Early signs such as myoclonic status epilepticus or absent brainstem reflexes may indicate poor prognosis, but must be interpreted with caution. Despite early pessimism, a proportion of patients recover meaningful function, emphasizing the importance of delayed, multimodal prognostication. Scales such as the Glasgow Outcome Scale (GOS) and the Cerebral Performance Category (CPC) remain standard, though their predictive value can be affected by early withdrawal of care. Rehabilitation is a cornerstone of management in survivors after the cardiac arrest. A tailored, interdisciplinary approach—initiated as early as clinically feasible—should address motor deficits, cognitive dysfunction, emotional dysregulation, and reintegration into daily life.

Functional neurorehabilitation should be guided by structured assessment tools and include intensive physical therapy, speech and language therapy, neuropsychological interventions, and caregiver support. From a systems perspective, integrating rehabilitation planning into the continuum of care—from ICU to outpatient follow-up—is essential. Developing standardized post-cardiac arrest pathways with early involvement of rehabilitation specialists improves functional outcomes and reduces long-term dependency. In conclusion, as survival after cardiac arrest improves, the medical community must address the complexity of neurological outcomes and the critical role of rehabilitation. Understanding the underlying pathophysiological mechanisms of brain injury, utilizing cautious and evidence-based prognostication, and implementing early, individualized rehabilitation strategies are essential to optimizing recovery and quality of life in this growing patient population.

Keywords: Brain injury, anoxia, encephalopathy, cardiac arrest

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PHYSICAL ACTIVITY IN STROKE PATIENTS: BARRIERS AND FACILITATOR

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Stroke remains a significant global health challenge, often resulting in substantial functional limitations and markedly reduced levels of physical activity among survivors. Approximately 30% of stroke patients are at high risk of recurrence, underscoring the critical role of physical activity in post-stroke care. Regular engagement in physical activity has been shown to reduce the risk of both first-time and recurrent strokes by positively influencing modifiable risk factors such as hypertension, hyperglycemia, and hypercholesterolemia.

According to the World Health Organization, physical activity is defined as any bodily movement produced by skeletal muscles that requires energy expenditure. The American Heart Association recommends 20 to 60 minutes of aerobic activity, three to five times per week. However, individuals with chronic conditions—particularly stroke survivors—are generally less physically active than the general population. Notably, only about 21% of stroke survivors meet the recommended physical activity levels, making stroke one of the conditions with the lowest rates of adherence. This issue is even more severe among non-ambulatory patients, for whom achieving sufficient activity is especially challenging. Accordingly, stroke rehabilitation programs are designed not only to restore physical function and promote independence but also to instill long-term habits of physical engagement aimed at preventing future cardiovascular events. To effectively address physical inactivity following stroke, the first essential step is accurate assessment.

Physical activity levels can be evaluated through both objective and subjective methods. Objective tools include the doubly labelled water method, heart rate monitors, calorimeters, and accelerometers. Subjective methods involve self-report questionnaires and activity diaries. Among these, accelerometers—wearable electromechanical devices—are particularly effective, as they provide objective, real-time data on the frequency, intensity, and duration of physical activity under naturalistic conditions. Commonly reported barriers to physical activity after stroke include environmental limitations, comorbid health problems, and stroke-related impairments. In contrast, social support has consistently emerged as a key facilitator. A widely used conceptual framework in this field highlights the dynamic interaction between motivation (the desire to be active) and capability (the resources to be active), with various internal and external factors influencing both. For instance, while the direct effects of stroke may act as barriers, encouragement from healthcare professionals or fellow survivors can serve as powerful motivators. For this very reason, interventions designed to increase physical activity post-stroke should be tailored not only to individual clinical profiles but also to a wide range of personal and social factors, including cultural norms and family dynamics. Evaluating the impact of cultural differences—particularly familial

interactions—can be essential for the long-term success and relevance of rehabilitation efforts.

Keywords: Stroke, Physical Activity, Barriers, Facilitator

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RTMS IN THE FUTURE OF SCI REHABILITATION

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Spinal cord injury (SCI) often results in long-term disability and limited meaningful neurological recovery. Current rehabilitation strategies focus on physical therapy and assistive devices. Neuromodulation techniques such as repetitive transcranial magnetic stimulation (rTMS) have emerged as promising tools to enhance neuroplasticity and functional recovery. We hereby explore the mechanisms, clinical applications, and future potential of rTMS in SCI rehabilitation. Introduction SCI disrupts neural pathways. With growing interest in neuromodulation technologies, rTMS has gained attention as a potentially transformative intervention for enhancing neuroplasticity and functional recovery. While initially developed for psychiatric and motor disorders, its application in SCI is expanding.

Mechanisms of rTMS in SCI The therapeutic potential of rTMS lies in its capacity to modulate corticospinal excitability and promote plasticity in spared neural pathways: - Cortical Excitability: High-frequency rTMS (>5 Hz) enhances excitability; low-frequency (<1 Hz) suppresses it. - Neuroplasticity: rTMS induces long-term potentiation or depression effects, supporting synaptic remodeling, potentially rebalancing disrupted motor networks. It may strengthen residual connections and promote axonal sprouting. - Spinal Circuitry Modulation: Indirect influence on spinal interneurons and residual motor pathways below the lesion and central pattern generators may improve locomotion. - Neurochemical Changes: Alters levels of brain-derived neurotrophic factor, dopamine and glutamate, key mediators of recovery, reducing secondary damage by inflammatory responses. Clinical Evidence Motor Recovery Studies demonstrate improved voluntary movement and muscle strength, particularly in incomplete SCI: -Benavides et al. (2021): High-frequency rTMS over the motor cortex enhanced hand function in chronic cervical SCI. -Kumru et al. (2016): rTMS combined with physical therapy showed greater gains in gait and lower limb strength. Sensory Improvements rTMS over motor or prefrontal cortex may enhance sensory thresholds and reduce neuropathic pain, modulating the thalamo-cortical loop and endogenous opioid release: -Nardone et al. (2017) reported improved somatosensory evoked potentials after rTMS in SCI patients. Autonomic Function - Emerging evidence suggests benefits in bladder control and cardiovascular regulation, though results remain preliminary. Future Directions - Individualized Protocols AI-driven personalization (fMRI and EEG biomarkers) may optimize frequency, location, and duration of rTMS.

Combination Therapies rTMS + Physical Therapy: Enhances cortical priming. rTMS + Exoskeletons or Robotic Gait Training: May facilitate more robust sensorimotor recovery. rTMS + Pharmacotherapy: Synergistic effects with neurotrophic agents. - Closed-Loop Systems Adaptive rTMS triggered by real-time biofeedback (EEG/EMG) could adjust stimulation dynamically. - Home-Based and Wearable rTMS Portable devices are under development, potentially enabling telerehabilitation applications. Limitations

Heterogeneity in SCI populations complicates response to rTMS (varies based on injury severity and baseline neural integrity). Optimal stimulation parameters (frequency, intensity, duration) remain unclear. Long-term effects and safety need further study Conclusion Repetitive transcranial magnetic stimulation presents promising, offering the ability to modulate neural circuits non-invasively. While still in the early stages, rTMS holds the potential to redefine recovery, with benefits in motor recovery, spasticity, pain, and autonomic function. Future research should focus on optimizing protocols, understanding long-term effects, and integrating rTMS into multimodal rehabilitation approaches.

Keywords: rTMS, SCI, rehabilitation, functional recovery

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WHY SHOULD SPASTICITY BE IN A FOCUS OF PRM DOCTORS?

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Spasticity or as it is proposed with new name "spastic movement disorder" is clinically a motor-sensory phenomena, which is a feature of the „Upper moto-neuron lesion syndrome" and is presented as velocity dependent muscle tone increase and hyperreflexia. Spasticity occurs due to a hyperexcitability of the stretch reflex and hyperexcitability occurs from an imbalance of descending inhibitory signals from the dorsal reticulospinal tract and the excitatory signals from the medial reticulospinal and vestibulospinal tracts. Neurological changes include supraspinal and intraspinal influences on the muscle stretch reflex. Muscular level changes involve alterations to extensibility, collagen content and extracellular matrix composition. Untreated spasticity leads to irreversible muscle changes: atrophy and shortening of muscle fibers, increased intramuscular connective tissue, increased adipose tissue and degenerative changes at musculotendinous junctions Functionally spasticity can represent only a mild inconvenience for a person, but on other hand it can cause restricted function with severe disability and limitation in the activity and participation. Spasticity as a clinical problem has nevertheless an important influence on persons ability and quality of life and therefore it represents a major rehabilitation problem and should be a focus of interventions for PRM specialist.

Spasticity is an expensive, often undertreated condition, with heavy economic burden for patients, caregivers and society and a cause of disability due to decreased mobility, weakness and fatigue. Spasticity results in increased dependence on family and institutional caregivers for activities of daily living and can consequently ends in costly complications such as joint contractures, pain, severe malnutrition and pressure sores with decreased quality of life. Long term consequences of neglected spasticity leads to secondary clinical complications and furthermore to severe morbidity, functional impairment and dependency on caregivers, representing significant burden of care. The likelihood of stroke survivors with untreated spasticity to live in institution compared to those with treated or less severe spasticity is significantly higher. The treatment of spasticity should be a part of a wider rehabilitation program, which is patient-centred, performed by the multi-professional team, working in an interdisciplinary way, with the preferred leadership and coordination of the PRM physician. The treatment consists of general and specific objectives, reached by general and focal interventions and should include multimodal treatment. The general objectives of multimodal approach are to improve passive and active range of movement, reduced shortening of the muscle-tendon complex, to prevent deformity and contractures, reduced need for surgery and improved effect of treatment and quality of life.

Keywords: Spasticity, quality of life, multimodal treatment

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INVITED SPEAKERS

CARDIOPULMONARY REHABILITATION

ACTUAL TRENDS IN CARDIAC REHABILITATION: FROM HOSPITAL CARE TO PRIMARY CARE

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Cardiovascular diseases are in the leading cause of death group in most European countries, accounting for around 40% of all deaths (in European countries), obliging to a reflection and debate about its actual status and future strategies and developments. Cardiac Rehabilitation is a comprehensive, multidisciplinary, multiprofessional, cost-effective, individualized, multi-strategy intervention (including health promotion, disease prevention, therapy, rehabilitation, retraining). It comprises patients with cardiac events, subacute/chronic heart disease, cardiac surgery, oncological disease, frailty, cardiovascular risk factors,…; in a symptomatic or asymptomatic condition; often with functional impairment for ADLs and other laser or occupational activities. It's a structured, patient centered, quantified, monitored program, with medical referral and prescription supported by safety and quality criteria, based on the scientific level evidence (IA), determined among the main medical and scientific institutions of the specialties involved – European Society of Physical and Rehabilitation Medicine (PRM), UEMS PRM Section, American Heart Association, European Society of Cardiology, European Association for Cardiovascular Prevention & Rehabilitation, International Council of Cardiovascular Prevention and Rehabilitation (ICCPR), National PRM and Cardiology Scientific Societies. There are different Cardiac Rehabilitation Models around the world, with facilitators and barriers. Cardiac Rehabilitation is undergoing a significant transformation in low-risk cardiac patients, shifting from traditional hospital-based settings to more accessible, patient-centered models and patient's engagement, integrated into Primary Care (in outpatients Phase III or Phase IIa), and in Home-Based Programs, often in hybrid programs. This evolution is supported by clinical evidence and driven by technological advancements, policy changes, and a growing emphasis on personalized care, with multidisciplinary and multiprofessional Cardiac Rehabilitation teams, working together to deliver comprehensive and individualized care. This includes, according to the best Clinical Practices, Quality and Patient's Safety, a Physical and Rehabilitation Medicine Physician (Physiatrist) in the Cardiac Rehabilitation team (presential or in telemedicine/telerehabilitation). As well as, interdisciplinarity between Cardiology, PRM and Familiar Medicine (General Medicine Practitioner) and Cardiac Rehabilitation integrated care pathways between hospital settings (in and out-patients), primary care, community care, homebased care in the different health systems. This new trend involves collecting data from wearables and artificial intelligence (AI) to fit Cardiac Rehabilitation to individual clinical needs. Ongoing assessment of patient progress, through continuous monitoring digital tools, allows for timely Cardiac Rehabilitation interventions, programs adjustments and outcomes evaluation. The integration of Cardiac Rehabilitation into Primary Care and Homebased Programs, supported by technological advancements, is enhancing accessibility, equity, personalization,patient engagement and compliance, if safety and quality criteria met. Digital Health Platforms provide remote monitoring,

instructional resources, and real-time communication between patients and healthcare providers, facilitating continuous care and rehabilitation evolution. Wearables and Mobile Apps trace heart rate, blood pression, respiratory and metabolic parameters, physical activity, exercise (capacity) and adherence to prescribed Cardiac Rehabilitation, giving immediate feedback and raising accountability. AI tools analyze patient data to personalize Cardiac Rehabilitation programs, improving outcomes and patient's commitment. This concerns Digital Literacy to warrant that patients have the necessary skills and resources to utilize digital health tools effectively. This shift not only maintains patient outcomes but also contributes to the sustainability of healthcare systems by reducing costs and hospital readmissions, improves high risk complex patients to have access to Hospital Cardiac Rehabilitation Programs and decreases geographical barriers. Cardiac Rehabilitation programs in Primary-care and Home-based-care can reduce operating costs associated with hospital-based services, making it more affordable. Perceived self-efficacy in patients after Cardiac Rehabilitation programs is very important, throughout outcomes and experiences measures. Further studies should be designed to establish the best strategy for patients, Cardiac Rehabilitation, Hospital-based and Primary-based continuum of care in integrated care pathways and for health systems.

Keywords: Cardiac-rehabilitation, Telerehabilitation, PRM, Primary, Care, PROMS.

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MODALITY OF EXERCISE TRAINING IN PATIENTS WITH CHRONIC HEART FAILURE

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Heart failure (HF) is the result of structural and/or functional heart abnormalities, leading to reduced cardiac output and/or increased intracardiac pressures, either at rest or under stress1. The 5-year mortality rates in patients with chronic advanced HF is greater than 50% despite improvements in therapy, changes in lifestyle, and better adherence to guidelines. Exercise-based cardiac rehabilitation is an essential tool for managing HF and has been recommended with Class IA evidence in HF management guidelines. Studies have shown1,2 that exercise training (ET) can improve cardiac function, enhance exercise tolerance, and improve quality of life. Although the benefits of exercise are well documented for people with chronic and stable HF, there is still no consensus on whether exercise prescriptions can be universally applied to all types of HF patients2,3.

There is still a need to understand which components of exercise training prescriptiond including frequency, intensity, time (duration), type (modality), and their combinationd are the most efficient at improving cardiovascular adaptations to ET. The aim of this paper is to describe and evaluate the evidence on different modalities of ET in patients with congestive heart failure. The establishment of an "optimal dose" of ET provides a major challenge and must take into account several factors with respect to the training program and the individual. In order to achieve the beneficial effects of ET, it is necessary to combine the different modalities of load. We have chosen to focus on several different forms of ET that may represent complementary approaches, including inspiratory muscle training (IMT), aerobic exercise training (AET) (both continuous and interval training), resistance training (RT) and combination of AET and RT. Inspiratory muscle training has been prescribed in patients with CHF and include improvements in VO2peak, VO2 kinetics during recovery, ventilatory efficiency (VE/VCO2 slope), dyspnea, and functional capacity. IMT is prescribed using a percentage of as a maximal inspiratory pressure (PImax), starting at 30%, with adjustment of the intensity every 7-10 days (up to 60% of PImax)4, depending on symptoms and response to treatment. The combination of AET and resistance training is particularly suitable for HF patients because they can be adjusted according to the physical condition and lifestyle of HF patients.

A combination of these exercises helps increase to gradually increase the intensity of exercise, starting with low-intensity aerobic activities and progressing to moderate RT. This approach avoids excessive overload at once and helps improve exercise tolerance. This modality exercise has significant intervention effects, improving cardiovascular function, enhancing muscle strength, and boosting endurance2,3,4 This enables HF patients to better cope with daily activities such as walking, climbing stairs, and lifting objects. Continuous AET may be con-sidered as another efficient option, demonstrating

the development of relevant adaptations to aerobic fitness forthe treatment of CHF patients. CT may becapable of promoting superior VO2peak benefits, although Interval AET also provides benefits in VO2peak compared to the non-intervention group. Interval training is also a widely preferred exercise intervention among HF patients. Since IT has a shorter duration and does not require prolonged periods of highintensity exercise, many patients are more likely to accept and consistently engage in this type of exercise, which relatively improves treatment adherence and long-term outcomes.4,5,6 Conclusion: Long-term ET, which forms the basis of the program and content of Exercise-based cardiac rehabilitation, leads to numerous positive effects that are well documented in the literature. ET and exercise programs for patients with CHF must be tailored to the individual's exercise capacity and risk profile, with the aim of achieving and maintaining the highest possible level of fitness for the individual.

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INSPIRATORY MUSCLE TRAINING IN CARDIAC REHABILITATION

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This session will focus on inspiratory muscle training (IMT) as a complementary strategy within cardiovascular rehabilitation programs, particularly for patients with heart failure. We will cover: 1) The physiological basis of IMT and its effects on the diaphragm and accessory respiratory muscles. 2) Assessment tools, primarily maximal inspiratory pressure (MIP), and their clinical relevance. 3) Current evidence, highlighting the impact of IMT on functional capacity, dyspnea, quality of life, and ventilatory efficiency. 4) Treatment protocols, including commonly used devices, training intensity, duration, and progression. 5) Clinical applications in heart failure (especially HFrEF), post-cardiac surgery recovery, and in patients with respiratory comorbidities. The session will conclude with examples of how to integrate IMT into comprehensive cardiac rehab programs and a brief discussion.

Keywords: Inspiratory muscle training, rehabilitation

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CLINICAL SIGNIFICANCE AND USEFULNESS OF PULMONARY REHABILITATION IN PATIENTS WITH RHEUMATIC DISEASES

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Inflammatory rheumatic diseases, characterized by chronic pain and functional limitations, have a far-reaching impact on individuals and society. Although the availability of new and effective drugs that improve the prognosis of rheumatic diseases has increased in the last decade, optimal treatment still requires interdisciplinary rehabilitation. This is especially true for patients who have autoimmune-mediated lung damage as part of their rheumatic disease, which is not an uncommon finding. Lung involvement in these patients is a major factor influencing the prognosis of the disease, with some diseases having characteristic presentation patterns related to the affected lung structures.

The typical manifestation of lung disease associated with rheumatic diseases is interstitial lung disease (ILD), with usual interstitial pneumonia (UIP) being the most common pattern. However, although ILD is a common complication and one of the leading causes of death in patients with rheumatic diseases, there is little evidence on the role and principles of pulmonary rehabilitation in these diseases. Aerobic training is considered the cornerstone of non-pharmacological treatment and is strongly recommended in international guidelines, but there is currently no consensus on the intensity, frequency, or type of rehabilitation program for patients with rheumatic diseases, especially those with increased cardiopulmonary risk. It is recommended to apply the same principles of pulmonary rehabilitation as in chronic obstructive pulmonary disease (COPD). Rehabilitation interventions in rheumatic patients usually combine medical exercises, patient education, occupational therapy, and the use of orthoses and aids. Results of randomized controlled trials (RCTs) have shown that whole-body training is the main component of pulmonary rehabilitation in patients with ILD. Pulmonary rehabilitation of patients with inflammatory rheumatic diseases at the Department of Physical and Rehabilitation Medicine with Rheumatology of Dubrava University Hospital is carried out by an interdisciplinary team, and the rehabilitation program and individual goals are clearly defined before the start of rehabilitation.

On average, the rehabilitation program is carried out for up to 12 weeks with an emphasis on performing interval-type endurance exercises. One session per day, five times a week of supervised individual exercise with a physiotherapist and 30 minutes of cycling at 50-70% of maximum intensity calculated based on the six-minute walk test (6MWT) or Cardiopulmonary Exercise Testing (CPET) with intensity progression during the program. CPET, as the gold standard for assessing cardiorespiratory fitness, plays a key role in selecting personalized exercise programs that are safe and effective. Furthermore, CPET allows for monitoring and continuous adaptation of the exercise

program over time, facilitating timely modifications to the rehabilitation regimen. This adaptability not only improves the effectiveness of pulmonary rehabilitation but also ensures that patients remain at an appropriate level of effort, maximizing their recovery potential and improving overall outcomes. The results obtained at our Department have shown, in accordance with the literature, that pulmonary rehabilitation can reduce dyspnea and increase exercise capacity in patients with inflammatory rheumatic diseases and ILD of varying severity. However, long-term effects need to be determined. In conclusion, rheumatic diseases in which phases of exacerbation and remission alternate usually require lifelong treatment. Despite the availability of effective drug treatment, the adverse outcome of chronic rheumatic disease on the lives of patients is still not negligible. Therefore, although there are no specific guidelines for pulmonary rehabilitation, comprehensive multidisciplinary rehabilitation can contribute to the results of treatment of patients with pulmonary manifestations of inflammatory rheumatic diseases.

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INVITED SPEAKERS

PAIN TREATMENT AND REHABILITATION

FIBROMIJALGIJA IN SPONDYLOARTHRITIS: OVERLAPPING SYMPTOM OR OVERDIAGNOSED CONDITION?

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Fibromyalgia (FM) and spondyloarthritis (SpA) share some overlapping symptoms, such as long-term pain, fatigue and tenderness in soft tissues, which can make distinguishing between these two conditions challenging. However, whether fibromyalgia is overdiagnosed in patients with spondyloarthritis is a nuanced issue and depends on several factors, including clinical assessment and diagnostic criteria. Meta analysis by Joneas et al. shows that the prevalence of FM, among a total of 5214 patients with axSpA, was 16.4% (95% CI 12.3–20.5%). Prevalence varied with axSpA sub-classification: in ankylosing spondylitis: 13.8% (9.1–18.6%); in MRI positive non-radiographic axSpA 20.3% (6.5–34.1%); and 'clinical' disease: 11.1% (6.0–16.2%). Overall, around 1/6 patients with axSpA also meet criteria for fibromyalgia.

While estimates from individual studies vary, comorbid fibromyalgia represents a considerable burden across all sub-classifications of axSpA (1). Another meta-analysis from Min Son et al. showed that axSpA and FM are more prevalent in women than men (sex ratio 3.2:1.3) (2). Koliko su dobri aktualni kriteriji iz 2010? Several studies have demonstrated that FM in axSpA patients is also associated with peripheral enthesitis, present in up to 55.8% of patients with recently diagnosed axSpA (3). In a study by Olfa et al. fibromyalgia associated factors were advanced age and a late age at the onset of axial spondyloarthritis. In addition to that, disease activity and function parameters (eg, BASDAI, ASDAS-ESR, ASDAS-CRP, BASFI, MASES) were significantly higher in the presence of FM (4). There are several reasons for possible overdiagnosis (symptom overlap, diagnostic challenges, comorbidities, over-reliance on symptom based criteria). Both conditions share some common features, like widespread musculoskeletal pain and fatigue. In SpA, inflammation often causes pain in joints and surrounding tissues, while FM involves generalized pain, usually in soft tissues, along with other systemic symptoms like sleep disturbances and cognitive symptoms (often referred to as "fibro fog"). However, the early stages can sometimes be difficult to differentiate from FM, especially in patients who don't yet have obvious structural changes on imaging. It is not uncommon for individuals with SpA to also have fibromyalgia. In fibromyalgia, diagnosis is often based on symptom criteria, like widespread pain and tenderness. In patients with SpA, a similar symptom profile can arise from disease flares or inflammation (5).

Therefore, differential diagnosis is first step and then excluding diagnosis of FM. Without proper diagnostic tests (like imaging or biomarkers specific to SpA), there might be a tendency to label the condition as FM when pain and fatigue persist.

Strategies for managing and potentially preventing long-term pain in SpA remain a critical unmet need. Athough targeted therapies for both conditions may differ, in overlapping situations management should include personalized approach, medications, physical therapy modalities, medical exercise and lifestyle changes. In conclusion, while there is a risk of overdiagnosing fibromyalgia in patients with spondyloarthritis due to overlapping symptoms, a thorough diagnostic process can help ensure accurate diagnosis and treatment. It is essential for healthcare providers to consider the full clinical picture, including history, symptoms, imaging, and lab results, to make a well-informed diagnosis.

Keywords: spondyloarthritis, fibromyalgia, symptom, diagnosis, overlap

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NEUROPATHIC PAIN FROM A REHABILITATION PERSPECTIVE: INTERVENTIONAL ASPECTS

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Neuropathic pain (NP) arises from a lesion or disease affecting the somatosensory system, either peripheral or central, and represents a significant challenge in rehabilitation medicine. It is characterized by symptoms such as burning, shooting pain, allodynia, and hyperalgesia, often leading to functional limitations and psychological distress. While pharmacological and physical therapies remain foundational, interventional approaches are increasingly used in comprehensive rehabilitation strategies to manage refractory neuropathic pain. Understanding the Role of Rehabilitation In rehabilitation, the primary goals for patients with neuropathic pain are to restore function, reduce pain-related disability, and improve quality of life. A multidisciplinary approach involving physical therapy, psychological support, and pharmacological treatment is standard. However, in patients who do not respond adequately to conservative therapies, interventional pain management becomes essential. Interventional Techniques in Neuropathic Pain

1. Peripheral Nerve Blocks and Pulsed Radiofrequency (PRF) Selective nerve blocks can offer diagnostic and therapeutic benefits. In conditions like postherpetic neuralgia or diabetic neuropathy, targeted peripheral nerve blocks with local anesthetics and corticosteroids may transiently reduce pain and inflammation, facilitating participation in rehabilitation. PRF, which delivers high-frequency currents below neurodestructive thresholds, has shown promise in modulating pain pathways without causing nerve damage, particularly in dorsal root ganglia (DRG)-related pain [1].

2. Epidural Steroid Injections (ESI) In cases of radiculopathy with neuropathic features, such as lumbar disc herniation, ESIs under fluoroscopic or ultrasound guidance are frequently used. By reducing inflammation at the nerve root level, these injections can alleviate neuropathic symptoms and enhance engagement in physical therapy programs [2].

3. Sympathetic Blocks Sympathetically maintained pain, such as in complex regional pain syndrome (CRPS), may respond to stellate ganglion or lumbar sympathetic blocks. These interventions can disrupt abnormal sympathetic activity and facilitate motor recovery and desensitization therapies in early CRPS management [3].

4. Spinal Cord Stimulation (SCS) SCS is a more advanced intervention used in chronic refractory neuropathic pain, including failed back surgery syndrome (FBSS) and peripheral neuropathies. Through neuromodulation of dorsal columns, SCS modifies pain perception and may significantly improve pain scores and reduce opioid consumption [4]. From a rehabilitation standpoint, SCS enables re-engagement in functional training and improves long-term outcomes.

5. Ultrasound-Guided Interventions Ultrasound guidance has revolutionized interventional rehabilitation by enhancing precision, safety, and efficacy of peripheral nerve and fascial plane injections. It is particularly useful in entrapment neuropathies, such as carpal tunnel or meralgia paresthetica, where visualization of nerve pathology and guided intervention can provide both diagnostic clarity and therapeutic benefit [5].

6. Botulinum Toxin Injections Botulinum toxin type A (BoNT-A) has demonstrated analgesic effects in focal neuropathic pain syndromes, possibly via inhibition of neuropeptides like substance P and CGRP. Its utility in post-stroke shoulder pain, peripheral nerve injuries, and trigeminal neuralgia supports its role as an adjunct in pain-focused rehabilitation [6].

7. Intrathecal Drug Delivery Systems (IDDS) In select cases of intractable neuropathic pain, especially cancer-related or spinal cord injury-associated pain, IDDS can deliver opioids or baclofen directly to the cerebrospinal fluid. Although less commonly employed in general rehabilitation settings, it is crucial in end-stage refractory cases to facilitate comfort and functional participation [7].

8. Regenerative Interventions Emerging techniques such as platelet-rich plasma (PRP) and stem cell injections show potential in neuropathic conditions secondary to nerve injury or entrapment. While evidence remains preliminary, these modalities represent a frontier in regenerative pain rehabilitation [8]. Conclusion The management of neuropathic pain in rehabilitation medicine has evolved with the integration of targeted interventional procedures. These techniques not only reduce pain intensity but also facilitate participation in physical and occupational therapies, improve mood and sleep, and reduce reliance on systemic medications. Optimal results are achieved through individualized, multimodal strategies.

Keywords: Neuropathic pain / Interventional Pain/ Ultrasonography

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NOCIPLASTIC PAIN: CAVE CANEM

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The human body is capble of incredible resilience however in some circumstances it may develop conditions that remain enigmatic (1). Among these complexities is nociplastic pain—a relatively newly introduced concept in pain science that sheds light on conditions where pain is not directly linked to tissue damage or inflammation but arises from altered nervous system processing (2). Its connection with the ancient phrase *cave canem*, Latin for "beware of the dog," provides an intriguing lens through which we should use this definition cautiously and in a more targeted use. If it is commonly accepted that a wound is associated with pain, more difficult is to understand why some form of pain becomes chronic. Even less understandable is a pain where like moder Saint Thomas we are looking for a wound without being able to find anything visible or "touchable"; as to say when a clinical examination doesn't reveal any positive or negative objective signs for a lesion.

Nociplastic pain is a term introduced to describe pain that is neither nociceptive, which is caused by actual or threatened tissue damage, nor neuropathic, which results from nerve damage. Instead, it is characterized by the heightened sensitivity of the nervous system, leading to pain perception even in the absence of physical damage. Conditions such as fibromyalgia, chronic headaches, and some cases of irritable bowel syndrome are examples where nociplastic pain is a key feature. This type of pain often confounds both patients and practitioners because conventional diagnostic tools may fail to reveal clear causes. Yet, for those who suffer, the pain is very real—disrupting daily life, sleep, and mental health. The phrase *cave canem* famously appeared in ancient Roman mosaics as a warning to visitors to beware of guard dogs. Beyond its literal meaning, it can be metaphorically applied to our understanding of acute pain as a sentinel—a signal warning us of potential danger.

However, in the case of nociplastic pain, the guard dog may be barking at shadows, signaling external danger where none exists. This misfiring of the nervous system's protective mechanisms calls for a new approach to understanding pain. It challenges us to distinguish the mechanisms underlying acute pain, whether traumatic or inflammatory, from unnecessary alarms found in chronic pain, including nociplastic pain. At its core, nociplastic pain involves a process called central sensitization. In this phenomenon, the brain and spinal cord amplify pain signals, even in the absence of a clear injury. Maladaptive neuroplastic changes—essentially, the brain\'s ability to rewire itself—play a critical role in this dysfunction (3).

Factors like stress, trauma, or prolonged pain exposure can \"train\" the nervous system to remain in a heightened state of alertness, interpreting even benign stimuli as painful. Traditional treatments, such as anti-inflammatory medications, may prove ineffective as they target physical damage while drugs usually use for neuropathic pain may have unpredictable efficacy and huge side effects. Rehabilitation methods that

incorporate physical therapy, cognitive behavioral therapy, and lifestyle changes like stress management and mindfulness have shown promise in reversing maladaptive central nervous system plasticity. Nociplatic pain challenges rehabilitation providers and patients alike to move beyond conventional paradigms and embrace a broader understanding of pain\'s multifaceted nature.

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INVITED SPEAKERS

SPORT MEDICINE

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KNEE ARTICULAR CARTILAGE REPAIR AND RESTORATION TECHNIQUES IN ATHLETES: A REVIEW

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Articular cartilage injuries are common among athletes, with a prevalence of 36-38% in high-level competitors. These lesions present unique challenges due to cartilage's limited healing capacity and the high demands placed on repair tissue by athletic activities. From an orthopaedic perspective, successful treatment must not only address pain and function but also facilitate return to sport (RTS) at pre-injury levels. This review examines current cartilage repair techniques and their outcomes in athletic populations. Bone marrow stimulation Bone marrow stimulation techniques such as microfractures involve creating small holes in the subchondral bone to stimulate mesenchymal stem cell migration and fibrocartilage formation.

This technique is commonly used for smaller defects (<2 cm^2) in athletes due to its minimal invasiveness and relatively quick recovery time. Athletic outcomes after microfracture show: RTS rates of 75-83% among professional athletes; Return to pre-injury level in 25-75% of cases; Average time to RTS of 7-9 months While microfracture allows quicker return, long-term outcomes often deteriorate after 5 years, with basketball players showing significant reduction in games played in the first season post-surgery. Autologous Chondrocyte Implantation (ACI) and Matrix-induced ACI (MACI) ACI is a two-stage procedure involving chondrocyte harvest, laboratory expansion, and reimplantation beneath a periosteal or collagen cover. MACI utilizes a collagen membrane seeded with chondrocytes. Engineered Nasal Chondrocyte Transplantation (Nose2Knee) is the novel tissue engineering approach utilizes autologous nasal septum chondrocytes. The technique addresses limitations of traditional autologous chondrocyte implantation (ACI) by using cells with superior regenerative capacity and minimal donor site morbidity.

Athletic outcomes include: 67-84% RTS rates; 64% return to pre-injury level; Average RTS time of 11-18 months; More durable long-term outcomes than microfracture27 Osteochondral Autograft Transplantation (OAT) OAT involves harvesting osteochondral plugs from non-weight-bearing areas and transplanting them to the defect site. This technique preserves hyaline cartilage structure. Athletic outcomes following OAT: Highest RTS rate among all techniques (89%); Fastest average return time (6.6 months); Significantly more "excellent or good" results compared to microfracture3; Limited by defect size due to donor site morbidity Osteochondral Allograft Transplantation (OCA) OCA uses cadaveric donor tissue to replace large osteochondral defects, offering the advantage of addressing sizeable lesions without donor site morbidity. Athletic outcomes after OCA: 75-88% RTS rates; 67-79% return to pre-injury competitive level; Average return time of 16 months; 77% adjusted RTS rate when considering athletes who believed they could return if they hadn't graduated from sports programs Treatment Selection Considerations Several factors influence treatment selection and

outcomes: 1. Defect size: Microfracture for small lesions (<2 cm²), ACI/MACI for medium lesions, OCA for large defects 2. Athletic level: Professional and elite athletes demonstrate higher RTS rates than recreational athletes 3. Sport type: Basketball players show lower RTS rates than soccer or football players 4. Age: Younger athletes have better outcomes across all techniques 5. Timing: Early intervention (<12 months from injury) correlates with improved RTS rates Conclusion Cartilage restoration techniques in athletes must balance durability with return-to-play timelines. Treatment selection should be individualized based on defect characteristics, athlete's competitive timeline, and long-term career considerations.

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PREVENTION OF OVERUSE INJURIES THROUGH THE EARLY DETECTION OF KINEMATIC ALTERATION: THE ROLE OF MOVEMENT ANALYSIS

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Overuse injuries represent a critical event in both athletic and general populations. These conditions typically develop gradually, resulting from the cumulative effects of repetitive mechanical stress exceeding the tissue capacity of self-repairing. In particular, tendons, cartilage or ligaments, that cause a pain affecting the athletical gesture. Given their insidious onset, effective prevention requires early identification of biomechanical alterations, that represent a risk factor for articular pain.1 Altered kinematics, such as joint misalignment, segmental coordination deficits, or delayed neuromuscular activation, can precede clinical symptoms by weeks or even months. These patterns often reflect modifiable risk factors, including muscle imbalance, previous injury, or suboptimal motor control. When detected early, it is possible to plan a personalized preventive intervention. 2 Modern movement analysis technologies, including inertial measurement units (IMUs), 3D motion capture, surface electromyography (sEMG), and markerless video-based systems, now provide objective, quantitative insight into movement patterns during real-life and sport-specific tasks. These tools allow clinicians to carry out a detailed analysis of the segmental movement, to identify deviations from normative data that may predispose individuals to chronic musculoskeletal conditions.3

For example, a delay in neuromuscular activation of the knee stabilized muscles could raise the risk of ACL injuries in footballer. Similarly, altered scapulothoracic rhythm and shoulder joint kinematics are recognized as risk factors for rotator cuff tendinopathies and subacromial impingement in overhead athletes. Moreover, in padel, the correct execution of the strokes could represent a risk factor of shoulder pain.1,4 The aim of the movement analysis goes beyond identifying risk, enabling the design of targeted preventive interventions. In particular, it is possible to plan exercise to improve the muscular activation or the articular movement to avoid the mechanical overload of the joint. Moreover, it is possible to monitor the progress of the athlete through the rehabilitation, verifying the efficacy of the treatment. In particular, wearable instruments allow for on-field monitoring of athletes performance, providing immediate feedback to the medical staff. 5,6 However, clinicians must contextualize kinematic deviations within a broader clinical framework. Some movement patterns may be compensatory rather than causative, and their interpretation requires consideration of anatomical, functional, and training-related variables. Thus, movement analysis should be integrated with clinical examination, and patient history to support multifactorial injury prevention models. In conclusion, the early detection of kinematic alterations could lower the risk of injuries, detecting the pre-clinical risk factors, to tailor a preventive program.

Keywords: sport rehabilitation; overuse injuries; prevention

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PRP THERAPY: CONTRAINDICATIONS AND POST-INJECTION REHABILITATION STRATEGIES

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Platelet-rich plasma (PRP) injections are increasingly used in the treatment of musculoskeletal disorders. While their efficacy and safety are generally recognized, specific contraindications and the importance of post-injection rehabilitation remain underappreciated. This presentation provides a synthesis of two recent consensus statements from the International Research Group on Platelet Injections (GRIIP, Groupe de Recherche International sur les Injections de Plaquettes), addressing contraindications in the presence of comorbidities and outlining evidence-based post-injection rehabilitation strategies. A formal international consensus involving 31 experts was conducted to assess indications and contraindications of PRP in patients with infectious, oncologic, and hematologic conditions. Twenty-three recommendations and four overarching principles were developed. These highlighted that while PRP is safe in many contexts, it should be avoided in patients with active infections (viral, bacterial, or dental), active or uncontrolled cancers, and untreated hematologic conditions. Specific conditions under which PRP is permissible include well-controlled HIV (CD4 >350/mm³ and undetectable viral load), inactive hepatitis B/C, cancer in remission, and stable monoclonal gammopathies. The consensus emphasized individualized benefit–risk assessment, informed patient consent, and coordination with specialists (e.g., oncologists or infectiologists) when relevant. Concurrently, a separate Delphi consensus by GRIIP experts addressed post-injection rehabilitation in chronic tendinopathies. The rehabilitation process was structured around three phases: immediate post-procedure care, progressive tendon loading, and return to activity/sports. Key recommendations included avoiding NSAIDs during the early inflammatory phase due to their interference with platelet activation, initiating tendon loading (5–10 days post-injection), and integrating sub-painful isometric, concentric, and eccentric exercises. Final rehabilitation should focus on patient-specific functional demands (sport or occupation). A second PRP injection may be considered only after 3 months in case of partial improvement. Imaging was not deemed necessary for return-to-play decisions, which should be based on clinical evaluation and functional scores (e.g., VISA). Despite a lack of high-level evidence, these expert-based guidelines provide a framework to improve patient outcomes and reduce heterogeneity in PRP practices. Together, they reinforce that optimal results from PRP injections rely not only on proper indication and biological product, but also on avoiding inappropriate use in high-risk populations and ensuring structured post-injection care.

Keywords: platelet-rich plasma, PRP, tendinopathy, contraindications, rehabilitation

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NEW ADVANCEMENT IN PHYSICAL AGENT MODALITIES IN SPORT INJURY MANAGEMENT

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Introduction: From a rehabilitation perspective, various approaches and strategies might be applied to help athletes overcome injury, including physical agent modalities (PAMs) with conventional physical therapy in the management of muscle recovery facilitating effective coordination in the healing process, providing advantages across different types of muscle injuries. Nevertheless, despite their widespread practice, there is a lack of solid bibliographic evidence to conclusively confirm their efficacy.

Therefore, this systematic review aimed to analyze the existing evidence regarding the clinical effectiveness of PAMs in pain management of sports-related injuries of athletes. Methods: PubMed, Scopus, and Web of Science were systematically searched from inception until May 8th, 2024. The papers were considered eligible for review in compliance with the conditions determined by the following PICO model: P) Participants: injured athletes; I) Intervention: magnetic therapy, TENS, lasertherapy, ultrasound therapy, diathermy, and extracorporeal shockwave therapy (ESWT); C) Comparator: NA; O) Outcome measure: any pain assessment. Results: Study selection reported a total of 785 records. After eliminating duplicates, we screened 484 articles. A thorough review of titles and abstracts led to the exclusion of 433 papers, leaving 51 articles for detailed eligibility assessment. Ultimately, 21 studies met our inclusion criteria, involving a total of 806 participants. These studies explored a variety of therapeutic PAMs for musculoskeletal conditions. Ten studies investigated ESWT, a non- invasive, safe, and highly effective treatment for various musculoskeletal issues, particularly when conventional methods prove insufficient; thus, conditions effectively treated include calcific tendinopathy of the shoulder, lateral epicondylitis, greater trochanteric pain syndrome, plantar fasciitis, and delayed bone healing. (1) Qu et al. (2) compared cold-water immersion, contrast-water therapy, and whole-body cryotherapy for post-exercise muscle damage in runners; in this, scenario whole-body cryotherapy emerged, as the most effective method for reducing muscle soreness.

Additionally, a pilot randomized controlled trial explored the combined use of cryotherapy and ultrasound alongside standard care to accelerate recovery from ankle sprains in football players. (3) Two randomized controlled trials (RCTs) demonstrated diathermy's superiority over ultrasound therapy in alleviating pain and improving patient satisfaction among athletes with chronic tendinopathies. (4) Regarding Neuromuscular Electrical Stimulation (NMES), Basas et al. (5) founded that combining NMES with eccentric and concentric exercises significantly reduced pain in athletes with patellar tendinopathy, with benefits sustained during long-term follow-up. Moreover, Transcutaneous Electrical Nerve Stimulation (TENS) applied directly to the painful area resulted in notable reductions in pain intensity during and immediately after treatment. Lastly, emerging

evidence suggested laser therapy's effectiveness in managing acute pain and its potential as an adjunct therapy alongside physical therapy, improving performance and facilitating faster return to sport (RTS). (6) Conclusion: Taken together, the findings of this systematic review suggested that physical agents might be effective for pain management in sport-related injuries of athletes. Among the various PAMs analyzed, this systematic review highlights the role of ESWT in the treatment of subacute or chronic injuries in athletes, such as tendinopathies. On the other side, Cryoultrasound, HILT, and Diathermy might be used for the treatment of acute phase of injuries, such as muscle injuries or ankle sprain.

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INVITED SPEAKERS

NUTRITIONAL SUPPORT IN PRM SETTINGS

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REHABILITATION AND NUTRITIONAL INTERVENTION IN PATIENTS ON CHRONIC HEMODIALYSIS

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Given the growing number of patients on chronic hemodialysis who suffer from sarcopenia, the concept of renal rehabilitation has become an increasingly common subject of research in recent years. In dialysis patients, there is more severe deterioration of muscles compared to patients in the 4th stage of chronic kidney disease (1).

The prevalence of sarcopenia is also significantly higher in hemodialysis (HD) patients, and it varies from 9.5 - 37.1% (2,3). Rehabilitation is defined by the World Health Organisation as "a set of interventions designed to optimize functioning and reduce disability in individuals with health conditions in interaction with their environment". Renal rehabilitation was defined as "a long-term comprehensive program consisting of exercise therapy, diet therapy and water management, drug therapy, education, psychological/mental support, etc., to alleviate physical/mental effects based on kidney disease and dialysis therapy, prolong the life expectancy, and improve psychosocial and occupational circumstances". Therefore it is a multidisciplinary and comprehensive concept led by nephrologists, rehabilitation specialists and nutritionists, also supported by nurses and physiotherapists. In 2018. Japanese Society for Renal Rehabilitation (JSRR) established clinical practice guidelines for renal rehabilitation (4).

A scoping review by Lambert et al. from 2022. processed 19 publications regarding exercise and physical activity guidelines. They concluded that there is a lot of publication recommendations on aerobic exercise, progressive resistance training and flexibility, bust mostly without explicit guidance, with inconsistency in exercise definitions as well as recommendations for frequency, intensity, type of exercise, timing, progression of effort, and safety aspects of exercise (5). Very important aspect of renal rehabilitation is adequate nutrient intervention. Chronic HD patients often tend to have skeletal muscle atrophy caused by chronic inflammation, insufficient nutritional intake, catabolic effects of dialysis therapy, hormonal abnormalities of anabolic hormones (e.g., testosterone, growth hormone, insulin-like growth factor-1), catabolic hormones (e.g., cortisol), or thyroid hormone, metabolic acidosis, and comorbidities (6). Furthermore, it is known that during the dialysis session, there is a 6–13 g amino acid loss. Therefore, it is usually suggested to ingest 1.0 to 1.2 g/kg/day of protein, which is 1.2 times higher than general recommendations for healthy individuals. In order to to obtain muscle mass, it is important to provide adequate daily energy intake, because one dialysis session with duration of 4h, causes energy leak of approximately 300 kcal.

Guided by that, the estimated energy intake should state 30–35 kcal/kg/day. It is important to emphasize sufficient intake of vitamin D and iron in order to prevent muscle protein catabolism (7). Considering the severe chronic condition of

patients on HD, the aforementioned renal rehabilitation interventions are of great importance in improving the quality of life and reducing the mortality of patients on chronic HD.

Keywords: renal rehabilitation, hemodialysis, nutrition, exercises, sarcopenia

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ENDOCRINOLOGY CONSULT IN THE PERIOPERATIVE REHABILITATION PERIOD

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Abstract Perioperative rehabilitation is a crucial phase in patient recovery that often involves multidisciplinary care. Endocrine disorders such as diabetes, obesity, sarcopenia, adrenal insufficiency, thyroid dysfunction, and disorders of bone metabolism can significantly affect perioperative outcomes. Timely consultations with endocrinologists during this period allow for effective patient risk assessment, optimization of metabolic control, and tailored rehabilitation planning. This review discusses the role of endocrinology in perioperative rehabilitation, focusing on common endocrine issues, their implications, and recommended management strategies. Introduction The perioperative period consists of preoperative preparation, intraoperative care, and postoperative recovery, with rehabilitation being crucial for improving outcomes (1). Endocrine disorders are common among surgical patients and can complicate recovery. Endocrinologists are vital for managing metabolic and hormonal imbalances that may hinder recovery.

Diabetes Mellitus and Glycemic Control Diabetes is prevalent among surgical patients, and hyperglycemia can lead to poor wound healing, infections, and prolonged hospital stays, while aggressive glucose control may induce hypoglycemia. Endocrinology consultations help establish individual glycemic targets and optimize insulin regimens, especially during recovery transitions. The use of new technologies can help in individualized therapy (2). Obesity and Sarcopenia Obesity increases the risk of surgical complications, and collaboration with endocrinologists is essential for metabolic evaluation and nutritional planning. Sarcopenia affects rehabilitation, particularly in the elderly and those with chronic illnesses (3). Endocrinologists can evaluate contributing factors for targeted interventions, especially in the case of sarcopenic obesity.

Thyroid Dysfunction and Surgical Recovery Both hypothyroidism and hyperthyroidism can complicate recovery, leading to delayed wound healing or cardiovascular risks. Managing thyroid function before surgery is ideal, but addressing any dysfunction during the perioperative period is crucial (4). Adrenal Insufficiency and Steroid Replacement Adrenal insufficiency poses serious risks due to impaired stress response. Patients with this condition or chronic steroid users often require stress-dose corticosteroids during surgery. Endocrinologists ensure proper steroid identification and dosing while monitoring for complications (5). Pituitary Disorders Patients with pituitary disorders may face complex hormonal imbalances that require careful management, especially during surgery or stress. Prompt evaluation and treatment adjustments from endocrinologists are necessary (6). Calcium Homeostasis and Bone Health Postoperative hypocalcemia can hinder rehabilitation, especially after neck surgeries. Endocrinologists are vital for managing calcium metabolism and electrolyte stability during recovery (7). Conclusion Incorporating endocrinology into perioperative care enhances outcomes

by managing hormonal and metabolic issues. Early consultation allows for tailored treatment plans, preventing complications and speeding recovery. Interdisciplinary collaboration is essential for achieving optimal results.

Keywords: Perioperative period, Outcomes, Endocrine disorders, Consult

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NEURONUTRITION PROVIDES ADDITIONAL STRENGTH IN NEUROREHABILITATION

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Nutritional support has emerged as a critical component in neurorehabilitation, with extensive research demonstrating its fundamental role in optimizing patient outcomes and recovery processes across various neurological conditions. Malnutrition affects approximately 42% of patients with moderate to severe acquired brain injury upon admission to neurorehabilitation facilities, contributing to longer hospital stays, increased complications, and elevated morbidity and mortality rates. The metabolic changes following neurological injury, including hypermetabolism and hypercatabolism, create unique challenges that predispose patients to malnutrition if nutritional support is not initiated early. Research evidence strongly supports targeted nutritional interventions, with protein supplementation studies showing significant enhancements in neurological recovery - a randomized controlled trial of 42 ischemic stroke patients demonstrated that 21 days of hyperproteic nutritional formula (10% protein) resulted in greater improvement in NIH Stroke Scale scores compared to controls. Omega-3 polyunsaturated fatty acid supplementation has shown remarkable neuroprotective effects, with experimental research demonstrating that mice fed omega-3 PUFA-enriched diets for two months exhibited attenuated behavioral deficits following controlled cortical impact, protection against hippocampal neuronal loss, reduced pro-inflammatory responses, and maintained nerve fiber conductivity. The timing of nutritional intervention proves crucial, with very early feeding (within 6 hours) resulting in significantly shorter ICU stays compared to delayed feeding - analysis of 9,210 critically ill trauma patients showed 7.82 days versus 17.55 days for late feeding beyond 48 hours.

Comprehensive nutritional interventions have demonstrated multifaceted benefits, with individualized nutritional management in 454 stroke patients showing independent associations with improved skeletal muscle mass, motor function, dysphagia management, and shortened length of stay when implementing high-calorie, high-protein diets for malnourished patients and calorie-restricted appropriate protein diets for obese patients. Specialized dietary approaches including ketogenic diets have shown promise in neurological recovery through neuroprotective effects via improved mitochondrial function, while Mediterranean diet adherence has been associated with improved cognitive function and reduced risk of cognitive decline and dementia.

Micronutrient supplementation, particularly vitamin D for neuroprotective effects and B vitamins for myelin sheath production and neural function improvement, plays essential roles in supporting neurological recovery. The field is advancing toward personalized nutritional approaches through neuronutrition, considering individual responses to nutritional therapy based on factors like severity of deficiency, underlying medical conditions, and genetic variations. Effective implementation requires comprehensive nutritional assessment using validated tools like the Mini Nutritional Assessment-Short

Form (MNA-SF) and Global Leadership Initiative on Malnutrition (GLIM) criteria, combined with multidisciplinary team coordination involving dietitians, neurologists, physiotherapists, and speech therapists working collaboratively to ensure nutritional interventions align with overall rehabilitation goals and address the complex metabolic and recovery needs of neurological patients.

Keywords: Neuronutrition, Protein supplementation, Neurorehabilitation, Stroke, Dementia

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MEDITERRANEAN DIET AND QUALITY OF LIFE IN RHEUMATOID ARTHRITIS PATIENTS

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Rheumatoid arthritis (RA) is a chronic inflammatory disease associated with various comorbidities and systemic manifestations. RA is the most common type of autoimmune arthritis, affecting 0.5-1% of the adult population worldwide. While the primary line of treatment for RA includes pharmacological therapies, people living with the condition often seek non-pharmacological therapies such as diet and exercise in an attempt to attenuate their symptoms. Nutrition plays a crucial role in managing RA symptoms, and the Mediterranean diet (MeD) has been suggested to have potential benefits. The MeD includes a variety of fruits, vegetables, whole grains, nuts, seeds, legumes, olive oil, and fish. It also includes moderate dairy (yogurt and cheese) and low amounts of red and processed meats and sweets. The MeD contains anti-inflammatory compounds in olive oil (like oleic acid and hydroxytyrosol), fruits, vegetables, and fish.

These compounds can help mitigate the inflammatory processes associated with RA. Furthermore, several studies indicate that the MeD can improve physical function in RA patients by reducing pain and stiffness and increasing overall mobility. Nevertheless, by potentially reducing pain and improving physical function, the MeD may contribute to an overall improvement in the quality of life for individuals with RA. Studies suggest increased adherence to a MeD can reduce disease activity and pain and improve physical function and vitality. RA patients are at increased risk of cardiovascular disease, and the MeD has been associated with a reduced risk of cardiovascular disease, which is an added benefit for this population. Maintaining a healthy weight is crucial for RA patients, as excess weight can put additional strain on the joints.

The MeD, typically high in fiber and low in processed foods, can support healthy weight management, reduce the joint burden, and improve the quality of life in these patients. Several studies, including randomized controlled trials, have shown promising results regarding the effectiveness of the MeD in managing RA symptoms and improving patient outcomes. Recent evidence suggests that dietary interventions, particularly Mediterranean diets, may synergistically enhance the therapeutic effects of conventional pharmacological treatments such as NSAIDs and DMARDs in RA management. Adherence to a MeD may positively influence inflammatory markers and gut microbiota composition, potentially augmenting the efficacy of pharmacologic agents and improving overall patient outcomes. RA patients can benefit from the MeD in terms of both disease activity and disease-related complications. Due to its anti-inflammatory and antioxidant effects and its role in maintaining body weight, the MD could be a helpful adjunct in treating RA. Therefore, integrating targeted nutritional strategies alongside standard drug therapy may offer a more comprehensive approach to controlling RA progression and symptoms. In summary, the Mediterranean diet,

emphasizing anti-inflammatory foods and healthy fats, has shown potential benefits for RA patients by reducing inflammation, improving physical function, and enhancing overall quality of life.

Keywords: Nutrition, Mediterranean, diet, Rheumatoid, Arthritis

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INVITED SPEAKERS

POSTOPERATIVE REHABILITATION

ACUTE MEDICAL REHABILITATION; AN INTRODUCTION

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Acute Medical Rehabilitation (AMR) can be defined as the intervention by a specialist (and his team) in Physical and Rehabilitation Medicine (PMR) starting in the first hours or days after an injury, operation, or acute illness. It is a multidisciplinary effort involving intensive cooperation and interaction with other medical specialists. In this introduction, the "Ten Commandments of AMR" will be presented and illustrated with examples. Prevention of complications is the key factor in AMR. The most common complications will be discussed. Early mobilisation is a risky but necessary intervention.

Other medical doctors may not always consider an early start of rehabilitation interventions necessary. Nevertheless, it is one of the main factors contributing to a better long-term outcome. PRM specialists have to be not only visible in the acute hospital, but they also need to be available daily for early consultation. Other professionals involved in the acute phase need to be educated in the principles of AMR. This will contribute to a better and more efficient cooperation between specialists in the acute phase. Patients and their relatives require information about current and future options and the patient's long-term functioning. A PRM specialist can best provide a functional prognosis. Following the acute phase, the patient needs post-acute rehabilitation, and the PRM physician is responsible for deciding with the patient about the next step. A PRM specialist can best undertake the discharge and transfer to a post-acute facility because he is aware of the patient's needs and potential and knows what can be offered in the post-acute facility. The last commandment is that we need to develop strategies for rehabilitation, for instance. before major surgeries, elective amputations and organ transplantations.

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EARLY REHABILITATION AFTER WAR TRAUMA AND OPERATION. ISRAELI EXPERIENCE

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Advancements in rehabilitation medicine are closely intertwined with the impact of war. While life-saving techniques have made survival possible for many grievously wounded individuals, this marks just the initial step on the long journey to recovery. In the context of disasters or war, integrating Physical and Rehabilitation Medicine (PRM) professionals into multidisciplinary medical teams, even during the acute phase of patient care, has become crucial. Delivering a comprehensive rehabilitation program in acute medical settings can be done by Mobile Rehabilitation Team (MRT) model, or through early admission to PRM departments within acute general hospitals. On October 7th, 2023, Soroka Medical Center became the focal point of a mass casualty event, with hundreds injured by various wartime mechanisms.

Both models were immediately accepted, including opening a new department for war victims and initiating the MRT in acute departments. The MRT activity model comprised several key stages: 1. Proactive review by a senior PRM doctor from Soroka's rehabilitation department for each new war victim, admitted to Soroka the next day after admission; 2. Primary assessment to determine the need for involvement of other PRM team members, identify rehabilitation requirements post-acute care, and prepare for future transfers to appropriate rehabilitation settings; 3. Provision of specific PRM treatments by team members; 4. Case presentation and discussion of pertinent PRM aspects with department staff at each management stage; 5. Patient consultations providing recommendations and explanations regarding functional aspects of their injuries; 6. Family consultations outlining future rehabilitation plans and functional prognosis. Over the 6-month conflict period, 496 war victims admitted to the Soroka Medical Center were assessed by a PRM doctor within days of hospitalization, with a total of approximately 3000 follow-up visits. Patients hospitalized on October 7th and 8th, 2024, prior to the initiation of MRT activity (298 patients), primarily suffered gunshot wounds (78%) and exhibited higher severity of injuries: mild/moderate/severe/devastating – 44/31/16/9 (%). Comparatively, victims admitted after October 8th, 2024 (456 patients), were predominantly injured by explosions (67.54%) and displayed similar severity indices: 61/17/9/13 (%). Despite the greater severity of injuries in the first group, only 8% were transferred to the rehabilitation department. In contrast, with the active involvement of PRM doctors and the implementation of MRT, this transfer rate increased to 28% in the second group.

During 6 months of conflict, the rehabilitation department admitted 86 wounded patients. Upon admission, the average FIM score was 92, which increased significantly to an average discharge score of 117, resulting in an average ΔFIM of 25. Patients suffering from blast injuries and multiple shrapnel wounds were transferred to the rehabilitation department within an average of 5.6±4.7 days after admission to the Medical Center.

The average length of stay (LOS) was 40.83 days. Patients received continuous care from colleagues in acute medical departments. For instance, 23 patients (19.5%) underwent surgical procedures, with one patient requiring 4 surgical interventions during their rehabilitation period. Both MRT model and early admission to inpatient rehabilitation departments within acute general hospitals can be appropriate.

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REHABILITATION AND HEALING PROCESS AFTER ANTERIOR CRUCIATE LIGAMENT RECONSTRUCTION

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Anterior cruciate ligament (ACL) reconstruction is one of the most frequently performed orthopedic procedures, especially in athletic and active populations. The primary goal is to restore knee joint stability and function following ligament rupture. While surgical technique is critical, long-term success is equally determined by the biological healing of the graft and an individualized, evidence-based rehabilitation protocol. Autologous grafts: hamstring tendons (HS), bone–patellar tendon–bone (BTB), and quadriceps tendon (QT) are the most commonly used options.

Each has distinct mechanical and biological profiles. BTB grafts allow for faster bone-to-bone healing but are linked to anterior knee pain and patellar complications. HS grafts cause less donor site morbidity, though tendon-to-bone healing is slower and may affect early joint stability. QT grafts provide a large graft diameter and good tensile strength but may compromise quadriceps function if harvested improperly. Recent research has emphasized that graft selection should not be generic, but rather patient-specific. Graft diameter, fixation method, tissue quality, and individual patient characteristics, such as age, sex, body mass index (BMI), and level of physical activity, all influence the integration and long-term function of the graft. However, some large registry studies and retrospective analyses suggest that graft size and BMI may not independently predict revision risk or patient-reported outcomes, particularly when adjusting for confounding variables. These findings highlight the complexity of optimizing graft selection. Biological graft incorporation progresses through phases of avascular necrosis, revascularization, cellular repopulation, and collagen remodeling. Histological studies confirm that even after 12 months, grafts retain key differences from the native ACL in structure and function.

This underlines the need for cautious, criteria-based rehabilitation rather than strictly time-based protocols. Rehabilitation typically follows five overlapping phases: acute (0–2 weeks), early rehabilitation (2–6 weeks), intermediate strengthening (6–12 weeks), advanced neuromuscular training (3–6 months), and return-to-activity (6–12+ months). Progression through these phases should be guided by objective criteria such as limb symmetry indices, hop tests, strength testing, and proprioceptive assessments, as these correlate with reinjury risk and functional performance. Adjunctive interventions, such as neuromuscular electrical stimulation (NMES), blood flow restriction (BFR) training, and motion analysis are increasingly used to optimize muscle activation and refine movement patterns. In elite athletes, return-to-play decisions now often include motion capture and force plate diagnostics to detect subtle asymmetries. Another essential but sometimes overlooked component is psychological readiness. Tools like the ACL-Return to Sport after Injury (ACL-RSI) scale help clinicians assess fear of reinjury, confidence, and motivation, factors strongly linked to successful return to

sport. To overcome limitations of traditional grafts, novel graft sources are being explored to better replicate native ACL function while reducing donor site morbidity. Early experimental data, including on lesser-utilized autografts such as the plantaris tendon, have demonstrated promising biomechanical potential. However, additional clinical and biomechanical studies are necessary before these grafts can be routinely recommended. In conclusion, optimizing outcomes after ACL reconstruction requires an integrated understanding of graft biology, patient-specific factors, and functional progression. A personalized approach to graft selection and rehabilitation, combined with objective metrics, psychological support, and interdisciplinary collaboration, is central to improving long-term function and reducing reinjury rates. As research in biologics, wearables, and predictive modeling advances, the future of ACL care will likely become increasingly individualized and data-driven.

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PRINCIPLES AND PRACTICE OF PRESURGICAL REHABILITATION IN THE COMMUNITY.

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Introduction: Preoperative rehabilitation is an essential component of joint replacement surgery preparation, aiming to improve patient outcomes and reduce postoperative complications. A study conducted in Boston demonstrated that patients undergoing a six-week prehabilitation program—including aquatic and land-based strength training, aerobic, and flexibility exercises—reduced their need for inpatient rehabilitation by 73%. Patients awaiting surgery often experience pain, joint stiffness, muscle weakness, balance problems, and psychological concerns. Prehabilitation addresses these issues by focusing on six key areas: strength, range of motion, joint stability, flexibility, balance, and cardiovascular fitness. Additionally, patients are trained to use assistive devices and adapt to postoperative mobility restrictions.

A structured prehabilitation program typically includes a multidisciplinary approach involving physiotherapists, occupational therapists, and social workers. Patients undergo motor and functional assessments, receive personalized treatment plans, and participate in a two-week group training program, supplemented with individual sessions as needed. This preparation enhances physical and functional readiness while also providing psychological support.

Results Postoperative rehabilitation begins immediately after surgery and aims to facilitate pain management, wound care, functional independence, and mobility restoration. A study of 29 patients (mean age 72±10 years) undergoing total knee or hip replacement showed that after an average hospital stay of 5.7±2.0 days, home-based rehabilitation commenced within 2.0±1.5 days and lasted 32.7±8.2 days. Patients received physiotherapy (11.4±3.8 sessions), nursing care (1-2 visits), and occasional occupational therapy and social work support. Functional assessments demonstrated significant improvements, with Functional Independence Measure (FIM) scores increasing from 103.0±5.3 to 117.7±5.5 and Timed Up and Go (TUAG) test times reducing from 54.4±19.1 seconds to 28.7±14.0 seconds, indicating enhanced mobility and independence. A follow-up study of 38 patients (mean age 73±12 years) undergoing total knee replacement, total hip replacement, or hip fracture surgery confirmed the prolonged benefits of home-based rehabilitation. Patients participated in a 34.0±9.4-day program, receiving physiotherapy (12.4±5.2 sessions), nursing care (1.9±0.7 visits), and occupational therapy as needed. A post-discharge telephone survey conducted approximately 114.5±51.4 days later revealed high patient satisfaction (8.8±2.0 on a 10-point scale), well-preserved walking ability (4.7±1.2 on a 6-point scale), and moderate success in stair climbing (3.0±0.9 on a 4-point scale). Most patients reported partial preservation of their preoperative motor abilities (1.9±0.8 on a 3-point scale). Conclusions These findings highlight the effectiveness of structured

pre- and postoperative rehabilitation in improving functional outcomes, promoting independence, and reducing the need for prolonged inpatient care. Home-based rehabilitation programs, in particular, demonstrate prolonged benefits, reinforcing the importance of integrating prehabilitation into the standard care pathway for joint replacement patients.

INVITED SPEAKERS

MUSCULOSKELETAL REHABILITATION

DIAGNOSTIC CHALLENGES IN INFLAMMATORY BACK PAIN /AXIAL SPONDYLOARTHRITIS

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Low-back pain (LBP) is the single leading cause of disability worldwide and the condition for which the greatest number of people may benefit from rehabilitation. LBP may be classified as specific, where pain can be explained by tissue damage, an underlying disease, or may be referred from other organs, or non-specific, where pathology or tissue damage cannot confidently account for the experience of pain, but is usually of „mechanical" origin. The latter is the most common type of LBP (about 90% of cases). Inflammatory back pain (IBP) is associated with inflammatory conditions, like chronic inflammatory rheumatic diseases, in the first place, spondyloarthritides (SpA). Several key features help differentiate IBP from other causes of back pain. It is a chronic pain, with insidious onset in a younger age, localized on the axial, particularly the lumbar spine, with additional alternating buttock pain from one side to another. Also, it improves with exercise, with no improvement with rest, nocturnal pain may awaken the patient, and is associated with prolonged morning stiffness. IBP can be defined according to various criteria, combining features of IBP, whose sensitivity ranges from 70.0 to 89.9% and specificity from 52.2 to 81.4%. The latest and most frequently used in clinical trials is one developed by Assessment for Spondyloarthritis Group (ASAS). SpA defines a group of closely related conditions, with several common etiopathogenetic, serological, clinical, and imaging features.

According to their predominant presentation, SpA can be axial (axSpA) or peripheral (pSpA). Furthermore, axSpA may be either radiographic (interchangeable term with ankylosing spondylitis, AS), with definitive radiographic damage on sacroiliac joints or non-radiographic axSpA (nr-axSpA), with changes visible only on MRI. Patients with axSpA also have some extra-musculoskeletal manifestations that can help in establishing diagnosis, but they also represent an additional burden for the patients, regarding higher disease activity and functional impairment. Diagnosis of axSpA can be complex and is often missed or delayed. Systematic review and meta-analysis of diagnostic delay in axSpA showed that the mean delay to diagnosis was 6.7 years overall (95% CI 6.2 to 7.2, I2 99%). ASAS produced classification criteria for axSpA, with entry criteria of having chronic back pain and age at onset less than 45 years, and thereafter two arms: imaging arm (sacroiliitis on standard radiograms or MRI plus at least one of the SpA features) or clinical arm (positive HLA B27 plus 2 or more of SpA features). ASAS classification criteria may be used as a guide to identify features associated with axSpA in clinical practice. Still, they should not be used for diagnostic purposes, as they have specific limitations that affect their utility when used incorrectly as diagnostic criteria. There are several referral strategies that include IBP for early diagnosis of axSpA. In the European study, the distinctive impact of IBP is most pronounced in the referral of patients by GP to a rheumatologist, while the diagnostic value of the criteria for IBP

in rheumatologist practice has very low specificity and positive likelihood ratio. ASAS accepted a modified Berlin algorithm for diagnosing axSpA, with IBP being one of the SpA features. Recently, it was confirmed to be the preferred strategy with the best sensitivity and specificity in diagnosing axSpA in patients with undiagnosed chronic low back pain. In conclusion, differentiating the etiopathogenesis of low back pain is crucial for diagnostic and therapeutic procedures. IBP is one of the main features of axSpA. Recognition of IBP is particularly important for referring patients to a rheumatologist. Early recognition of characteristic symptoms and signs, and thus the diagnosis of axSpA, results in timely and appropriate treatment and ultimately better outcomes.

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GUIDELINES FOR THE MANAGEMENT AND THE ROLE OF THE PRM SPECIALIST IN SPONDYLOARTHRITIS

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Abstract Spondyloarthritis (SpA) represents a group of chronic inflammatory diseases primarily affecting the axial skeleton, peripheral joints, and entheses. Early diagnosis and interdisciplinary management are essential for improving patient outcomes. Physical and Rehabilitation Medicine (PRM) specialists play a pivotal role in non-pharmacological and functional management strategies. This paper provides an overview of current management guidelines for SpA and emphasizes the multifaceted role of PRM specialists in assessment, rehabilitation, patient education, and long-term follow-up. Spondyloarthritis (SpA) encompasses a spectrum of inflammatory rheumatic diseases, including ankylosing spondylitis, psoriatic arthritis, reactive arthritis, and enteropathic arthritis. These conditions share clinical, radiologic, and genetic features, such as the presence of HLA-B27 and sacroiliitis. Given the progressive nature and functional impairment associated with SpA, comprehensive management that includes pharmacologic, physical, and rehabilitative interventions is critical. SpA is broadly classified into axial and peripheral types. According to ASAS (Assessment of SpondyloArthritis International Society) criteria, early diagnosis hinges on clinical presentation, imaging (MRI or X-ray), and laboratory markers.

Diagnostic delay is a known challenge; thus, PRM specialists should be vigilant in identifying early functional signs that may precede radiologic changes. Several national and international guidelines, including those by ASAS-EULAR and ACR, recommend a multidisciplinary approach (1,2). All guidelines recommend; Shared decision-making with patients. Use validated measures (e.g., ASDAS, DAPSA) to assess disease activity; Consider comorbidities when selecting therapies; Aim for remission or low disease activity (treat-to-target). Some key points about the guidelines for the management can be described as follows: Pharmacological Treatment (Based on EULAR Guidelines): 1. Non-Steroidal Anti-Inflammatory Drugs (NSAIDs): First-line therapy for both axial and peripheral SpA. They are recommended to be used continuously or on-demand depending on symptoms and risk profile. 2. TNF-α inhibitors and IL-17 blockers for refractory cases 3. Janus Kinase Inhibitors (JAKi) 4. DMARDs primarily for peripheral arthritis 5. Glucocorticoids: Local injections can be used for enthesitis or sacroiliitis; systemic steroids are not routinely recommended for axial SpA; Non-Pharmacological Treatment: 1. Exercise and Physical Therapy: Regular exercise improves mobility, posture and reduces pain. 2. Patient Education: Empowering patients with knowledge about self-management and lifestyle modifications. 3. Psychosocial Support: Depression and anxiety are common comorbidities. The Role of the PRM Specialist PRM is an unique specialty that combines functional assessment with using several treatments in the management of SpA PRM do not only assess pain but also uses several invasive procedures in pain management such as local injections and physical

therapy, balneotherapy. PRM also focus on range of motion, functional status, muscle strength, and posture. In addition to pharmacological treatment, PRM provides rehabilitation strategies which is individualized to the patient. The rehabilitation strategies may include: Postural training; Breathing exercises; Stretching and strengthening; Hydrotherapy and aerobic conditioning; Use of assistive devices when necessary Given the chronic nature of SpA, PRM specialists contribute to monitoring disease progression, adapting rehabilitation goals, and preventing secondary complications such as osteoporosis, spinal deformities, and cardiovascular risks. Advancements in imaging, biomarkers, and biologic therapies are changing the landscape of SpA management. PRM specialists must stay updated to integrate these innovations into holistic care plans. Tele-rehabilitation and digital health tools are emerging as valuable adjuncts. Effective management of spondyloarthritis requires a multidisciplinary approach in which PRM specialists play a central role. From early diagnosis and functional evaluation to tailored rehabilitation and long-term support, PRM intervention enhances quality of life, maintains function, and supports the overall therapeutic plan. The integration of physical and rehabilitative strategies with medical treatment is indispensable for optimal patient outcomes.

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EFFECT OF EXERCISE ON OBESITY AND CARDIOVASCULAR COMORBIDITIES IN PATIENTS WITH RHEUMATOID ARTHRITIS AND SPONDYLOARTHRITIS

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Studies show that the prevalence of obesity in rheumatoid arthritis (RA) patients is higher than in the general population (approximately 30-40% of patients with RA are obese). In patients with spondyloarthritis (SpA), up to 40% of them are obese, with varying rates depending on the specific SpA subtype. Obesity in RA and SpA patients can lead to more severe functional impairments, reduced physical quality of life and exacerbate inflammation. Furthermore, obesity may also influence the treatment response through alteration of drug metabolism and can also exacerbate comorbidities, such as cardiovascular disease (CVD) and type 2 diabetes - both more prevalent in RA and psoriatic arthritis (PsA) patients (1,2). Exercise can have a significant positive impact on managing obesity in these group of in patients, but it is important to consider the disease activity, structural damage and patient's overall general condition.

Three major areas which can be beneficial in terms of reduction of body fat include: weight management through calories burning and fat reductions (eg. low-impact exercises like swimming or cycling), reducing systemic and joint inflammation by lowering levels of pro-inflammatory cytokines, improving proprioception and muscle strength and increasing range of motion (eg. stretching, yoga, and tai chi). Study by Sobejana et al. showed that 12-week medium to high intensity exercise program was safe and improved cardiorespiratory fitness in RA patients with high risk for CVD by 14%, with stable C - reactive protein level (CRP), while withdrawals were not related to the exercise (3). Another study by Stavropoulos-Kalinoglou et al. demonstrated significant improvements in aerobic capacity, blood pressure, triglycerides and lipoprotein levels, body mass index,10-year CVD event probability, CRP level, DAS28 and HAQ in exercise group compared to control group.

The strongest predictor for the observed improvements in all the assessed CVD risk factors and disease characteristics was change in VO2max (4). Study by Thomsen et al. investigated the effects of high-intensity interval training on cycle ergometer during 11 weeks on CV factors in patients with PsA. maximal VO2, as a predictor of CV morbidity and mortality, was significantly increased after 3 and 9 months in the exercise group (+ 3.72 ml/kg/min CI 95% 2.38 to 5.06 $p < 0.001$; +3.08 ml/kg/min CI 95% 1.63 to 4.53 $p < 0.001$) compared to the control group. Truncal fat was also significantly reduced after 3 months in the exercise group although did not show sustained reduction after 9 months (− 1.28% CI 95% − 2.51 to – 0.05 $p = 0.04$) (5). Recently published systematic literature review by Ortolan et al., based on the new ASAS/EULAR recommendations for the management of axial SpA, was performed. For non-pharmacological treatment authors found a moderate or high positive impact on disease activity, function,

and pain (range in RCTs of exercise for ASDAS: 0.29–0.94, BASDAI: 0.14–1.43, BASFI: 0.04–0.92, BASMI: 0.06–1.14), although type, intensity and duration of exercises were very heterogeneous (6). Randomized study by Niedermann et al investigated the effect of 12 weeks of CV training on fitness in patients with ankylosing spondylitis (AS) (7). The fitness level (assessed with a bicycle ergometer) in the training group was significantly higher than in the control group. Improvements in cardiorespiratory fitness is important in reducing CV morbidity and mortality and an increase in VO2 peak corresponds to decrease in cardiac events in healthy population (8). In conclusion, individully tailored exercise plan to the patient's condition and capabilities, with an emphasis on low-impact activities, can help in managing obesity and CVD in RA and SpA patients. Engaging in a well-designed exercise program can significantly enhance both physical and mental well-being in these patients.

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INVITED SPEAKERS

CANCER REHABILITATION

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ULTRASOUND ASSESSMENT OF LYMPHEDEMA

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Lymphedema (LE) is a chronic, progressive disorder characterized by impaired lymphatic drainage, leading to the accumulation of protein-rich lymphatic fluid in the cutaneous and sub-cutaneous tissues. It can arise from mechanical insufficiency of the lymphatic system (as in primary or secondary LE) or dynamic overload in the presence of an otherwise intact lymphatic network. Accurate diagnosis and staging of LE are crucial for optimal medical management, as the clinical course varies from reversible edema to irreversible fibro-adipose tissue remodeling [1]. Conventional examination and anthropometric measurements remain central to diagnosis, but are limited in sensitivity and specificity - especially in early and advanced stages [2]. High-resolution ultrasound (US) has emerged as a non-invasive, accessible, cost-effective, and dynamic imaging modality that enhances the diagnostic process by providing detailed insight into the histo-anatomical patterns at each stage of LE progression [3]. In the early stage, US detects dermal edema increased thickness and decreased echogenicity of the dermo-epidermal complex, reflecting fluid accumulation in the papillary and reticular dermis. This is anatomically significant as the dermis hosts a rich superficial and deep lymphovascular plexus tangled with collagen and glycosaminoglycan-rich ground substance, which binds water and contributes to edema [4].

As LE advances, US reveals cellular infiltration, increased echogenicity, and eventually fibrotic involution, with loss of the dermo-hypodermal interface. US also facilitates the evaluation of subcutaneous tissues, detecting patterns such as dilated lymphatic collectors ("cobblestone"), lymphatic lakes, and sclero-edematous changes within adipose lobules ("snowfall"), which correlate with disease severity and influence treatment responsiveness. Moreover, US contributes to differential diagnosis, distinguishing LE from other causes of edema - such as venous insufficiency or lipedema - by revealing specific patterns of fluid distribution and tissue architecture [5]. US-guided dynamic maneuvers, like "sono-palpation" and "refill test", should be used to characterize tissue compressibility and fluid mobility, identifying non-pitting and fibrotic components which are not discernible by standard physical examination alone. Compared to other imaging modalities such as magnetic resonance imaging, US offers superior resolution of superficial structures, with real-time dynamic imaging and greater accessibility, making it particularly valuable in routine valuations [6]. In conclusion, US represents a powerful extension of the physical examination for LE, providing objective, reproducible, and detailed assessment of LE-related tissue changes. Its ability to characterize the depth, severity, and potentially the reversibility of tissue changes underscores its central role in modern LE care [7].

Keywords: Lymphedema, Ultrasound, Lymphedema-Diagnosis

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CANCER AND OSTEOPOROSIS: HOW IMPORTANT IS IT?

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Cancer and its treatments are well-established contributors to the deterioration of skeletal health, primarily through reductions in bone mineral density (BMD), ultimately resulting in osteoporosis and an elevated risk of fractures. This complication extends far beyond the musculoskeletal system, constituting a significant systemic issue that adversely affects patients' quality of life, level of independence, physical functionality, and long-term outcomes. In oncology, the preservation of bone integrity is particularly critical in patient populations with prolonged survival expectations, such as women with early-stage breast cancer and men with non-metastatic prostate cancer. In these groups, the burden of skeletal complications becomes increasingly relevant as overall cancer survival improves. Androgen deprivation therapy (ADT), a cornerstone of treatment in prostate cancer, has been widely associated with a spectrum of adverse metabolic and skeletal effects, including obesity, insulin resistance, metabolic syndrome, osteoporosis, sarcopenia, cardiovascular disease, gynecomastia, and hypogonadism. Similarly, the use of aromatase inhibitors in hormone-sensitive breast cancer significantly accelerates bone loss, particularly in postmenopausal women. Collectively, these treatment-related effects create a high-risk profile for fracture development, emphasizing the importance of early and proactive bone health management in cancer survivors. According to current ASCO guidelines, all patients with non-metastatic cancer should undergo a comprehensive assessment of clinical risk factors for osteoporotic fractures at the time of cancer diagnosis. In individuals at elevated risk, BMD should be measured promptly using dual-energy X-ray absorptiometry (DXA), and fracture probability should be further evaluated through validated tools such as the FRAX score. Risk stratification should guide clinical decision-making and allow for timely intervention.

Management of osteoporosis in cancer patients must be multifaceted. Pharmacologic therapies play a central role; bone-targeted agents such as bisphosphonates (e.g., zoledronic acid) and RANKL inhibitors (e.g., denosumab) have demonstrated efficacy in both reducing the incidence of skeletal-related events and preventing the progression of cancer-treatment-induced bone loss. Non-pharmacologic measures are equally essential and include weight-bearing physical activity, adequate calcium and vitamin D supplementation, nutritional optimization, fall prevention strategies, and behavioral modifications such as smoking cessation and reduction in alcohol consumption. A multidisciplinary approach—often involving oncologists, endocrinologists, PM&R specialists, and rehabilitation teams—is ideal for addressing the complex needs of this population. In conclusion, osteoporosis remains underdiagnosed and undertreated in patients with cancer, despite its well-documented impact on morbidity and mortality. Fragility fractures significantly impair quality of life, increase hospitalization rates,

accelerate functional decline, and add to overall healthcare costs. Therefore, proactive bone health assessment and intervention should be integrated into routine cancer care. Maintaining skeletal health is essential not just for preventing fractures, but for preserving physical function, sustaining independence, and enhancing the overall survivorship experience in oncology.

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SPORT RECONDITIONING AND CANCER

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Sport reconditioning (SR), encompassing both aerobic and resistance exercise, has emerged as a critical component in the management of cancer patients and survivors. The American Heart Association (AHA) emphasizes that structured exercise programs, tailored to individual patient needs and supervised by certified professionals, can significantly improve cardiovascular fitness (CRF), muscular strength, and quality of life (QoL) in cancer survivors.

Central to this approach is the Individual Rehabilitation Project (IRP), a tailored program designed to elevate the post-treatment quality of life. It stresses the importance of early interventions, particularly after surgery, to mitigate potential complications and functional deficits.[1] For instance, Dolan et al. reported significant improvements in CRF, QoL, and fatigue among breast cancer survivors (BCS) participating in supervised aerobic and resistance training programs.[2] For this reason, fostering adapted physical activity (APA) and healthy lifestyle (including a balanced diet and weight management) should become an everyday purpose of healthcare professionals. Fencing may be a well-suited activity to counteract fatigue, pain, and limited arm mobility.[3]

The American College of Sports Medicine (ACSM) supports the integration of exercise into cancer care, recommending moderate-intensity aerobic exercise for at least three sessions per week, combined with resistance training two to three times per week. These recommendations are based on a comprehensive review of randomized controlled trials (RCTs) and systematic reviews, which consistently demonstrate the safety and benefits of exercise during and after cancer treatment.[4]

Exercise has been shown to mitigate treatment-related toxicities such as fatigue, mood disorders, and cognitive impairment. An umbrella review by Bai et al. identified that exercise significantly reduces adverse events associated with cancer and its treatments, including cardiac toxicity, chemotherapy-induced peripheral neuropathy, and dyspnea. Exercise also modulates body composition and biomarkers, enhancing sleep quality, psychological well- being, and overall QoL.[2]

Despite the robust evidence supporting exercise, a significant proportion of cancer patients remain inactive during treatment. An American Society of Clinical Oncology (ASCO) survey revealed that 25% of patients did not engage in regular exercise, and another 25% exercised at suboptimal levels. This underscores the need for oncology providers to actively promote and integrate exercise recommendations into routine cancer care.[5]

Prehabilitation, or exercise interventions before cancer surgery, is an emerging field with promising results, particularly in lung cancer patients. Preoperative exercise has

been associated with reduced morbidity and mortality, although more research is needed to establish its benefits across other malignancies.[6]

The feasibility of implementing exercise programs in cancer care settings has been demonstrated in various studies. For instance, supervised aerobic and resistance training in BCS significantly improved CRF, QoL, and reduced fatigue. These findings support the inclusion of structured exercise programs in cancer rehabilitation models.[2]

Resistance training has been shown to improve muscle strength, bone mineral density, and functional mobility. Champ et al. highlight that individualized high-intensity compound movements can optimize health outcomes by enhancing the structural integrity of bones and muscles, stimulating metabolism, and minimizing injury risk.[7]

In conclusion, SR is a vital aspect of cancer care, offering numerous benefits that enhance treatment tolerance, physical function, and QoL. Guidelines from the American Heart Association, the American College of Sports Medicine, and other evidence-based literature provide a strong framework for the integration of exercise into oncology practice. However, efforts must be made to overcome barriers to physical activity and ensure that exercise recommendations are effectively communicated and implemented in clinical settings.

Keywords: Cancer Rehabilitation, Exercise Oncology, Sport Reconditioning, Resistance Training, Quality of Life.

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CANCER PREHABILITATION AS PART OF THE CANCER CARE CONTINUUM

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Cancer prehabilitation is a proactive, multidisciplinary intervention delivered between cancer diagnosis and the onset of treatment, aiming to optimize physical and psychological resilience. This concept is gaining recognition as a critical element of the cancer care continuum, complementing acute treatment and survivorship strategies. By focusing on early risk modification, prehabilitation helps patients better tolerate treatment, recover faster, and experience improved quality of life. Core components of cancer prehabilitation include structured exercise programs, nutritional support, psychological counseling, and behavior modification, such as smoking cessation. These interventions target common vulnerabilities among cancer patients, including fatigue, deconditioning, and anxiety. Studies demonstrate that prehabilitation improves functional capacity, reduces postoperative complications, and enhances psychological well-being. In randomized controlled trials, multimodal prehabilitation has been associated with a 20–40% increase in pre-treatment physical performance.

Moreover, it decreases the rate of treatment delays and lowers hospital readmissions, making it both clinically effective and cost-efficient. In breast and colorectal cancer populations, home-based and hybrid delivery models have shown strong patient engagement and high adherence. Despite its proven benefits, cancer prehabilitation is still not widely implemented, particularly across Mediterranean health systems. Barriers include limited interdisciplinary infrastructure, lack of standardized protocols, and variable funding models. However, recent pilot programs in Italy, Spain, and Croatia suggest that integrating prehabilitation into existing rehabilitation services is both feasible and scalable. Physical medicine and rehabilitation (PM&R) specialists are well-positioned to lead cancer prehabilitation initiatives.

Their expertise in functional assessment, therapeutic exercise, and team-based care aligns naturally with the demands of early intervention in oncology. Involvement of PM&R professionals ensures that interventions are tailored, evidence-based, and responsive to individual patient needs. This presentation will discuss the clinical rationale, current evidence, and practical implementation strategies for cancer prehabilitation, with an emphasis on models adaptable to Mediterranean healthcare systems. It will also explore how PM&R can play a leadership role in shaping early cancer care and survivorship planning. In conclusion, cancer prehabilitation represents a strategic shift toward proactive, personalized care that bridges diagnosis and treatment. By embedding it into standard care pathways, healthcare systems can improve outcomes, reduce costs, and empower patients at the very start of their cancer journey.

Keywords: Neoplasm, Physical Therapy, Multidisciplinary Team

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INVITED SPEAKERS

FUTURE OF REHABILITATION - PRECISION MEDICINE

THE FUTURE OF REHABILITATION MEDICINE – PRECISION REHABILITATION: PSYCHOSOCIAL AND ENVIRONMENTAL FACTORS

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In the context of precision rehabilitation, the integration of psychosocial and environmental factors is essential to achieving individualized and functional outcomes in PRM. Jorge Laíns emphasizes that successful rehabilitation extends beyond biological impairments—it must encompass the patient's social roles, emotional context, and environmental supports or barriers. This holistic approach aligns with the International Classification of Functioning, Disability and Health (ICF), promoting a biopsychosocial model that reflects real-life challenges and aspirations (World Health Organization, 2001; Wade, 2015). By systematically incorporating psychosocial variables such as motivation, family dynamics, economic status, and mental health conditions, clinicians can better tailor rehabilitation programs. Environmental elements—access to healthcare services, assistive technologies, and architectural barriers—must also be assessed to foster optimal participation and autonomy (Perenboom & Chorus, 2003). Importantly, acknowledging these factors enhances not only treatment adherence but also long-term outcomes (Stucki & Bickenbach, 2017). Laíns calls for rehabilitation plans to be dynamic, evolving with the patient's context, and co-designed with multidisciplinary teams. Emerging tools such as patient-reported outcome measures (PROMs) and ecological assessments enable more accurate, functional goal-setting (Wade, 2015). These developments pave the way for a precision model that is both evidence-based and context-sensitive. Ultimately, incorporating psychosocial and environmental dimensions allows PRM to remain a humanistic and inclusive specialty, reinforcing its role in personalized, sustainable healthcare systems (Stucki & Bickenbach, 2017). Key references: World Health Organization. (2001). International Classification of Functioning, Disability and Health (ICF). Wade DT. (2015). Rehabilitation – a new approach. Part four: a new paradigm, and its implications. Clin Rehabil, 29(12):1145–1154. Stucki G, Bickenbach J. (2017). Functioning: the third health indicator in the health system and the key indicator for rehabilitation. Eur J Phys Rehabil Med, 53(1):134–138. Perenboom RJ, Chorus AM. (2003). Measuring participation according to the International Classification of Functioning, Disability and Health (ICF) Disabil Rehabil. Jun 3-17;25(11-12):577-87.

Keywords: Precision Medicine; Rehabilitation future; Biopsychosocial model

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BIOMARKERS AND GENETICS IN PERSONALIZING REHABILITATION

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Genetics and biomarkers are emerging as key tools in precision rehabilitation, enabling more accurate prediction of recovery and individualized therapeutic planning. Genetic factors such as polymorphisms in BDNF, ApoE, and genes related to dopaminergic and serotonergic systems significantly influence neuroplasticity, cognitive reserve, and functional outcomes after neurological injuries like stroke and traumatic brain injury. For example, the BDNF Val66Met variant is associated with reduced neural plasticity and poorer recovery, while the ApoE4 allele correlates with worse prognosis in brain injury. Biomarkers, including molecular, physiological, and neuroimaging indicators, provide measurable insights into disease mechanisms, treatment response, and prognosis. Proteins such as S100β, genetic/epigenetic markers, functional neuroimaging, and electrophysiological measures allow for patient stratification, early prognosis, dynamic monitoring, and real-time treatment adjustments. By integrating genetic insights with biomarker analysis, rehabilitation medicine can move from generalized protocols toward tailored, patient-centered interventions, improving efficiency, adherence, and long-term outcomes. Despite challenges such as high costs, limited standardization, and ethical concerns, combining genetics and biomarkers with digital health and artificial intelligence holds strong potential to transform rehabilitation into a fully personalized model of care.

Keywords: biomarkers, genetcis, precision rehabilitation, prognosis

THE FUTURE OF REHABILITATION MEDICINE – PRECISION REHABILITATION: MOBILE APPLICATIONS / APPS AND SENSOR TECHNOLOGIES

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The author highlights the transformative role of mobile applications and sensor technologies in advancing precision rehabilitation. These digital tools offer continuous, real-world insights into patients' functional status, supporting adaptive and personalized interventions throughout the rehabilitation process (Antonini et al., 2025). Mobile health (mHealth) platforms and wearable sensors capture valuable data on physical activity, gait patterns, cardiovascular performance, and adherence to prescribed exercises (Ross et al., 2022). This data can be analysed in real time to adjust therapeutic plans, increasing clinical responsiveness and patient engagement. More importantly, these technologies shift the rehabilitation model from episodic clinic visits to continuous, data-driven care anchored in the patient's daily life (Dobkin & Dorsch, 2011). By integrating digital monitoring with PROMs and ICF metrics, clinicians gain a comprehensive view of functioning and participation. Algorithms can flag deviations from expected recovery trajectories, prompting timely interventions (Lin et al., 2024). Moreover, remote monitoring enables care delivery in rural or underserved regions, improving accessibility and equity (Antonini et al., 2025). The author advocates for the ethical deployment of these technologies, emphasizing data privacy, user-friendliness, and digital literacy. Additionally, she calls for standardized validation protocols to ensure that digital assessments are clinically meaningful and interoperable with existing health systems (Ross et al., 2022). Incorporating sensor data into rehabilitation aligns with the core goals of precision rehabilitation: delivering the right intervention to the right person at the right time, grounded in objective functional data. It empowers patients, enhances clinical decision-making, and represents a crucial step toward sustainable, high-impact rehabilitation (Dobkin & Dorsch, 2011).

Keywords: Precision-Rehabilitation, Mobile-Apps, Sensor Technologies, PRM

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SMART REHAB THROUGH BIG DATA

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The future of Physical and Rehabilitation Medicine (PRM) is being transformed through the integration of Big Data and artificial intelligence (AI), driving the emergence of "Smart Rehabilitation." This model emphasizes personalized, data-driven care tailored to maximize function, participation, and quality of life. PRM specialists are strategically positioned to lead this transformation due to their holistic, patient-centered, and function-oriented approach. Smart rehabilitation leverages predictive analytics, machine learning, and real-time data from electronic health records (EHRs), wearables, and IoT sensors to enhance clinical decision-making (Lanotte et al., 2023). AI supports but does not replace clinical judgment; rather, it augments the rehabilitation team's ability to stratify patients, forecast complications, and personalize recovery pathways (Hwang et al., 2024). Functional outcomes remain the compass of intelligent rehabilitation systems. Metrics such as activities of daily living (ADLs), mobility scores, and ICF parameters are increasingly collected through connected devices and digital platforms. This real-world, objective data fuels evidence-based practice, shifting from hypothesis-driven to data-driven research (Cieza et al., 2023). Educational reform is critical, with PRM training needing to incorporate digital literacy, AI ethics, and interdisciplinary collaboration with engineers and data scientists. Academic institutions must pioneer the validation of AI tools and algorithms to ensure clinical relevance and safety (Lanotte et al., 2023). Team-based care is also being reshaped. Smart dashboards and shared visualizations foster collaborative planning among PRM physicians, therapists, nurses, and neuropsychologists. Big Data centralizes information, facilitating more effective communication, resource allocation, and consensus-based decisions (Zhang, 2025). Ultimately, smart rehabilitation is not a threat but an opportunity—it redefines functionality, strengthens clinical leadership, and promotes precision rehabilitation across diverse populations.

Keywords: rehabilitation, Big Data, artificial intelligence

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ORAL PRESENTATION

ORAL PRESENTATION

INTERVENTIONAL ULTRASOUND IN PRM

INTRODUCING A NOVEL APPROACH: ULTRASOUND-GUIDED HYDRODISSECTION OF FLEXOR TENDON ADHESIONS COMBINED WITH INDIVIDUAL KINESIOTHERAPY TO PROMOTE POST-OPERATIVE AND POST-INJURY REHABILITATION

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Background

Flexor tendon adhesions, a formidable challenge following injuries or surgeries involving the fingers, particularly in tendon repair, necessitate a new treatment approach. The formation of adhesions, often a result of an over-stimulated inflammatory response, can lead to restriction in the gliding function of the tendons, progressing to decreased range of motion and impaired functionality, thus limiting the use of the fingers in activities of daily living (ADL). Post-operative rehabilitation outcomes are significantly impacted by the formation of adhesions, often leading to prolonged therapy without satisfactory results.

Case report

Our approach has yielded promising results. We present a series of cases of 15 patients treated in our department after finger and hand injuries and/or operations, who later developed flexor tendon adhesions with severe limitation in the range of motion of the finger/s. Surgical adhesiolysis was not indicated, predominantly due to an abundance of scar formation, worsening prognosis of consequent adhesion formation after repeated surgical incisions. Ultrasound was used as a diagnostic tool for the localization of adhesions and kinematic evaluation of the tendon. Most cases were treated in the region of proximal phalanges (zone 2). Ultrasound-guided hydrodissection of flexor tendon adhesions in local anesthesia was then used in combination with physiotherapy. In selected patients, a combination of regional anesthesia was used to further promote adhesiolysis by manual redress therapy. Progression in finger movement and hand function was recorded, resulting in satisfactory results for patients and therapists.

Conclusion

Ultrasound-guided hydrodissection of the flexor tendon adhesions is a minimally invasive procedure with the potential to significantly improve post-injury and/or post-surgical rehabilitation after the formation of flexor tendon adhesions. We propose that this method be considered part of the rehabilitation treatment to shorten the recovery and markedly improve the functional results of these patients, offering hope for better outcomes.

Keywords: USG, hydrodissection, adhesions, flexor tendon

SAFETY AND EFFICACY OF ULTRASOUND AND FLUOROSCOPY-GUIDED RADIOFREQUENCY THERMAL ABLATION IN OSTEOARTHRITIS HIP PAIN

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Background and Aims

Osteoarthritis hip pain significantly impacts quality of life. When conservative treatments fail and surgery is not viable, less aggressive strategies are needed. Thermal radiofrequency ablation has emerged as a minimally invasive alternative for pain control. Ultrasound and fluoroscopy have refined the precision targeting neural structures. The aim of the study is to evaluate the safety and efficacy of associating ultrasound and fluoroscopy to guide hip joint denervation for the treatment of osteoarthritis hip pain.

Methods

An analysis of clinical records and patient interviews were conducted from January 2022 to January 2025. Patients with hip osteoarthritis experiencing severe pain and undergoing ultrasound and fluoroscopy-guided thermal radiofrequency ablation of the articular branches of the femoral, obturator, and accessory obturator nerves were included. Pain and functional outcomes were assessed with Numeric Pain Scale and Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC). Additionally, adverse effects and analgesics use were documented.

Results

A total of 32 patients were included, 60% male, with a mean age of 64.09±13.98 years. Symptoms persisted for 40.91±38.98 months. Radiographic Tönnis classifications were distributed between grade II (53%) and III (47%). Additionally, 56% of patients presented associated pathologies, mainly femoroacetabular impingement (83%). Pre-intervention pain scores averaged 8.39±1.47, reducing 4.78±2.35 ($p<0.001$). The initial mean WOMAC score was 72.91±12.41, decreasing 38.39±18.09 ($p<0.001$). The mean time from procedure to reassessment was 7.17±3.89 months. Regarding obesity, no statistically significant relationship was found with pain reduction efficacy ($p=0.8684$) or functional improvement ($p=0.8303$). Concerning analgesics consumption, 19 patients discontinued pain medication entirely. Regarding procedural safety, no adverse effects were reported.

Conclusion

Ultrasound and fluoroscopy-guided radiofrequency nerve ablation represented an effective strategy, significantly reducing osteoarthritis hip pain, with notable improvements in functional scores. However, larger prospective studies with well-defined follow-up periods are necessary to better understand the duration of the therapeutic effect and the factors associated with a better prognosis.

Keywords: Hip; Osteoarthritis; Pain; Radiofrequency; Denervation

NAILFOLD CAPILLAROSCOPY IN COMPLEX REGIONAL PAIN SYNDROME: THE ROLE OF THE PHYSICAL AND REHABILITATION MEDICINE SPECIALIST IN MICROCIRCULATORY MORPHOLOGICAL EVALUATION

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Background and Aims

Complex regional pain syndrome (CRPS) is characterized by chronic pain, autonomic dysfunction, and microcirculatory abnormalities. Vasomotor instability and trophic changes are common features, yet standardized non-invasive tools to assess microvascular changes are limited. Nailfold capillaroscopy, although traditionally used in rheumatology, may offer diagnostic value in CRPS. The aim of this study was to examine whether distinct morphological alterations can be identified in nailfold capillaries of CRPS patients, and to highlight the role of the physical and rehabilitation medicine (PRM) specialist in early evaluation and differential diagnosis.

Methods

A total of 22 patients diagnosed with CRPS type I, according to the Budapest criteria, underwent standardized nailfold capillaroscopy of all fingers on both hands. Parameters analyzed included capillary density, presence of megacapillaries, avascular zones, microhemorrhages, and capillary disorganization. Results were compared to those of 22 healthy age- and sex-matched controls.

Results

Pathological findings were observed in 17 out of 22 patients (77%), including enlarged and tortuous capillary loops, avascular areas, and microhemorrhages, predominantly on the clinically affected hand. In 6 patients, alterations were also detected contralaterally. None of these findings were present in the control group ($p < 0.01$).

Conclusion

Capillaroscopy reveals significant morphological abnormalities in CRPS patients and may serve as a useful tool in the differential diagnosis of pain and trophic disorders. Given their expertise in musculoskeletal and autonomic dysfunction, physical and rehabilitation medicine specialists are well positioned to apply capillaroscopy as a non-invasive, accessible diagnostic method in the early assessment of CRPS.

Keywords: CRPS,Capillaroscopy

ORAL PRESENTATION

UROLOGY AND GYNECOLOGY/OBSTETRICS REHABILITATION

URINARY AND ANO-RECTAL SPHINCTER DYSFUNCTION IN CHRONIC PELVIC PAIN SYNDROME: A CROSS-SECTIONAL STUDY IN A PHYSICAL MEDICINE AND REHABILITATION CENTER

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Background and Aims

Chronic pelvic pain syndrome (CPPS) is a multifactorial condition that significantly impairs quality of life. Urinary and ano-rectal sphincter disturbances often coexist, exacerbating functional morbidity. This cross-sectional study aimed to assess the prevalence and characteristics of sphincteric disorders in patients with CPPS managed in a Physical Medicine and Rehabilitation (PM&R) setting.

Methods

Between January and December 2024, 130 consecutive patients (83 women, 47 men; mean age 44.3 ± 11.7 years) with CPPS duration > 6 months were enrolled. Assessments included clinical history; pelvic pain intensity via Visual Analog Scale (VAS) and neuropathic pain screening (DN4); urinary sphincter evaluation using the Urinary Sphincter Profile (USP) score; ano-rectal function via the Cleveland Clinic Constipation and Incontinence scores; and health-related quality of life using the SF-12 questionnaire. Complementary investigations (urodynamic studies, imaging) were performed when indicated.

Results

Mean CPPS duration was 3.2 ± 1.5 years. Etiologies comprised endometriosis (23.1 %), pelvic myofascial pain (20 %), traumatic childbirth sequelae (13.1 %), prostatodynia (11.5 %), post-surgical changes (10.8 %), interstitial cystitis (9.2 %), and idiopathic cases (12.3 %). Urinary symptoms were reported by 64.6 % (urgency 40.8 %, dysuria 29.2 %, incontinence 21.5 %), while 38.5 % exhibited ano-rectal disturbances (constipation 26.2 %, fecal incontinence 12.3 %). Dual sphincter involvement occurred in 23.1 %. Neuropathic pain (DN4 > 4) was present in 41.5 %. Average VAS was 6.8 ± 1.3, mean USP score 14.0 ± 3.9, and 68.5 % had impaired physical SF-12 scores (< 35).

Conclusion

Sphincteric dysfunction, especially urinary, is highly prevalent in CPPS and substantially undermines physical quality of life. Central sensitization features in over 40 % of patients, and one-quarter experience combined urinary and ano-rectal involvement. A comprehensive, multidisciplinary PM&R approach incorporating targeted sphincter evaluation is essential for optimal management.

Keywords: Chronic, pelvic, pain-Sphincter, dysfunction-Urinary, symptoms-Ano-rectal

URODYNAMIC EVALUATION OF BLADDER COMPLIANCE AND DETRUSOR ACTIVITY FOLLOWING RADIOTHERAPY FOR PROSTATE CANCER

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Background and Aims

Local treatment of prostate cancer (PC) involves radical prostatectomy and radiotherapy (RT). Despite significant advancements in RT techniques, these modalities can adversely affect the genitourinary system. Lower urinary tract symptoms (LUTS) are among the most commonly reported side effects of RT, primarily resulting from radiation-induced genitourinary toxicity. This study aimed to evaluate bladder compliance and detrusor activity following radiotherapy for prostatic cancer using urodynamic study (UDS)

Methods

This is a single-center prospective study, including 41 patients who underwent radiotherapy for prostate cancer. All patients had completed radiotherapy at least 12 months before UDS to assess bladder compliance and detrusor activity during filling cystometry. We evaluated LUTS using Urinary Symptom Profile (USP), 3-day frequency-volume charts (FVC) and post-void residual (PVR) measurement.

Results

Medical records of 41 patients were analysed. The mean age was 65.23 years. The evaluation of LUTS was done after an average of 20 months after finishing radiotherapy. 73.2% had radical prostatectomy prior to radiotherapy. 46.34% had hormonotherapy and 36.6% had chemotherapy. About LUTS, 68.3% had urgency urinary incontinence, 63.4% stress urinary incontinence and 61% dysuria. Using USP, stress urinary incontinence subscore was 7/9, overactive bladder subscore 16/21 and dysuria subscore was 6/9. FVC showed increased urinary frequency and an average voided volume of 150 ml. All patients had filling cystometry that revealed a poor bladder compliance in 24.4% and detrusor overactivity (DO) in 19.6%.

Conclusion

Radiotherapy for prostate cancer induces a low bladder compliance and capacity. DO may occur following radiotherapy. The small sample size (41 patients) highlights the need for further prospective studies to clarify and confirm the effects of radiotherapy on bladder and urethral function.

Keywords: Prostate cancer, radiotherapy, urodynamic, compliance

URODYNAMIC ASSESSMENT OF LOWER URINARY TRACT DYSFUNCTION FOLLOWING SURGERY FOR POSTERIOR URETHRAL VALVES

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Background and Aims

Posterior urethral valves (PUV) are one of the main causes of congenital bladder outlet obstruction and can significantly impact long-term renal function. Despite successful surgical treatment of PUV, lower urinary tract dysfunction (LUTD) may persist. The aim of this study is to review the characteristics of lower urinary tract symptoms (LUTS) following PUV surgery and to discuss their management.

Methods

This is a retrospective descriptive study involving 35 boys presenting LUTS after surgery for PUV. All patients were evaluated in a neuro-urology consultation at the department of Physical Medicine and Rehabilitation. Each patient underwent a renal and bladder ultrasound, a voiding diary, and a full urodynamic assessment.

Results

The mean age of the patients was 6.8 years. LUTS was mainly characterized by recurrent urinary tract infections, urinary incontinence, and urinary frequency. Renal and bladder ultrasound consistently revealed urinary tract dilatation, a thickened, trabeculated bladder and a significant post-void residual volume. Urodynamic evaluation showed dysuria in 14 children with significant post-void residual volume on uroflowmetry. Filling cystometry revealed detrusor overactivity in 20 cases, large-capacity bladders in 9 cases, while 6 urodynamic studies were normal. All patients received specific management, including prescription of anticholinergic medications, training in clean intermittent catheterization and pelvic floor physical therapy.

Conclusion

Our study found results consistent with those reported in the literature. Urodynamic evaluation proves to be essential in the assessment of persistent LUTS after PUV repair, allowing for tailored therapeutic management.

Keywords: Posterior urethral valve, urodynamic study

PELVIC FLOOR REHABILITATION IN URINARY INCONTINENCE - ANALYSIS OF THE FIRST YEAR OF TREATMENTS IN A HOSPITAL IN THE NORTH OF PORTUGAL

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Background and Aims

Urinary incontinence (UI) is one of the main conditions addressed in pelvic floor rehabilitation (PFR) consultations. The most common types are stress, urge and mixed UI. It mostly affects women. The risk factors identified include multiparity and menopause in women; prostate surgery in men; and neurological disease, obesity, and advanced age in both sexes. Treatment may be conservative or surgical. PFR can be considered a first-line treatment for various types of UI, having been shown to reduce symptoms and improve patients' quality of life. Aims of this work: 1) to characterize the patients treated for UI during the first year of functioning of the Pelvic Floor Unit (PFU) of the Physical and Rehabilitation Medicine Department (PRMD) of a hospital in the North of Portugal; 2) to evaluate the clinical outcomes achieved through the implemented PFR programs.

Methods

Retrospective study conducted between October 2023 and October 2024. Instruments used: anal elevator test (Modified Oxford Scale), ICIQ-SF, UDI-6, OABSS. Patients' perceived improvement with treatment was also assessed.

Results

In total, 18 patients were treated, the majority women (94.4%). The types of UI treated were mixed and stress UI (55.6% and 44.4%, respectively). The main reported triggering factor for UI was childbirth (44.4%). As for the treatments implemented, all patients received instruction on home-based exercises and counseling on lifestyle modifications, with the majority (88.9%) reporting regular adherence to the exercise plan. All rehabilitation programs included pelvic floor kinesiotherapy and BFB. Endocavitary electrotherapy was used in 66.7% of patients, and transcutaneous tibial nerve stimulation in 61.1%. Overall improvement was observed across all evaluated parameters.

Conclusion

The PFR programs used at the PFU showed positive clinical outcomes in most cases of UI, during the first year of activity. The acquisition of additional therapeutic modalities by the Department may provide further benefit to patients with UI and other conditions.

Keywords: Incontinence, Rehabilitation

PELVIC FLOOR REHABILITATION IN FEMALE STRESS URINARY INCONTINENCE: RESULTS OF A PROTOCOL COMBINING BIOFEEDBACK AND ELECTROSTIMULATION

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Background and Aims

Stress urinary incontinence is the involuntary loss of urine during physical effort, sneezing or coughing. The aim of our work was to study the effect of pelvic floor rehabilitation on stress urinary incontinence in women.

Methods

We conducted a prospective study of 52 patients followed in our department for monosymptomatic stress urinary incontinence. A protocol of 30 sessions of perineal rehabilitation was carried out for each patient: the first 10 with biofeedback and 20 others with electrostimulation via an intra-vaginal probe. We assessed the severity and impact of stress urinary incontinence using the Michigan Incontinence Symptom Index before (T0) and at the end of the sessions (T1).We excluded patients with other urinary symptoms and those with cognitive disorders

Results

The mean age was 51.4 years. 59.6% of the patients had given birth vaginally in at least one of their deliveries and 23.07% had undergone labor dystocia. Our patients did not perform any perineal exercises during pregnancy. Assessment of pelvic floor muscle contraction by digital palpation revealed a score of less than 3 on the modified Oxford scale (MOS) in 67.3% of cases. 13.4% had 2nd degree urogenital prolapse and 7.6% 3rd degree. The mean stress urinary incontinence sub score according to the Michigan Incontinence Symptom Index was 8.4 at T0 and 7.1 at T1, and the sanitary pad use sub score was greater than 2 at T0 in 86.5% of patients and less than 2 in 21.15% at T1. The mean boredom score was 6.7 at T0 and 5.7 at T1.

Conclusion

Our results confirm that pelvic floor retraining improves the symptoms and quality of life of women suffering from stress urinary incontinence. Our study is limited because we evaluated our patients in the short term, and further studies on the long-term efficacy of pelvic floor retraining are needed.

Keywords: stress, incontinence, pelvic, rehabilitation

ORAL PRESENTATION

CHILDREN REHABILITATION

BEHAVIORAL AND COGNITIVE DISTURBANCES IN CHILDREN WITH POSTERIOR FOSSA TUMORS POST-SURGERY: A DESCRIPTIVE LONGITUDINAL ANALYSIS

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Background and Aims

Background: Posterior fossa tumors (PFTs) in children are associated with motor, cognitive, and behavioral challenges that may hinder social reintegration and quality of life post-surgery. Aim: This study investigates the incidence and characteristics of behavioral disturbances in children following surgical treatment for PFTs, focusing on psychosocial and cognitive impacts.

Methods

Methods: Epidemiological analysis was conducted using data (2013–2024) from the Early Intervention and Rehabilitation Unit at "P. & A. Kyriakou" Children's Hospital. Children with histologically confirmed PFTs were included. Data collected covered demographics, anxiety, behavioral and sleep disorders, suicidal ideation, and cognitive deficits.

Results

Results: Among 183 patients (mean diagnosis age: 5.8 years; male-to-female ratio: 1.5:1), attention and memory deficits were reported in 84%, persisting in 61% despite cognitive improvements. Children ≤6 years showed high rates of parental attachment (64%) and behavioral control needs (73%). In older children, 77% had limited socialization, and ≥9-year-olds reported anxiety (84%) and fear of relapse (91%). Sleep disorders were prominent early (91%), decreasing to 12% after one year. Psychological support was regular in 68% of cases.

Conclusion

Conclusion: Early identification and intervention for behavioral and cognitive issues in children with PFTs are critical to promoting recovery, autonomy, and successful community reintegration.

Keywords: brain tumour, children, cognition, behaviour

BEYOND BASIC MOBILITY: COMPREHENSIVE ASSESSMENT OF WHEELCHAIR DRIVING SKILLS IN CHILDREN

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Background and Aims

Children using wheelchairs require efficient driving skills to enhance their functioning and participation in daily activities, including engagement in traffic. Currently available assessment tools lack sufficient focus on these specific skills. Therefore, we developed a new comprehensive test to evaluate wheelchair driving abilities in pediatric populations.

Methods

We designed a test comprising four subscales with 32 items for active wheelchair (AW) users—managing wheelchair, basic and advanced driving skills, skilful driving, and traffic—with an additional subscale for electric-powered wheelchair (EPW) users. Each item was evaluated on a 4-point scale. For pilot testing, we recruited children referred to our pediatric department between July 2019 and September 2024. Following assessment, selected participants underwent a 10-day specific training program targeting identified skill deficits.

Results

The study included 100 children (68 boys), with a mean age of 8.3 years; 55 used AW and 45 used EPW. Vast majority of children were with cerebral palsy (90 %), others with neuromuscular diseases. None were excluded from the study. Children using EPW scored significantly lower than those using AW across all four subscales ($p<0.001$). On average, children demonstrated greatest difficulty in wheelchair management and advanced driving skills, achieving only 43.5% and 46.2% of the maximum possible score for AW users (15.2% and 45.7% for EPW users, respectively). Twenty children participated in the targeted training program, resulting in mean total improvements of 2.5 points for the AW group (n=8) and 3.2 points for the EPW group (n=12).

Conclusion

The developed assessment tool effectively identifies specific wheelchair driving skills requiring improvement and clearly differentiates between AW and EPW users' abilities. The test demonstrated adequate sensitivity to detect modest improvements following a focused training intervention. Future research will focus on establishing the psychometric properties of this assessment tool to validate its use in clinical practice.

Keywords: child, wheelchair, skills,test

CLUBFOOT - DEFORMITY DEGREE AND FUNCTIONAL OUTCOMES AFTER THE TREATMENT

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Background and Aims

Occuring in 1-2 per 1.000 newborns, clubfoot is one of the most common anomalies of the locomotor system. With its multifactorial etiopathogenesis, including both genetic and environmental factors, 80% of clubfeet are idiopathic while 20% are syndromic, present with associated malformations. The aim of this study was to show correlation between deformity degree and functional outcomes after the treatment.

Methods

In our cross-sectional study, we evaluated 50 randomly selected, eligible clubfoot patients that were treated at the University Children's Hospital, Belgrade, Serbia between November 2006 and November 2022. The treatment has consisted of using Ponseti method while surgical treatment was used for those patients resistent to previous conservative method accroding to Ponseti, as well as for syndromic or neglected clubfoot cases. Deformity degree was categorized as I, II, III or IV, according to Dimeglio classification while functional status of patients after the treatment was assessed by using Clubfoot Assessment Protocol (version 1.0). Correlation between deformity degree and different functional scores was tested by Spearman's test.

Results

Results of our study have shown statistically significant ($p<0,001$), negative correlation between clubfoot deformity degree and all evaluated functional scores, including: passive mobility, muscle function (strenght), morphology and motion quality of the foot after the treatment. Surprisingly, more patients (around 70%) were treated both conservatively and surgically, despite Ponseti method being seen as a "gold standard". Possible explanation could be higher number of syndromic or neglected clubfoot cases, resistent to previous conservative treatment.

Conclusion

This study has shown an important impact of initial clubfoot deformity degree on its functional outcomes after the treatment, suggesting that severe clubfeet are associated with the worst functional scores after conservative and/or surgical treatment that should be started during first weeks of life.

Keywords: clubfoot, Dimeglio classification, Ponseti method

PHYSIOTHERAPY EFFECT ON THE FUNCTIONAL STATUS OF CHILDREN WITH CEREBRAL PALSY AFTER SELECTIVE DORSAL RHIZOTOMY SURGERY

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Background and Aims

The study has shown the importance of selecting patients according to functional status for surgical treatment and the importance of assessing functional status indicators when planning a rehabilitation program for children after selective dorsal rhizotomy, the aims were to evaluate the effect of physiotherapy on the functional status of children with cerebral palsy after selective dorsal rhizotomy surgery.

Methods

VAS scale for pain level assessment, goniometry, Ashworth scale for muscle tone assessment, manual muscle strength testing according to the Lovett scale, Tinetti test for balance and gait assessment, modified FIM scale for mobility assessment.

Results

A statistically significant change in the following functional status indicators was found after physiotherapy: pain level, range of motion, lower limb muscle tone, balance and gait, and mobility ($p<0.05$). Mobility showed the most significant change. When comparing the differences in indicators between the GMFCS classification system levels, muscle tone before physiotherapy differed statistically significantly, while mobility and balance differed statistically significantly after physiotherapy. It was found that the results of Level II patients improved the most after physiotherapy, and those of Level IV patients improved the least.

Conclusion

Statistically significant ($p<0.05$) improvements were observed in the following functional status indicators in children with cerebral palsy after selective dorsal rhizotomy surgery: pain level, range of motion, muscle tone, balance and gait, and mobility. Muscle strength increased statistically significantly only in separate muscle groups. When assessing and comparing the differences in functional status indicators before and after physiotherapy, a statistically significant difference was found in mobility function between Level II and Level III, and between Level II and Level IV, and in balance function between Level II and Level IV ($p<0.05$). The greatest statistically significant improvement in indicators after physiotherapy was found in Level II according to the GMFCS classification system, and the smallest improvement was found in Level IV.

Keywords: Cerebral palsy, selective dorsal rhizotomy

ASSOCIATIONS BETWEEN PARENTAL PHYSICAL ACTIVITY AND CHILDREN'S MOTOR DEVELOPMENT

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Background and Aims

Research has shown the importance of physical activity for all people, regardless of gender, age or health condition, aims were to assess parental physical activity (FA) and children's motor development, and to identify associations between them.

Methods

The assessment was carried out before or after the physiotherapy. The Peabody Developmental Motor Skills Test was used to assess the children's motor development (reflexes, positioning, movement and object manipulation). The International Physical Activity Questionnaire was used to assess parental FA, consisting of questions on vigorous, moderate-intensity physical activity, walking and sitting. A questionnaire about the child. For data analysis, physical activity was translated into MET, according to IPAQ Scientific Committee guidelines.

Results

The average mean of parents physical activity was high. 44% had a high level, 53% a medium level, and 3% had a low level. The mean value of the motor development quotient for all the subjects was moderate. 53% of the children scored at the average level and 47% scored above the average level. Children of parents with moderate and high levels of physical activity had average and above-average motor development.

Conclusion

The the average mean of physical activity score for all subjects was high. 44% of adults achieved a high level of FA, with the highest proportion of 53% in the medium range and 3% in the low range. The assessment of motor development resulted in an average motor development coefficient of all subjects reaching the average level of motor development. The results of the assessment of the four domains of large motor development showed that reflex development determines the development of position-holding and movement skills. Children of parents with moderate and high levels of physical activity had moderate and above-average motor development coefficient, but no association was found between parental physical activity and children's motor development ($p>0.05$).

Keywords: children's motor development, physical activity

THE INFLUENCE OF THE INTENSITY OF SENSORY INTEGRATION THERAPY ON THE OUTCOME MEASURED BY THE GAS SCALE

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Background and Aims

Sensory integration therapy (SIT) is an important therapeutic concept in the treatment of children with sensory integration difficulties. In the modern world there is a high prevalence of SI integration difficulties. 5% to 20% of children without diagnosed developmental disabilities have SI difficulties. SIT has a clinically positive effect on the treatment of these disorders but without clearly defined guidelines about the intensity of its implementation. The aim of this randomized controlled trial is to assess whether the intensity of sensory integration therapy has an impact on the achievement of therapeutic goals measured through an individualized outcome measure the Goal Attainment Scale (GAS).

Methods

This randomized controlled trial included 20 children aged 2-9 years with sensory integration difficulties. The children were randomly selected into two groups of 10 children each. First group attended sensory integration therapy (SIT) periodically once a week for 45 minutes over 10 visits, while the second attended SIT in a cycle of 10 therapy sessions of 45 minutes daily. Each child was assigned 3 therapeutic goals. Each goal was assigned a baseline value (- 1) and a final value using the GAS scale ranging from -2 to +2. Then a GAS score, called a T-score and level of change were calculated for each participant.

Results

The study outcomes were achieved T score and level of change. The T score outcome was statistically significantly better in the daily treatment group and the change level outcome recorded an even larger difference, which was highly significant. The group that received treatment daily had statistically significantly better results than the group that received treatment once a week.

Conclusion

More extensive studies are needed for definitive recommendations on the intensity of the implementation of SIT but the preliminary results of our study move in the direction that it should be implemented in daily cycles.

Keywords: Sensory difficuties; SIT; GAS scale

ORAL PRESENTATION

NEUROREHABILITATION

FOUR-YEAR FOLLOW-UP ON POST-STROKE FATIGUE AND WORKFORCE REINTEGRATION

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Background and Aims

Although post-stroke fatigue can hinder returning to work, there is a lack of quantitative research on this topic. Therefore, we performed a long-term cohort study to determine if fatigue is independently linked to the likelihood of returning to paid employment.

Methods

Our study included 95 first-time stroke patients under 65 years old who were employed full-time at baseline. They were recruited from the neurology department of IBN ROCHD University Hospital between 2018 and 2020 and followed for four years. Fatigue levels were measured using the Multidimensional Fatigue Inventory, with pathological fatigue defined as a General Fatigue dimension score of ≥12. Return to paid employment was characterized as working at least 10 hours per week. Data analysis was conducted using multivariable logistic regression.

Results

After four years, 60% of patients had resumed paid employment. The adjusted Odds Ratio (OR) for returning to work was 0.37 (95% confidence interval [CI] 0.15-1.05) for those who had a baseline General Fatigue score of ≥12. Persistent pathological fatigue after four years of follow-up was linked to a reduced likelihood of returning to paid work [Adjusted OR 0.31, 95% CI 0.12-0.78]. Additionally, higher General Fatigue scores at follow-up showed a negative association with work resumption, with each point increase in fatigue corresponding to an adjusted OR of 0.86 (95% CI 0.79-0.93).

Conclusion

Post-stroke fatigue seems to be an independent factor contributing to the inability to return to paid employment after a stroke.

Keywords: Post stroke, fatigue, work-reintegration

POST STROKE FATIGUE: ANALYSIS OF SUBTYPES AND ASSOCIATED FACTORS

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Background and Aims

Post stroke fatigue (PSF) is a disabling complaint endorses stroke recovery. PSF is highly varied among stroke survivors. Most of previous studies considered PSF as one entity, pooling its physical and cognitive subtypes. The current study aimed to investigate the prevalence and associated factors of PSF with consideration of fatigue subtypes among stroke survivors

Methods

A cross-sectional study was conducted. Demographics, medical history, stroke characteristics, depression and anxiety, sleep quality, and stroke recovery were evaluated. The Modified Fatigue Impact Scale (MFIS) has been adopted to assess PSF and its subtypes (physical and cognitive). Descriptive statistics, MFIS subscales comparisons, and regression analyses were performed.

Results

A total of 92 participants were included, with a PSF prevalence rate of 71.7%. The MFIS physical subscale demonstrated a significantly higher prevalence and severity than cognitive subscale. Diabetes mellitus, hypercholesterolemia, and left stroke were associated with the MFIS cognitive subscale, while recurrent stroke was related to the MFIS physical subscales. Stroke recovery, depression and anxiety, and sleep quality were related with the MFIS total score as well as its two subscales. Depression and left stroke were significant predictors for MFIS total score and cognitive subscale. Sleep quality and being male were also significant predictors for MFIS cognitive fatigue

Conclusion

PSF is highly prevalent. PSF subtypes were markedly varied in prevalence, severity and associated factors. Future research and clinical protocols should consider different PSF subtypes rather than conceptualizing PSF as one entity.

Keywords: Fatigue, disorder, Cognitive, Exhaustion

DOES RADIAL EXTRACORPOREAL SHOCK WAVE THERAPY REDUCES POST STROKE HAND SPASTICITY?

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Background and Aims

Hand spasticity after a stroke decreases residual hand functions and independence of every day activities. It is associated with pain, contractures and high level of disability. Radial extracorporeal shock wave therapy (RESWT) is an enticing treatment option for focal spasticity. The main goal of this clinical study was to evaluate the effects of RESWT on the hand spasticity after stroke. Afterwards to assessed the efficiency of RESWT in motor and functional recovery of a spastic hand poststroke.

Methods

This controlled clinical trial included 90 patients with spastic hand post stroke, assigned in to examined group (EG) and control group (CG). The EG received RESWT and standard rehabilitation treatment and the CG received only a standard rehabilitation treatment. For evaluation of treatment efficacy were used: Modified Ashworth Scale (MAS), Disability Assessment Scale (DAS) and the subscore for motor recovery of the Fugl–Meyer assessment for upper extremity. The clinical findings were evaluated at the same time points for both groups: before the start of the rehabilitation, immediately after the end of the 2nd, 6th and 14th week from the start of the rehabilitation.

Results

In the EG the results indicated a significantly lower MAS score for more than one average score (<0.05). Analysis of the results in the EG for DAS domains showed a significant disability reduction in maintaining hand hygiene, dressing, limb position abnormality and pain due to spasticity in all control measurements. The RESWT resulted in significantly better hand motor control in all three control measurements in the EG.

Conclusion

Study results showed that RESWT reduced hand spasticity after stroke. This treatment resulted in reduced disability leading to better quality of life in this patients. Given that no side effects were observed it remains that RESWT is a safe, non-invasive treatment for spastic hand after a stroke.

Keywords: spasticity, radial, extracorporeal, shock, wave

REHABILITATION OUTCOMES OF POST-STROKE FACIAL PALSY IN FIFTEEN PATIENTS : A PROSPECTIVE STUDY

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Background and Aims

Post-stroke facial palsy significantly impairs motor function and quality of life. While rehabilitation is widely recommended, evidence on optimal protocols remains limited. This study evaluates the efficacy of a multimodal rehabilitation program in 15 patients with facial palsy following ischemic or haemorrhagic stroke. The aim of the study is to demonstrate the importance of early and appropriate rehabilitation of facial palsy following a stroke to improve function and quality of life.

Methods

A prospective study was conducted on 15 consecutive patients (mean age 62 ± 8 years; 9 males, 6 females) with unilateral central facial palsy secondary to stroke. All participants underwent a 12-week standardized rehabilitation program combining : - Neuromuscular re-education (mirror therapy, proprioceptive neuromuscular facilitation), - Electrostimulation (at 20–50 Hz), - Functional training (speech, mastication, and eyelid closure exercises). Outcomes were assessed at baseline, 6 weeks, and 12 weeks using the House-Brackmann Grading System (HBGS), Sunnybrook Facial Grading System (SFGS), and the Facial Disability Index (FDI).

Results

- Functional Improvement : 12/15 patients (80%) achieved ≥1-grade improvement on HBGS ($p < 0.01$). - Symmetry : SFGS scores improved by 42% ± 12% ($p < 0.001$), with marked gains in voluntary movement (e.g., smile amplitude increased by 58%). - Quality of Life : FDI social/well-being subscores rose from 45 ± 10 to 72 ± 8 ($p < 0.05$). Two patients developed mild synkinesis.

Conclusion

A structured 12-week multimodal rehabilitation program significantly improves facial symmetry, motor function, and psychosocial outcomes in post-stroke facial palsy. Early intervention and individualized adjustments (e.g., electrostimulation parameters) are critical for minimizing complications. These findings support integrating such protocols into standard post-stroke care.

Keywords: Facial, palsy, stroke, rehabilitation, functional

CAN VESTIBULAR REHABILITATION THERAPY BE A VITAL SUPPORT FOR PATIENTS TRANSITIONING HOME AFTER UNDERGOING ACOUSTIC NEUROMA SURGERY?

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Background and Aims

The surgical removal of an acoustic neuroma impacts the patient's balance system, leading to symptoms such as dizziness, nausea, visual disturbances, and instability during daily activities. Vestibular exercises are an evidence-based approach for managing vertigo and are effective for various balance disorders. This study aimed to evaluate the effects of Vestibular Rehabilitation Training (VRT) on enhancing patients' walking performance, as measured using the Functional Gait Assessment (FGA) scale.

Methods

: In a pilot study approved by the Medical Ethics Commission on September 19, 2017 (No. 0120–472/2017/5), a total of 22 male and 28 female participants were enrolled, with a mean age of 47.3 years (± 7.8). All patients underwent unilateral surgical resection of an acoustic neuroma. Each patient scored at least 25 out of 30 on the Mini-Mental State Examination (MMSE) and a minimum of 30 out of 56 on the Berg Balance Scale (BBS). During the 14-day recovery period in the hospital, patients participated in vestibular exercises to enhance their eye, head, and body movements while seated, standing, or walking. After being discharged to their home environment, patients continued to perform vestibular vestibular VRT exercises. The functionality of their walking was assessed using the FGA scale both before discharge and three months after surgery.

Results

To determine a clinically significant change between two FGA measurements, we used an external criterion of 5 points, as established in the literature. Our analysis revealed that 75% of patients surpassed this minimum clinically significant change of 5 points, indicating improved dynamic adaptation during functional walking.

Conclusion

VRT enhanced walking performance and balance in our patients, resulting in improved daily functioning and greater self-confidence in their home environments. Further research with a larger patient group and ongoing monitoring of their rehabilitation progress is needed.

Keywords: Surgery, Vestibular, Disorders, VRT, FGA

THE EFFECT OF THE TREDMIL PROGRAM ON THE SPATIO-TEMPORAL GAIT PARAMETERS OF PATIENTS AFTER STROKE

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Background and Aims

Treadmill training is a part of kinesitherapy treatment aimed at practicing a more correct gait pattern in the rehabilitation of patients with a mild form of hemiparesis. The aim of this study is to objectively measure the spatio-temporal parameters of gait to determine whether mechanically assisted walking improves the parameters of the gait scheme, gait cycle and its temporal determinant.

Methods

The pilot study with a series of subjects included a total of 29 men with an average age of 45-65 years, in the subacute phase of recovery after a stroke, who are able to walk independently. In addition to daily kinesitherapy, occupational therapy and electrotherapy, the subjects had a 30-minute training in mechanically assisted walking. The intensity of exercise was initiated by a subjective sense of the speed that the patient could master and gradually increased. Rehabilitation was carried out 21 days / 5 days a week. Outcome measures were monitored by Barthel index, Trunk Control Test, Motoricity Index, and registration of kinematic changes in gait with Zebris FDM-T HP/Cosmos software.

Results

The Wilcoxon rank test showed a statistically significant increase in all parameters of the functional tests used by p = 0.000 and a significant statistical improvement in the horizontal distance between the two central starting points of the heels of opposite legs (p = 0.031), cadence (p = .015), time to step (p = 0.014) and a very significant improvement (p = 0.00) in speed, The width of the steps of the opposite and the length of the stride of the same leg, as well as the phase of support and the phase of swinging of both legs.

Conclusion

Treadmill gait training in mild forms of hemiparesis is an additional tool for a more correct gait pattern, which enhances functional recovery and reduces rehabilitation costs.

Keywords: Stroke, tredmil training, gait

EVALUATING NEURACI: ACCURACY OF A NEUROREHABILITATION COMPLEXITY AND RESOURCE ALLOCATION INDEX

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Background and Aims

Efficient resource allocation at hospital admission is essential in neurological rehabilitation due to the clinical heterogeneity of patients, which complicates expenditure assessment. This study aimed to evaluate the accuracy of NeuRACI (Neurorehabilitation Resource Allocation and Complexity Index) in categorizing patients by clinical complexity and to compare its performance with individual clinical variables.

Methods

We included 243 patients referred to neurological rehabilitation. NeuRACI is a composite index that allocates resources by combining four clinical factors: clinical complexity, acute length of stay (LOS), age, and presence of an artificial airway. Each factor is assigned an adjustable weight. Patients were classified into two groups based on the absence (Group A) or presence (Group B) of an artificial airway. ROC curve analysis was used to assess the accuracy of NeuRACI and other clinical variables in distinguishing between these groups.

Results

The mean NeuRACI score for Group A was 943.19, while Group B had a significantly higher mean score of 5251.41, reflecting greater resource allocation priority for more complex patients with artificial airways or prolonged LOS ($t = -23.427$; $p < .001$). Group B also exhibited multiple comorbidities indicative of a more complex clinical state compared to Group A ($t = -14.103$; $p < .001$). No significant differences were found between groups in age or acute LOS. NeuRACI demonstrated excellent discriminative ability with an AUC of 0.98 (95% CI: 0.96–0.99; $p < .001$).

Conclusion

NeuRACI effectively integrates multiple clinical factors to categorize patients by complexity and airway status in neurorehabilitation setting. This index facilitates objective decision-making and supports tailored care planning aligned with individual patient needs.

Keywords: rehabilitation, needs, care, patients, resources

SEXUAL DYSFUNCTION IN MULTIPLE SCLEROSIS: A SILENT STRUGGLE FOR MOROCCAN PATIENTS

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Background and Aims

Multiple sclerosis (MS) is a demyelinating disease of the central nervous system, leading to various deficits, including sexual dysfunction. This study aims to assess the prevalence of sexual dysfunction in Moroccan MS patients and highlight the challenges they face in discussing this issue.

Methods

A prospective, descriptive, and analytical study was conducted on MS patients followed at the Physical Medicine and Rehabilitation Department of CHU Ibn Rochd, Casablanca. Sexual dysfunction was evaluated using the International Index of Erectile Function (IIEF-5) for men and the Female Sexual Function Index (FSFI-6) for women as well as a tailored questionnaire.

Results

A total of 120 patients were included, with a mean age of 34.4 ± 8.5 years and a female predominance. The average disease duration was 9.1 ± 4 years. MS forms were relapsing-remitting (68.3%), progressive-relapsing (18.3%), and progressive (13,3%). The prevalence of sexual dysfunction was 100% in sexually active men (IIEF-5) and 57.9% in women (FSFI-6). Married patients were more willing to discuss sexual dysfunction than single patients. 76,6% admitted a loss of self-confidence , 95% never spoke about their issue to a health professional and 100% consider it a taboo in the Moroccan society.

Conclusion

Sexual dysfunction is highly prevalent among sexually active MS patients in Morocco, with men being more affected than women. The topic remains difficult to address, underscoring the need for better awareness and patient support.

Keywords: multiple sclerosis, sexual dysfunction

ASSESSING DRIVING COMPETENCE IN SPINAL CORD INJURY PATIENTS: A RETROSPECTIVE STUDY

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Background and Aims

Spinal cord injury (SCI) is a damage to the spinal cord that has significant repercussions on functionality and participation in basic activities of daily living (ADLs) and instrumental activities (IADLs), and can even compromise the ability to drive a car. This study characterises a sample of patients who underwent a driving fitness assessment after a SCI, identifying the most common adaptations to vehicles and the restrictions imposed.

Methods

This is an observational, analytical and retrospective study carried out in a rehabilitation centre that has a specific consultation for assessing driving ability. The medical records of patients diagnosed with SCI who were assessed in this context over the past two years were reviewed. The variables age, gender, referral, etiology, level of SCI, classification according to the American Spinal Injury Association (AIS) and motor scores were included. The Statistical Package for the Social Sciences (SPSS) software, version 29.0.0.0 (IBM Corp., Armonk, NY), was used for statistical analysis.

Results

A total of 66 patients were included, mostly male (77.3%), with a median age of 59 years, and referred from outpatient clinics (68.2%). The most representative SCI was of non-traumatic etiology (50%) and with an AIS D classification (71.2%). The majority of patients were deemed fit to drive (98.48%), with the most frequent adaptations being automatic gear selection (56.1%) and the handbrake (34.8%). A lower motor score in the lower limbs and total motor score were associated with a greater number of adaptations ($p<0.001$), as were complete injuries (AIS A) ($p=0.003$).

Conclusion

The level of SCI directly affects autonomy and therefore driving ability. A careful assessment by a doctor, following a pathology or trauma that could compromise this ability, is essential to restore the patients autonomy and enable them to resume driving in a safe and adapted manner.

Keywords: Spinal cord injury; rehabilitation; driving

EMPOWERING INDIVIDUALS THROUGH PERSONAL GOAL SETTING IN LONG-TERM BRAIN INJURY REHABILITATION: A TAXONOMIC ANALYSIS AND ITS IMPACT ON QUALITY OF LIFE

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Background and Aims

Long-term rehabilitation following an acquired brain injury (ABI) requires an individualized, person-centered approach that respects the needs, autonomy, and life aspirations of individuals. At Center Naprej, we implement a structured goal-setting model based on a two-level taxonomy, enabling the formulation of goals across ten key life domains, including Health, Knowledge/Work, Emotions, and Social Life. This approach fosters active user participation in the rehabilitation process, supports the creation of personalized goals, and facilitates long-term progress monitoring, thereby adjusting rehabilitation to their individual needs.

Methods

This study was conducted in two phases (2019–2024) and included 62 individuals with ABI from two units of Center Naprej. Firstly, we examined general and specific goals set by users. An internal assessment tool – the Wheel of Life - was used.

Results

Participants defined 253 general goals across ten life domains. The majority of these goals were related to the domains of Knowledge/Work (36%), Health (28%), and Emotions (8%). The users formulated 1,122 specific goals based on these goals across six rehabilitation areas. Again, the largest percentage was directed toward Health and Knowledge/Work (35% and 46%, respectively). A five-year analysis revealed that users maintain consistent goals over time, indicating long-term commitment. Furthermore, increases in their evaluations over the research period suggest measurable progress in goal attainment. In the second phase, involving 47 users, we explored the relationship between goal achievement and quality of life using the QOLIBRI questionnaire. A positive trend was found: higher levels of goal achievement were associated with higher quality of life scores ($\eta^2 = 0.083$), although the results were not statistically significant ($p = 0.058$).

Conclusion

The findings highlight the importance of long-term commitment to personal goals and the role of structured taxonomies in identifying key life domains. This contributes significantly to improved rehabilitation outcomes and enhanced quality of life for individuals after ABI.

Keywords: Rehabilitation, Goals, QoL, Taxonomy, Empowerment

ORAL PRESENTATION

CARDIOPULMONARY REHABILITATION

APPLICATION OF A PULMONARY REHABILITATION EXERCISE PROGRAM BASED ON IMB MODEL IN PATIENTS WITH SEVERE CHRONIC OBSTRUCTIVE PULMONARY DISEASE

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Background and Aims

This study aims to construct a pulmonary rehabilitation program based on the Information-Motivation-Behavioral Skills (IMB) model to improve lung function and quality of life in patients with severe Chronic Obstructive Pulmonary Disease (COPD).

Methods

Convenience sampling was used to select patients with severe COPD admitted to the Department of Respiratory and Critical Care Medicine of a tertiary hospital in Chongqing from October 2023 to February 2024. Patients were randomly divided into an experimental group (n=32) and a control group (n=31). The experimental group received 6 months of IMB model-based pulmonary rehabilitation in addition to routine care, while the control group received routine care measures. The degree of dyspnea, exercise endurance, quality of life, pulmonary rehabilitation compliance, self-management level, and lung function were compared between the two groups before and after the intervention.

Results

After the intervention, the experimental group showed better results in terms of dyspnea severity, exercise endurance, quality of life, pulmonary rehabilitation compliance, and self-management level compared to the control group, with statistically significant differences (P0.05).

Conclusion

Pulmonary rehabilitation based on the Information-Motivation-Behavioral Skills model can effectively alleviate dyspnea symptoms in patients with moderate to severe COPD, improve their exercise endurance, compliance with pulmonary rehabilitation, self-management ability, and quality of life.

Keywords: pulmonary rehabilitation,IMB,POCD

A COMPARATIVE ISOKINETIC EVALUATION POST HIIT TRAINING: STEMI PATIENTS VS. HEALTHY COUNTERPARTS

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Introduction

High-intensity interval training (HIIT) is recognized for improving cardiorespiratory fitness. However, its effects on muscular strength, in-STEMI patients are less understood. This study investigated the impact of a 12-week HIIT program on aerobic capacity and isokinetic muscle strength in post-STEMI patients and healthy controls, respectively.

Methods

A total of 32 participants (16 post-STEMI patients, 16 age-matched healthy controls) completed a supervised 12-week HIIT protocol (3 sessions including 4x4 min at 85-95% of HR-max/week). Pre- and post-intervention assessments included a cardiopulmonary exercise test (CPET) to determine VO_2 max and isokinetic dynamometry to evaluate peak torque of the quadriceps and hamstrings at 60°/s and 240°/s angular velocities. No resistance training was included in the intervention. Paired t-tests and Wilcoxon signed-rank test valuated pre- to post-intervention changes, while independent t-tests as well as Wilcoxon rank-sum test assessed group differences. $P < 0.05$ was set for statistical significance.

Results

CPET testing showed significant improvements for both groups from baseline (+32%, $p<0.001$ and +34%, $p<0.001$ for MI and CTRL, respectively). Significant improvements were found in extension peak torque at 60°/s (PRE: 86.36±28.1 Nm; POST: 89.82±29.3 Nm; $p = 0.035$) and extension torque relative to body weight ($p = 0.050$). Flexion torques and deficits did not change significantly. Group comparison revealed no statistically significant differences between MI and CTRL groups for other parameters. Deficit trends remained stable post-intervention.

Conclusion

Both STEMI patients and healthy individuals showed significant improvements in VO_2 max following the HIIT intervention. Notably, both groups also demonstrated marked increases in peak torque at both isokinetic velocities, despite the absence of dedicated strength training. These findings suggest that HIIT may confer neuromuscular adaptations contributing to increased dynamic strength, highlighting its potential as a dual-benefit modality for improving both cardiovascular and muscular function in clinical and healthy populations.

Keywords: HIIT, STEMI, isokinetic dynamometry, exercise

ADDITIONAL EXERCISES IN CARDIAC REHABILITATION IMPROVE GAIT PARAMETERS IN FRAIL PATIENTS AFTER OPEN-HEART SURGERY

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Background and Aims

Exercise-based cardiac rehabilitation (CR) is the most commonly used after open-heart surgeries (OHS)(1), these patients are more likely to have frailty syndrome(2) and have walking difficulties(3). There are no universally accepted standards for CR patients. Aim was to evaluate and compare the effects of additional exercises in CR on gait parameters in frail patients after OHS.

Methods

All 105 patients ≥65 years, after OHS and with frailty were invited to the study. Patients were randomly assigned to 3 different groups: control group (CG), intervention group 1 (IG-1), and intervention group 2 (IG-2). All groups received 20-day conventional CR program that included aerobic, stretching, breathing exercises 6 times/week; IG-1 additionally received multicomponent dynamic aerobic, balance and strength training (with unstable balance platforms, resistance bands and weights) 3 times/week; the IG-2, a combined computer-based program (with computer devices for gait, balance, strength training) 3 times/week. Groups were assessed 2 times: on admission and after CR. Frailty level was measured using Edmonton Frail Scale (≥4 score). Gait parameters were measured using Zebris program with force plate. Foot rotation, step and stride length, step width, double stance, step and stride time, cadence and gait speed were recorded.

Results

Within-group comparisons showed that significant differences were observed in all 3 groups in step, stride length, double stance phase and gait speed. Step, Stride time and cadence significantly improved results in CG and IG-2 groups, however, foot rotation significantly changed only in IG-2 group. Results showed that significant change in measuring step and stride time was found between CG and IG-1 as well as between the CG and the IG-2. Double stance significant change was observed only between the IG-1 and IG-2 groups.

Conclusion

All programs improved almost all gait parameters, however, combined computer-based program showed a greater effect on the results of gait parameters compared with other programs.

Keywords: Cardiac, rehabilitation, frailty, exercises, surgery

PREVALENCE OF UNDIAGNOSED OSA IN PATIENTS STARTING THE CARDIAC RHB PROGRAM

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Background and Aims

Determine the prevalence of undiagnosed obstructive sleep apnea syndrome (OSAS) in patients starting a cardiac rehabilitation program.

Methods

The risk of OSA was assessed using the STOP-BANG questionnaire in patients who began the cardiac rehabilitation program between October 2023 and October2024. Data collected included sex, age, CVRF, neck circumference, BMI, and smoking status.

Results

460 patients were seen in the cardiac RHB between October 2023 and October 2024. Of these, 11.52% (n=53) had ≥3 positive findings on the STOP-BANG questionnaire, which implies a high risk of OSAS. Of these 53 patients, 16.98% (n=9) were women with a mean age of 63.42 (SD 6.64) years, and 83.01% (n=44) were men with a mean age of 57.59 (SD 11.06) years. 64.15% (n=34) had a BMI >30, and 24.52% (n=13) had a BMI of 25-29.9. Regarding neck circumference, 73.58% (n=39) had a circumference >40 cm. A total of 35.71% (n=20) of patients had a previous diagnosis of OSAS, and 62.26% (n=33) had not been evaluated and were therefore referred to the pulmonology department. A total of 69.7% of referred patients were diagnosed with OSAS, 9.09% (n=3) had the diagnosis excluded, and 24.2% (n=8) are awaiting overnight polysomnography. The analysis found a statistically significant relationship (p40 cm and a high risk of OSAS. No statistically significant relationships were found between being overweight (p=0.261) or obese (p=0.45) and an increased risk of OSAS.

Conclusion

A high percentage of patients enrolled in cardiac rehabilitation programs are at high risk for OSA, and most of them are undiagnosed and untreated. A screening method should be included in cardiac rehabilitation consultations. Neck circumference is a simple measure and has been shown to be an important predictor of OSA risk. Diagnosis and treatment of OSA has been shown to reduce the risk of further cardiovascular events.

Keywords: OSAS, Cardiacrehabilitation

STUDY ON FIRST AID AND CARDIOPULMONARY RESUSCITATION (CPR) KNOWLEDGE AMONG THERAPISTS IN THE REHABILITATION GYM

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Background and Aims

Therapy areas within Physical and Rehabilitation Medicine (PRM) departments involve patients with significant comorbidities, increasing the risk of medical emergencies. Adequate training in cardiopulmonary resuscitation (CPR) and first aid is essential to ensure prompt and effective responses by healthcare professionals. This study aimed to assess the theoretical knowledge and perceived preparedness for emergency situations among rehabilitation staff, including physiotherapists, occupational therapists, speech therapists, and support staff.

Methods

A cross-sectional descriptive study was conducted through a structured survey administered to PRM staff working in the rehabilitation gyms of Hospital General Universitario Gregorio Marañón. The survey collected sociodemographic data, professional experience, training background in CPR and first aid, theoretical knowledge through clinical scenarios, and self-perceived readiness to handle emergencies. Descriptive and comparative analyses were performed using non-parametric statistical tests.

Results

Out of 86 invited professionals, 57 completed the survey (response rate: 66.3%). While 87.5% had received CPR training, only 47.3% had completed a first aid course. Merely 14.5% considered their training sufficient. Those who completed both CPR and first aid courses scored significantly higher in the knowledge test (mean 7.05/10) compared to those without training (5.05/10; $p = 0.03$). Physiotherapists outperformed other professional groups ($p = 0.001$). Self-perceived preparedness was reported by only 27.3%, but this group had significantly higher knowledge scores ($p = 0.011$). Almost all participants demanded regular training, with a recommended update frequency of approximately 2.3 years.

Conclusion

Combined training in CPR and first aid is associated with higher theoretical knowledge and greater self-confidence in emergency management. Despite extensive clinical experience, most professionals felt inadequately trained. The findings highlight the need for structured, accredited, and regularly updated training programs tailored to the rehabilitation setting, as well as specific emergency protocols to enhance patient safety and professional response capacity.

Keywords: Cardiopulmonary, Resuscitation, First, Aid, Emergency

ORAL PRESENTATION

PAIN TREATMENT AND REHABILITATION

CHANGES IN SUPRASPINATUS TENDON PATHOLOGY AND SHOULDER PAIN AFTER TRAUMATIC SPINAL CORD INJURY

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Background and Aims

Shoulder pain affects between 30-78% of individuals with spinal cord injury (SCI). Over time, repetitive use of the upper extremities, for wheelchair propulsion and transfers, can contribute to increases in pain in persons with SCI. The Aim of this study was to evaluate the change in shoulder pain and supraspinatus (SS) tendon pathology from inpatient discharge to one-year post-discharge.

Methods

This was an observational, prospective study. Individuals at least 20 years old who had a traumatic SCI and who were completing inpatient rehabilitation at the study hospital were recruited. Participants were evaluated regarding SS tendon health (Ultrasound Shoulder Pathology Ratings Scale and quantitative ultrasound (QUS) metrics) and shoulder pain and function (Disabilities of the Arm, Shoulder, and Hand; Wheelchair Users Shoulder Pain Index; and 0-10 ratings of shoulder pain). All measures were repeated 12 months later, and differences across the two time points were evaluated.

Results

The SS tendon in the non-dominant shoulder showed significant changes for QUS metrics of width, contrast, and homogeneity across the first year after traumatic SCI, but the dominant SS tendon exhibited no significant changes during this time period. Clinical measures of shoulder pain and function did not significantly change between baseline and 12-month follow-up. No significant correlations were found between changes in SS QUS measures and changes in shoulder pain across time for either shoulder.

Conclusion

Changes in non-dominant SS tendon width during the first year after SCI were detected in this study, but were not found for the dominant shoulder and were not significantly related to patient-reported shoulder pain. These results suggest that non-invasive and inexpensive ultrasound methods may be useful for monitoring pre-clinical signs of rotator cuff tendinopathy in individuals with SCI, and that special attention should be paid to the health of the non-dominant SS tendon during the first year after injury.

Keywords: ultrasonography, supraspinatus, spinal cord injury

NON-INVASIVE MODALITIES FOR CHRONIC LOW BACK PAIN: HILT VS. ULTRASOUND THERAPY OUTCOMES

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Background and Aims

Chronic low back pain (CLBP), persisting for more than 12 weeks, is a prevalent condition associated with pain, muscle weakness, restricted lumbar mobility, functional limitations, and psychosocial distress. Among the non-invasive physical modalities, high-intensity laser therapy (HILT) has recently emerged as a promising intervention due to its deep tissue penetration and analgesic properties. Ultrasound therapy remains a commonly utilized standard modality.The aim of this study was to examine the effectiveness of HILT in patients with chronic low back pain. The principal aim was to compare the effects of both physical modalities, therapy with high-intensity laser versus ultrasound therapy, and to point out the eventual differences in the analgesic effect and the range of lumbar spine motion.

Methods

This prospective, monocentric, controlled clinical study aimed to evaluate and compare the therapeutic efficacy of HILT versus ultrasound therapy in patients with CLBP. A total of 140 patients were randomized into two groups: the experimental group (HILT with therapeutic exercises) and the control group (ultrasound therapy with exercises). Outcome measures included the Numeric Pain Rating Scale, Oswestry Disability Index, Schober's test, and the Beck Depression Inventory, assessed at baseline, post-treatment, and at 3- and 6-month follow-ups.

Results

The results demonstrated a statistically significant reduction in pain intensity, improvement in lumbar spine mobility, and decreased disability in the HILT group compared to the control group across all time points. Moreover, the HILT group showed greater improvement in psychological well-being, as reflected in significantly lower BDI scores at follow-ups.

Conclusion

HILT combined with therapeutic exercise appears to be a safe, effective, and sustainable treatment option for CLBP. It provides superior clinical outcomes in terms of pain relief, functional recovery, and reduction of depressive symptoms when compared to conventional ultrasound therapy.

Keywords: low, back, pain, physical, therapy

EVALUATING PHYSICAL THERAPY EFFICACY IN MANAGING PREGNANCY-RELATED LOW BACK PAIN

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Background and Aims

Pregnancy-related lower back pain (LBP) is a prevalent condition affecting functional mobility and quality of life. Effective management strategies are essential to mitigate pain and improve overall well-being. This study aimed to evaluate the impact of a structured physical therapy program, "Prenatal-Mix," on functional limitations and pain intensity in pregnant women with LBP.

Methods

A total of 42 pregnant women (mean age: 28.7 ± 4.3 years) in their second trimester with LBP participated in the study. Participants underwent the "Prenatal-Mix" physical therapy program, which combined core strengthening exercises, pelvic floor muscle training, gentle stretching routines (including Pilates and Yoga), and Prenatal aqua therapy. The Oswestry Disability Index (ODI) and Numeric Rating Scale (NRS) were used to assess functional disability and pain intensity before and after the intervention. Statistical analysis was conducted using SPSS version 19.0, employing Student's t-test and chi-square (X^2) analysis to determine significance.

Results

Pre-intervention, the mean ODI score was 23.95 ± 8.7, which significantly reduced to 8.95 ± 5.7 post-intervention ($t=9.4$, $p<0.001$). Pain intensity showed a gradual reduction over time, with 9.5% of participants reporting decreased pain after two weeks, 31% after one month, 55% after three months, and 4.5% after five months. Irregular attendance correlated with delayed pain relief. Initially, 45.2% of participants exhibited minimal disability (ODI 0–20), increasing to 95.2% post-intervention ($p<0.001$). Chi-square analysis indicated a statistically significant association between training and reduced disability ($X^2=28.17$, $p=0.0001$) as well as pain intensity ($X^2=48.9$, $p=0.0001$).

Conclusion

A structured physical therapy program significantly reduces functional limitations and pain intensity in pregnant women with LBP. Regular participation enhances outcomes, underscoring the importance of integrating targeted physical therapy into prenatal care to improve maternal health and quality of life.

Keywords: back pain, pregnancy, physical therapy

ORAL PRESENTATION

SPORT MEDICINE

ELECTROMYOGRAPHIC ASSESSMENT OF PROFESSIONAL GOALKEEPERS EXPERIENCING SHOULDER PAIN DURING A FUNCTIONAL ACTIVITY

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Background and Aims

This study aimed to assess and compare the electromyographic activity of specific shoulder girdle muscles in professional goalkeepers, both with and without shoulder pain.

Methods

Ten professional goalkeepers participated in the study, five experiencing shoulder pain (mean age: 19.60 ± 3.20 years, body mass: 74.50 ± 2.85 kg, height: 17.80 ± 5.39 cm) and five without pain (mean age: 19.11 ± 1.65 years, body weight: 73.50 ± 6.10 kg, height: 178.50 ± 5.10 cm). Surface electromyography signals were recorded from seven upper limb muscles while participants performed a task, marking points with a pen in a counterclockwise motion within three circles. The normalized root-mean-square value was used to assess muscular activation.

Results

Goalkeepers experiencing shoulder pain exhibited increased activation in the upper trapezius (pain group mean: 27.90 ± 10.50, control group mean: 13.30 ± 6.10; $p = 0.002$, $\eta^2p = 0.450$), serratus anterior (pain group mean: 30.50 ± 19.80, control group mean: 13.20 ± 5.60; $p = 0.025$, $\eta^2p = 0.280$), and latissimus dorsi (pain group mean: 26.90 ± 17.80, control group mean: 4.85 ± 3.95; $p = 0.002$, $\eta^2p = 0.448$) muscles. However, no significant differences ($p > 0.05$) were observed in the activation of the middle and lower trapezius, middle deltoid, and sternocleidomastoid

Conclusion

Modified muscle activation patterns may play a role in shoulder pain among professional goalkeepers and should be taken into account in rehabilitation strategies.

Keywords: EMG; goalkeepers; shoulder pain

THE UNTAPPED POTENTIAL: ADAPTED PHYSICAL ACTIVITY AND FUNCTIONAL IMPROVEMENT IN ADOLESCENT IDIOPATHIC SCOLIOSIS

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Background and Aims

While standard care for adolescent idiopathic scoliosis (AIS) includes observation and bracing, the specific benefits of tailored exercise warrant further investigation. This prospective study evaluated the impact of a 6-month Adapted Physical Activity (APA) intervention on functional capacity and postural alignment in adolescents with AIS. We hypothesized that APA would lead to measurable gains in these key clinical outcomes.

Methods

Twenty-five adolescents (mean age 14.2 ± 1.8 years, mean Cobb angle 22.5° ± 8.1°) with AIS (Cobb angle 10°-40°) participated in a 6-month individualized APA program. This program, delivered twice weekly (60-minute sessions), focused on active self-correction, core stabilization, and targeted strengthening. Assessments at baseline and 6 months included Cobb angle (radiography), functional capacity (Timed Up and Go, Single Leg Stance), and postural alignment (trunk imbalance, shoulder asymmetry). Adherence was recorded.

Results

Following the 6-month APA program, significant improvements were observed. Mean Timed Up and Go time decreased from 10.8 ± 2.1 s to 8.9 ± 1.5 s ($p<0.001$), and Single Leg Stance time increased from 8.2 ± 3.5 s to 11.5 ± 4.0 s ($p<0.001$). Trunk imbalance significantly reduced from 2.1 ± 1.5 cm to 1.2 ± 0.9 cm ($p<0.001$), and shoulder asymmetry significantly improved ($p=0.01$). Cobb angle showed a non-significant change (22.5° ± 8.1° to 21.0° ± 7.5°, $p=0.15$), with 78% demonstrating stabilization or improvement. Adherence was high (85.2% ± 10.5%).

Conclusion

Adapted Physical Activity significantly improves function and posture in adolescent idiopathic scoliosis, suggesting its value alongside standard care. Future research should explore long-term effects, compare APA to other interventions, and identify optimal exercise parameters for diverse scoliosis types. Larger studies are needed to optimize APA integration into comprehensive management strategies.

Keywords: Adapted Physical Activity ,idiopathic scoliosis

USING A COMBINATION OF THREE CLINICAL TESTS FOR DETECTING MENISCAL TEARS INCREASES THE ACCURACY OF THE CLINICAL EXAMINATION

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Background and Aims

Recent studies indicate that using combination of two or more clinical tests for detecting meniscal tear gets a higher sensitivity and specificity than any clinical test performed individually. The aim was to investigate the validity of combination of three clinical tests for detection of meniscal tear (Thessaly Test, joint line tenderness, McMurray Test) and compare it with the results of another combination of three clinical tests (Ege Test, Steinmann I Test, atrophy of the thigh muscles) as well as with all six clinical tests performed individually.

Methods

The study involved 84 participants who were divided into two groups: the "OP group" consisting of participants diagnosed with a meniscal tear and who consequently underwent arthroscopic meniscectomy, and the "CN group" comprising of healthy participants with no history of knee injury. Two independent observers recorded the results of six clinical tests: Thessaly Test, joint line tenderness, McMurray Test, Ege Test, Steinmann I Test, and atrophy of the thigh muscles. The tests were grouped into two combinations of three tests each. The first combination included Thessaly Test, joint line tenderness and McMurray Test, while the second combination comprised of remaining three tests. Cochran's Q Test was used to calculate interobserver variability for both combinations of tests and for each test performed individually.

Results

First combination of three clinical tests when considering the combination positive if two tests are positive had high sensitivity of 95%, specificity of 90.9%, and an overall accuracy of 92.9%. Furthermore, when compared to clinical tests performed individually, the combination demonstrated superior results.

Conclusion

This study shows that using a combination of three clinical tests for detection of meniscal tear (Thessaly Test, joint line tenderness, McMurray Test), when considering the combination positive if two tests are positive, has greater accuracy than six tests performed individually. There were no statistically significant differences between observers.

Keywords: Meniscus; Exercise; Athletes.

EFFECTS OF A SPECIFIC PROPRIOCEPTIVE TRAINING ON INJURY PREVENTION IN BASKETBALL PLAYERS

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Background and Aims

Basketball carries a high risk of both chronic and acute musculoskeletal injuries, affecting various parts of the body. This study aimed to investigate the impact of a specific proprioceptive training protocol on professional basketball players.

Methods

Thirty male basketball players (M = 21.93, SD = 3.75 years) were divided into two groups: an experimental group (n = 15) and a control group (n = 15). The experimental group completed an adapted proprioceptive training program designed to enhance position-specific skills, following their regular team training. The parameters assessed included longitudinal body axis alignment, spinal range of motion, and total plantar load distribution. These were measured at three time points: baseline (T 0), after 4 weeks of training (T 1), and after 8 weeks of training (T 2).

Results

Data analysis showed a significant improvement of the assessed parameters in the experimental group, compared to the control group.

Conclusion

In conclusion, the findings highlight the effectiveness of specific and detailed training programs in injury prevention, offering valuable insights for coaches and sports psychologists.

Keywords: Basket; injury; prevention; performance; trauma;

THE ROLE OF PROPRIOCEPTIVE TRAINING IN REDUCING LUMBAR SPINE PROBLEMS AMONG ELITE FIGURE SKATERS

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Background and Aims

Figure skating is a physically demanding Olympic sport that requires a unique combination of artistic expression and athletic performance. The sport's growing technical complexity places increasing stress on the musculoskeletal system, particularly the lumbar spine, posing a concern for rehabilitation specialists and sports medicine professionals. This study aimed to investigate the prevalence of lower back pain among elite figure skaters and explore contributing factors related to training type, gender, discipline, and performance of specific skating elements.

Methods

A cross-sectional study was conducted with 194 competitive figure skaters: 35 male singles, 45 female singles, 56 pair skaters, and 58 ice dancers. Data were collected through structured questionnaires assessing the presence of lumbar pain in relation to on-ice and off-ice training routines and technical element execution.

Results

Lower back pain was reported by 33.8% of singles skaters, 41.1% of pair skaters, and 25.9% of ice dancers. A statistically significant difference ($p<0.05$) was observed among disciplines in relation to off-ice training and performance of physically demanding lifts and spins. No significant difference was found regarding spirals and step sequences.

Conclusion

The findings underscore a notable prevalence of lumbar spine pain in figure skaters, particularly in disciplines requiring greater physical load through lifts and spins. These results highlight the need for multidisciplinary approaches in injury prevention and athlete management, including tailored rehabilitation protocols, biomechanical assessments, and modifications to training intensity. Early intervention strategies and collaboration between coaches, physical medicine specialists, and physiotherapists are essential to preserve spinal health and athletic longevity.

Keywords: figure skating, injury prevention, rehabilitation

ORAL PRESENTATION

POSTOPERATIVE REHABILITATION

KNEE MUSCLES POWER AND FUNCTIONAL PERFORMANCE IN PATIENTS WITH KNEE ARTHROPLASTY

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Background and Aims

Lower limb muscular power has a strong influence on the quality of gait and on other activities in patients with total knee arthroplasty (TKA). However, directly and objectively assessing muscle power is not always evident in clinical practice, as expensive equipment is required. Thus, there is a need for identifying accessible and easily applicable tests, strongly correlated with muscle power, to be included in the clinical evaluation of these patients. In this regard, functional performance tests could be very helpful. The aim of this study was to assess the relationship between functional performance and knee muscles power in patients with TKA.

Methods

33 patients (17 men and 16 women) were included in a cross-sectional study at six months after TKA. The power of the knee extensor and flexor muscles was assessed by the isokinetic method at the velocities of 60o/s, 90o/s and 120o/s, using a Gymnex Iso 1 Dynamometer. Functional performance was evaluated using the timed up-and-go (TUG), stair climbing test (SCT) and 6-minute walk (6MW) tests. Based on these data, the relationship between functional performance and muscle power parameters was analysed.

Results

Quadriceps and hamstrings power significantly correlated ($p<0.05$) with all three functional performance tests. The highest level of correlation was found between knee extensor power and TUG test. The correlation was significant ($p<0.05$) for all the three angular velocities used.

Conclusion

Functional performance tests were highly correlated with knee extensor and flexor power, thus representing valuable tools for completing the clinical examination. On the other hand, as muscle power essentially contributes to improving functional performance, the rehabilitation programs after TKA should address also this parameter, for preventing disabilities and for enhancing long term autonomy.

Keywords: knee, arthroplasty, quadriceps, power, function

LOWER LIMB AMPUTATIONS IN A NORTHERN PORTUGUESE HEALTH UNIT: A RETROSPECTIVE STUDY

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Background and Aims

Lower limb amputations are complex, last-resort surgeries with significant impact on patient functionality and quality of life. Although exact prevalence data is scarce, it is estimated that around 150,000 amputations are performed annually in the United States. The most common causes are Diabetes Mellitus, Peripheral Arterial Disease, and trauma, though congenital, neoplastic, and infectious pathologies are also reported. This study aims to describe and characterize patients who underwent major (hip disarticulation, transfemoral, transtibial) and minor (distal to tibiotalar level) lower limb amputations at the Santo António Local Health Unit in northern Portugal.

Methods

A retrospective analysis was conducted using clinical records from 2015 to 2024 of patients followed in the Physical and Rehabilitation Medicine Department. Data collected included age, sex, amputation level and side, cause, cardiovascular risk factors, prosthetic use and mortality. Statistical analysis was performed using IBM SPSS Statistics 29.0.2.0.

Results

A total of 744 patients were included (71.8% male), with a mean age of 67.3 years. Transtibial amputation was the most common (39.2%). Other major amputations included transfemoral (35.2%) and hip disarticulation (0.8%) and minor amputations accounted for 7.5%. Vascular causes were most prevalent (50.9%), followed by trauma (15.3%), neoplasia (5.6%), and infection (3.9%). Cardiovascular risk factors were frequent: 53.1% of patients had diabetes, 67.6% hypertension, 66.2% dyslipidemia, 50.4% peripheral arterial disease, and 33.7% were smokers. Prosthetic fitting was achieved in 76.9% of cases. During follow-up, 27.8% of patients died, with a mean age at death of 70.9 years.

Conclusion

Vascular etiology was the leading cause of lower limb amputation in this cohort. The high prosthetic fitting rate may reflect quality rehabilitation services. Further studies are essential to improve care strategies for this patient population.

Keywords: Lower limb; Amputation; Portugal.

FUNCTIONAL REHABILITATION AFTER TOTAL KNEE ARTHROPLASTY IN PATIENTS WITH RHEUMATOID ARTHRITIS: SPECIFIC CHALLENGES AND PERSONALIZED STRATEGIES

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Background and Aims

Total knee arthroplasty (TKA) aims to improve function in rheumatoid arthritis (RA) patients; however, diverse epidemiological, clinical, radiological, biological profiles, and ongoing medical treatments influence rehabilitation outcomes. This study therefore investigated the impact of personalized rehabilitation, tailored to these parameters, on functional recovery post-TKA in these patients.

Methods

A prospective cohort study enrolled 60 rheumatoid arthritis (RA) patients undergoing primary total knee arthroplasty (TKA) at the Physical Medicine and Rehabilitation Department of Ibn Rochd University Hospital Center in Casablanca. Baseline data collected included age, body mass index (BMI), Charlson Comorbidity Index, pain intensity (Numeric Pain Rating Scale - NPRS), functional status (Health Assessment Questionnaire - HAQ), Kellgren-Lawrence grade, inflammatory biological markers (C-reactive protein - CRP, erythrocyte sedimentation rate - ESR), and current medical treatment (corticosteroids, conventional synthetic /biologicDMARDs..). Personalized rehabilitation programs were designed based on these individual patient profiles. Functional outcomes were evaluated at 12 weeks postoperatively using the Timed Up and Go (TUG) test and the Knee Injury and Osteoarthritis Outcome Score (KOOS).

Results

At 12 weeks, personalized rehabilitation significantly improved functional outcomes, with mean Timed Up and Go (TUG) decreasing from 22.1 ± 4.5 s to 14.5 ± 2.8 s ($p<0.001$) and mean Knee Injury and Osteoarthritis Outcome Score for Activities of Daily Living (KOOS-ADL) increasing from 45.8 ± 7.6 to 72.3 ± 9.1 ($p<0.001$). Subgroup analysis indicated that patients with fewer comorbidities, negative inflammatory markers, and those receiving biologic DMARD therapy achieved significantly better TUG (13.5 ± 2.3 s, 13.2 ± 2.0 s, 13.0 ± 2.1 s respectively) and KOOS-ADL (75.0 ± 8.0, 77.0 ± 7.0, 78.5 ± 7.5 respectively) compared to their respective counterparts ($p<0.05$).

Conclusion

Personalized rehabilitation enhances functional recovery after TKA in RA patients. Fewer comorbidities, lower inflammation, and biologic DMARD use correlate with greater improvements, highlighting the importance of individual patient characteristics in rehabilitation strategies.

Keywords: knee arthroplasty, rheumatoid arthritis, rehabilitation

BENEFITS OF EARLY PROACTIVE PRM EVALUATION IN ACUTE CARE SETTINGS FOR PATIENTS WITH MULTI-TRAUMA INJURY

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Background and Aims

Victims of terrorism and combat injuries usually present with a multifaceted injury pattern, including orthopedic injury, mild traumatic brain injuries, and acute stress response. These patients show a significant functional decline requiring an intensive and prolonged rehabilitation process to return to optimal functioning levels. PRM assessments are typically conducted upon request by the acute care team, which may lead to underdiagnosis and delay in diagnosis of impairments. Starting from October 9, 2023, the rehabilitation department at Soroka University Medical Centre began proactively identifying patients needing rehabilitation intervention following a multi trauma injury due to military operations or terrorism. Since then, daily monitoring by a rehabilitation physician has been conducted for all hospitalized patients with multi-trauma injuries. Our aim was to assess whether proactive assessment and monitoring by a rehabilitation physician for all war-related multi-trauma patients from the first day of hospitalization contribute to referring more patients to a multidisciplinary intensive rehabilitation framework.

Methods

A retrospective study compared two groups of patients: Those injured on October 7 and 8, 2023, and the intervention group of multi-trauma patients hospitalized in the following year. Demographic data of the patients, aspects of hospitalization, and the type of rehabilitation required, were examined and compared between the two groups.

Results

The demographic and injury data of the two groups were similar. Among the 302 patients in the control group, 68 were discharged and 28 were sent to rehabilitation. Among the 625 patients receiving an early proactive assessment and intervention, 318 were discharged and 67 were sent to rehabilitation. (X^2 (1, N=628) = 4.2, p = 0.04).

Conclusion

Proactive and early intervention by a rehabilitation physician leads to more effective identification of patients needing multidisciplinary intensive rehabilitation, and therefore, such measures should be considered for populations at risk of severe functional decline due to multi-trauma or similar situations.

Keywords: multi-trauma, acute rehabilitation

REHABILITATION OF A PATIENT WITH FEMORAL NERVE PALSY AFTER BILATERAL TOTAL HIP ARTHROPLASTY VIA DIRECT ANTERIOR APPROACH: A CASE REPORT

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Background

Bilateral total hip arthroplasty (THA) has proven to be an effective treatment modality for patients with bilateral hip osteoarthritis, allowing for faster recovery. This case highlights the importance of rehabilitation following THA and the challenges associated with potential complications such as femoral nerve palsy (FNP).

Case report

A 44-year-old female patient with bilateral secondary hip osteoarthritis due to developmental hip dysplasia underwent bilateral THA in a single operative session under general anesthesia, using a direct anterior surgical approach. The patient was mobilized 24 hours after surgery and rehabilitation was initiated. Clinically, active extension of the left knee was absent. On the seventh postoperative day, the patient was transferred to a rehabilitation facility where the initial evaluation recorded passive flexion of 70° in both hips, minimal activity of the left quadriceps muscle (manual muscle test, MMT 1/5), and preserved strength of the distal musculature of the left leg. The right leg showed an expected postoperative status. Clinical suspicion of an acute left FNP was confirmed by electromyoneurography, and ultrasound excluded nerve discontinuity or compression in the left groin. The rehabilitation program included kinesiotherapy, gait training, cryocompression and muscle electrostimulation. After six weeks of inpatient rehabilitation, functional hip range of motion was achieved bilaterally, with persistent weakness in the left knee extensors (MMT 1/5). Outpatient rehabilitation was continued, and after six months, complete recovery of motor deficit was observed. Electromyoneurography also confirmed recovery of the left FNP.

Conclusion

FNP during THA is a relatively rare complication (incidence 0.21%). Studies report recovery periods ranging from six months to two years, with rehabilitation—particularly early muscle electrostimulation of the denervated muscles—remaining the gold standard of treatment. Compared to rehabilitation after unilateral THA, this case required greater focus on achieving symmetrical recovery of hip function and the prevention of complications.

Keywords: femoral nerve palsy, hip arthroplasty

COMPLEX REHABILITATION AFTER MULTIPLE AMPUTATIONS

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Background

Rehabilitation of patients after limb amputation is a complex process involving medical, physical, and psychological support aimed at restoring functionality and quality of life. In the early rehabilitation phase, the focus is on wound care, prevention of complications, and preservation of mobility. Functional rehabilitation includes exercises, prosthetic preparation, and learning new skills. Psychosocial support is essential for adapting to a new way of life, while long-term follow-up enables timely problem-solving and maintenance of achieved outcomes. The entire process requires a multidisciplinary approach (physiatrist, physiotherapist, nurse, prosthetic engineer) and an individualized recovery plan.

Case report

The patient, a male active-duty soldier, was severely injured on February 23, 2023, sustaining multiple injuries resulting in the amputation of all four limbs. In our Rehabilitation Department, the patient was provided with appropriate prosthetic devices, as indicated by a multidisciplinary team decision. Rehabilitation was carried out through a structured, individualized plan including physiotherapy, desensitization, gait training, patient and family education, and continuous psychosocial support.

Conclusion

Despite the extreme complexity of the case, the patient achieved significant functional progress and demonstrated a high level of adaptation to his new way of life.

Keywords: rehabilitation, amputation, prosthetics

ORAL PRESENTATION

MUSCULOSKELETAL REHABILITATION

THE EFFECT OF THE MEDITERRANEAN DIET ON DIASEASE ACTIVITY, FUNCTION AND FATIGUE IN PATIENTS WITH RHEUMATOID ARTHRITIS

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Background and Aims

In order to maintain remission or low disease activity and prevent disease progression in rheumatoid arthritis (RA), a multimodal approach is preferred one, including pharmacological and non – pharmacological treatment. The aim of our study was to evaluate effect of the Mediterranean diet on RA activity.

Methods

A total of 26 patients (19 female and 7 male) mean age 61 years from the Sestre milosrdnice University Hospital Center were observed in longitudinal analyses from February 2025 to April 2025, at baseline (T0), after 6 week period (T1). All the patients underwent nutritional consultation and following data were analyzed: demographic, clinical and laboratory data, as well as composite indices and questionnaires assessing disease activity (DAS 28), function (HAQ-DI) and fatigue (FACIT-F). No pharmacological therapy was changed in the time frame of interest.

Results

The mean DAS28 score significantly decreased from 4.13 ± 1.20 at T0 to 3.45 ± 1.39 at T1, with a mean change of −0.68 ± 0.76 ($p < 0.001$). Mean HAQ-DI scores demonstrated modest improvement from 1.04 (SD=0.83) at T0 to 0.96 (SD=0.68) at T1 (mean change -0.08, 95% CI -0.32 to 0.16). While 54% of patients showed reduced disability scores (median improvement -0.5 points), the overall difference did not reach statistical significance (p=0.483). Mean FACIT-F scores improved significantly from 29.6±11.2 (T0) to 33.5±10.8 (T1), with a mean increase of +3.9 points (95% CI: 1.5-6.3). Effect size was moderate-large.

Conclusion

In our cohort of patients with established RA, Mediterranean diet showed positive effects on significantly improving disease activity and fatigue, with moderate improvement in function. Dietary guidelines for RA patients should be made in order to improve outcomes in these patients.

Keywords: Rheumatoid, arthritis; Mediterranean, diet; fatigue

EFFECTS OF A MULTIMODAL THERAPY PROGRAM (MTP) INCLUDING RADONTHERMAL THERAPY (RTT) ON BASDAI SCORES AND PAIN IN INPATIENTS WITH ANKYLOSING SPONDYLITIS (AS)

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Background and Aims

AS is a chronic inflammatory disease of insidious onset, mostly affecting the axial skeleton. It leads to varying degrees of restricted spinal mobility, pain and loss of functional capacity. Although there is a wide range of medications, including biologics, rehabilitation plays an important role in the treatment. Various MTPs are available for the management of individuals with AS. These programs can also include balneotherapy. In the Gastein valley RTT in the Gastein healing gallery (GHG) and radon baths (RBs) are administered, because of known positive analgesic and anti-inflammatory effects of RTT.

Methods

The aim of this study was to evaluate the effectiveness of a specific MTP: 3 weeks physical therapy (active und passive) combined with 5 RBs (0.3-3 kBq/l; 25 minutes bathing time) and 10 sessions in the GHG (radon content 30-160 kBq/m3; 1 hour). We recorded the BASDAI index and VAS scores for pain at the beginning (T0) and at the end of the program (T1).

Results

70 inpatients (mean age 54.8; 58% males) with AS treated in Klinikum Bad Gastein between January and April 2025 were assessed. 65.7% of the patients took NSAIDs and 51.4% biologics. The mean BASDAI scores were at T0 4.49 and at T1 2.56, respectively. Mean VAS pain scores were at T0 6.41 and at T1 2.87. The reduction in both BASDAI and VAS pain scores were significant ($p<0.05$). We also found a reduction in other symptoms and a clinical improvement in general.

Conclusion

This study demonstrated significant and clinical relevant reductions in disease activity and in pain in inpatients with AS, who underwent a MTP including RBs and sessions in the GHG. From our point of view a MTP with RTT is an important part in the management of AS in addition to medical treatment.

Keywords: Ankylosing Spondylitis, BASDAI, Rehabilitation, Radon

PREDICTORS OF FUNCTIONAL RECOVERY AND MORTALITY AFTER HIP FRACTURE- DO WE RECOGNIZE THEM IN DAILY CLINICAL WORK?

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Background and Aims

Hip fractures in the elderly are followed by increased mortality, and functional decline. Identification of early postoperative mortality and functional predictors enables the stratification of high-risk patients and can help in the development of strategies aimed at reducing risk and improving outcome after hip fracture. The primary aim of this study was to investigate predictive factors during the early postoperative phase related to mortality and functional outcome after hip fracture.

Methods

We examined 344 elderly patients with hip fracture. Multivariate logistic regression analysis was used to explore independent prognostic factors for 1 year mortality. We further analyzed functional recovery of 191 patients with hip fracture after 6 months.

Results

By the end of 12 months, 87 patients (25.4%) had died. Our results revealed that age, cognitive status, functional status prior to injury, functional status on discharge, and presence of delirium were independent predictor of 1 year mortality. Our investgation further showed that patients with worse general health, weaker handgrip strength and longer time from admission to surgery had worse functional recovery 6 months after hip fracture.

Conclusion

Identifying patients upon admission for mortality and worse functional outcome possibly enables development of targeted prevention and intervention strategies in older patients with hip fracture.

Keywords: hip fracture, mortality, functional outcome

CHRONIFICATION RISK AND BODILY FUNCTIONAL MEASURES IN LOW BACK PAIN

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Background and Aims

The STarT back screening tool (SBST) validly categorizes the risk of pain chronification which is relevant for prognosis and treatment of back pain according to the biopsychosocial model. This cross-sectional study sought to investigate if low, medium, and high risk SBST chronification groups differ in bodily functional and psychosocial measures and if interactions with patients` age and gender exist. 595 chronic low back pain patients (68 % females, mean age 53 ± 6.7 years) recruited from an outpatient rehabilitation center completed the SBST and well-established reliable function categories, rated visual analogue pain scale, and performed maximum bodily functional measurement testings. Multivariate analyses of variance were calculated for statistical analyses.

Results

Significant between SBST group effects were observed for pain, disability (Roland Morris disability questionnaire, Pain Disability Index), the 5-level European Quality of Life Questionnaire, the Hospital Anxiety and Depression Scale ($p < 0,001$) but not for the Avoidance-Endurance behaviour. Differences in maximum trunk extension and flexion strength, hand grip strength, and trunk range of motion outcome measures interacted with age and gender but the impact of gender vanished in the high risk SBST group.

Conclusion

Pain chronification risk has significant impact not only on psychosocial but on bodily functional measures as well. However, high chronification risk seems to dominate otherwise existing gender associated trunk muscle strength differences in chronic back pain patients. Future randomized controlled trials should focus on the need for individually tailored treatment programs to optimize back pain therapy outcome.

Keywords: chronification risk, bodily measurements, impact

ORAL PRESENTATION

CANCER REHABILITATION

IS LIMB-SPARING SURGERY MORE EFFECTIVE THAN AMPUTATION IN ENHANCING PATIENTS' QUALITY OF LIFE AND FUNCTIONAL CAPACITY?

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Background and Aims

For patients with aggressive musculoskeletal tumors in the lower extremities, treatment options may include above-knee amputation or limb-salvage surgery. However, the comparative subjective and objective advantages of limb-salvage surgery over amputation remain uncertain. This study aims to compare functional status and quality of life for patients treated with above-knee amputation versus limb-salvage surgery.

Methods

As part of a retrospective cohort study, we analyzed 39 out of 68 patients aged 17 years and older who underwent either above-knee amputation or limb-salvage surgery for aggressive musculoskeletal tumors around the knee between 2014 and 2022. During the final follow-up, we collected data using the Physiological Cost Index, the Reintegration to Normal Living Index, SF-36, and the Toronto Extremity Salvage Score questionnaires. The minimum follow-up duration was 14 months, with a median of 60 months

Results

Patients who underwent limb-salvage surgery demonstrated higher Physiological Cost Index scores and greater reintegration into normal living than those who had above-knee amputation. However, the Toronto Extremity Salvage Scores and SF-36 outcomes were comparable between the groups.

Conclusion

These findings indicate that limb-salvage surgery provides superior gait efficiency and facilitates reintegration into daily life compared to above-knee amputation. However, it does not enhance the patient's perceived quality of life

Keywords: Limb, sparing, surgery, amputation, functional

BEYOND THE SWELLING: EXPLORING NEUROPATHIC PAIN IN BREAST CANCER SURVIVORS WITH LYMPHEDEMA

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Background and Aims

Background: Lymphedema is a common and persistent complication among breast cancer survivors, often accompanied by varying types of pain, including nociceptive and neuropathic components. Pain mechanisms associated with lymphedema include tissue stretching due to swelling, inflammatory responses from lymphatic fluid stasis, nerve compression, and musculoskeletal strain resulting from altered biomechanics. Clinically, this pain may present as heaviness, tightness, burning, tingling, or pain related to complications such as cellulitis and fibrosis. Objective: This study aimed to assess the presence and characteristics of neuropathic pain in patients with breast cancer-related lymphedema (BCRL) using validated instruments such as the PainDETECT questionnaire and conventional pain assessment tools.

Methods

Methods: Lymphedema was identified using limb circumference measurements, with a relative volume change (RVC) of ≥5% considered diagnostic. Pain was evaluated through the PainDETECT questionnaire and a direct inquiry regarding pain presence. Additional symptoms including numbness, tingling, and muscle weakness, were analysed to distinguish neuropathic features from general pain intensity. Sociodemographic and disease-related data were collected via structured questionnaires and medical records review.

Results

Results: Among a total of 87 breast cancer survivors with a mean age of approximately 58 years (58.47 ± 8.95) and a mean body mass index (BMI) of 27 (27.74 ± 5.64), 58% self-reported swelling, while 39% reported no swelling. Based on relative volume change (RVC), 40 participants (45.98%) had RVC < 5%, and 47 participants (54.02%) had RVC ≥ 5%. Participants with higher volume changes demonstrated significantly more advanced disease stages according to the International Society of Lymphology (ISL) staging classification ($p < 0.001$).

Conclusion

Conclusion: Early identification of neuropathic pain in BCRL may support more personalized and effective pain management strategies, contributing to improved long-term outcomes and quality of life for breast cancer survivors.

Keywords: Keywords., Breast, neoplasm, Lymphedema, Neuropathic

MULTIMODAL REHABILITATION TREATMENTS FOR THE MANAGEMENT OF TEMPOROMANDIBULAR DISORDERS IN HEAD AND NECK CANCER PATIENTS: A SYSTEMATIC REVIEW

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Background and Aims

Temporomandibular disorders (TMD) in patients with head and neck cancer (HNC) are understudied, particularly regarding multimodal rehabilitation (MR) treatments aimed at functional recovery, pain reduction, and quality of life (QoL) improvement. This systematic review (SR) evaluates the role of MR interventions in addressing these outcomes.

Methods

Eligible studies included randomized controlled trials (RCTs) and observational studies involving HNC patients with TMD, undergoing MR treatments. Outcomes considered were mandibular mobility (Maximum Interincisal Opening, MIO), pain intensity (0-100 Visual Analogue Scale, VAS), and QoL (0-100 University of Washington Quality of Life, UW-QOL; 0-148 Functional Assessment of Cancer Therapy – Head and Neck, FACT-HN). Exclusion criteria were non-English articles, duplicates, studies unrelated to the review's aim, non-motor interventions, ex vivo or animal studies, absence of Ethics Committee approval, and non-original studies. A systematic search was conducted across PubMed, Scopus, and Web of Science (1990–2024). Evidence quality was assessed using the National Heart, Lung, and Blood Institute tools, and risk of bias (RoB) with the RoB in the Non-Randomized Studies of Interventions Version 2 tool for observational studies, and the Cochrane RoB tool for RCTs. Data extraction covered study design, patient characteristics, interventions, and outcomes.

Results

Of 257 articles, 7 met the criteria (3 observational studies, 4 RCTs; 340 patients). Studies showed a RoB ranging from low to high and evidence quality from fair to good. MIO improved by an average of 10 mm, pain intensity decreased by 15–20%, and QoL improved significantly (UW-QOL by 25–30 points; FACT-HN by 20–25 points).

Conclusion

Despite study heterogeneity and short-term follow-up, MR appears effective in improving mandibular function, reducing pain, and enhancing QoL in HNC patients with TMD.
Funding: none. Registration: PROSPERO Registration n° CRD42024618345.

Keywords: Exercise, Rehabilitation, Neoplasm

ORAL PRESENTATION

OTHER TOPICS

EPIDEMIOLOGY AND MANAGEMENT OF FUNCTIONAL URINARY DISORDERS IN CHILDREN

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Background and Aims

Urinary disorders in children are very common. If left untreated, they can affect quality of life as well as nephrological prognosis. The objective of our study is to evaluate these functional urinary disorders in children to propose an appropriate therapeutic approach.

Methods

This is a retrospective descriptive study involving 125 children referred to the department of Physical Medicine and Rehabilitation for the management of functional urinary disorders. The parameters analyzed include: Sociodemographic characteristics of patients, Urinary symptoms, Urodynamic data and therapeutic management implemented.

Results

The average age was 8 ± 0.5 years, with a female predominance. The most common urinary symptoms were: Primary nocturnal enuresis (68%), Urgency (58.4%), Urge incontinence (52%), Pollakiuria (44%). Urinary tract infection was found in 48% of patients, while 41.6% had constipation and 26.4% presented with anal incontinence. A family history of urinary disorders was reported in 32% of cases. Neurological examination revealed no abnormalities, and vesicorenal ultrasound showed no upper urinary tract anomalies. However, a significant post-void residual volume was noted in 23.2% of patients. Urodynamic exploration, performed in 82 patients, revealed: a reduced bladder capacity (62.4%) and detrusor overactivity (53.6%). Therapeutic management combined multiple approaches: Therapeutic educational measures and treatment of irritative factors in all patients, pharmacological treatment with prescription of anticholinergic drugs in 61.6% of patients, administration of an ADH analogue in 6 patients, intermittent catheterization in 20% and perineal rehabilitation in 78 children.

Conclusion

The management of urinary disorders in children requires a systematic and thorough analysis of multiple parameters to propose a comprehensive and tailored therapeutic approach.

Keywords: Functional urinary disorders, Children, urodynamic

ARTIFICIAL INTELLIGENCE FOR EARLY RISK STRATIFICATION AND TREATMENT OPTIMIZATION IN ADOLESCENT IDIOPATHIC SCOLIOSIS: PRELIMINARY RESULTS FROM A CLINICAL IMPLEMENTATION

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Background and Aims

Adolescent Idiopathic Scoliosis (AIS) is a multifactorial condition characterized by curve progression. Early identification of high-risk patients is important for timely and effective interventions, including bracing and specific rehabilitation programs. Traditional decision-making relies on single clinical parameters, which may not capture the complexity of risk profiles for each patient. Recent advancements in Artificial Intelligence (AI) that can process and analyze large amounts of data offer new possibilities for precision medicine in AIS care. This study aimed to evaluate the real-world applicability of an AI-based predictive model for early risk stratification in AIS and its role in supporting clinicians in personalized therapeutic decision-making.

Methods

A supervised Machine Learning (ML) algorithm was developed and internally validated using clinical and radiographic data from a retrospective cohort of 600 AIS patients. The model integrated demographic, skeletal maturity, and postural parameters to estimate the risk of curve worsening over 12 months. The outcome variable was defined as either an increase in the Cobb angle or, when follow-up radiographs were unavailable, a clinically assessed increase in rib hump during follow-up.

Results

In the ML model, the most influential predictors of AIS worsening were: lower hump at baseline, lower Risser stage, smaller initial Cobb angle, younger age at the time of brace prescription, and brace prescription for 18–24 hours per day.

Conclusion

The integration of AI in the early management of AIS may enhance clinical decision-making by providing individualized risk profiles and suggesting targeted interventions. Our ML model identifies individualized risk profiles and reveals that patients with milder clinical presentations, such as lower Cobb angles and subtle humps, may paradoxically carry a higher risk of curve progression, thus requiring careful therapeutic consideration to avoid undertreatment.

Keywords: artificial intelligence; scoliosis; machine learning.

GERIATRIC REHABILITATION AGAINST FRAILTY AND SARCOPENIA

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Background

The goal of geriatric rehabilitation is to improve functional ability, autonomy, and quality of life in older adults after illness, injury, or surgery. It aims to restore independence, prevent further decline, support mental health, facilitate community reintegration, and coordinate multidisciplinary care. The aim of this paper is to highlight the role of physical activity through various exercises in improving strength and power at the level of individual muscle fibers, as well as enhancing overall functionality. Before starting different exercise programs, methods for pre-exercise assessment will be presented, along with contraindications for participation in the exercise program.

Case report

Various low-intensity exercises will be presented, including gradually progressive resistance training, respiratory and aerobic exercises. These types of training improve muscle mass, strength, and function, promote neurological adaptation and coordination, and increase bone density. The program will be designed with an individualized approach and will include walking exercises, as well as balance exercises, which are particularly effective in preventing falls in individuals with a history of falling. Methods for assessing muscle mass, muscle strength, and physical performance will also be presented. Physical performance is defined as the objectively measured function of the whole body related to locomotion, for objective evaluation, the gait speed test is used, which is safe and highly reliable for diagnosing frailty, while the SPPB (Short Physical Performance Battery) is applicable in clinical practice.

Conclusion

In the recommendations of EWGSOP2 and the FACS algorithms, the first step in the rehabilitation of sarcopenia and frailty together with nutritional support, which are the two most important interventions is best implemented together.

Keywords: Geriatric, Rehabilitation, kinesiotherapy, Progressive Resistance

FEMORAL NEUROPATHY SECONDARY TO ILIOPSOAS HAEMATOMA: A CASE SERIES AND REHABILITATION OUTCOMES

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Background

Spontaneous iliopsoas haematoma is a recognized complication of anticoagulant therapy, though less frequently associated with traumatic injuries. Femoral neuropathy is an uncommon but serious consequence, often resulting from compression by masses within the iliopsoas muscle. There is no established consensus regarding the best treatment approach, with both conservative and surgical options considered viable. We report three cases of femoral neuropathy secondary to iliacus and psoas muscle haematomas.

Case report

Case 1: An 81-year-old previously autonomous female, anticoagulated with a NOAC for atrial fibrillation, developed generalized weakness, asthenia, and gait impairment following a seizure. Imaging revealed a left iliacus and psoas haematoma compressing the femoral nerve. Electromyography (EMG) showed severe neurogenic compromise. Despite conservative management and rehabilitation, significant deficits persisted, impacting gait. Case 2: An 82-year-old autonomous male suffered a cervical fracture in a car accident and was treated conservatively with a neck brace. He initially had no neurological deficits but developed bilateral lower limb weakness after initiating anticoagulation for immobilization. Imaging identified extensive bilateral iliopsoas haematomas and retroperitoneal collection. EMG revealed severe axonal damage of the left femoral nerve. Despite a reduction of the haematoma after blood transfusion and anticoagulation reversion the deficit persisted and gait remains impaired. Case 3: An 82-year-old male with atrial fibrillation on warfarin, hospitalized for pneumonia and respiratory failure, experienced abdominal and left inguinal pain, knee extension deficit, and sudden haemoglobin drop. Imaging revealed a right iliopsoas haematoma with signs of active bleeding. Anticoagulation was reversed, and bleeding stopped spontaneously. After stabilization, rehabilitation was initiated, and anticoagulation therapy was optimized by switching to a NOAC.

Conclusion

Iliopsoas haematomas can result in significant neurological impairment, particularly femoral neuropathy, severely impacting patient mobility and independence. Early recognition, prompt imaging, multidisciplinary management, and individualized rehabilitation are crucial to optimize outcomes.

Keywords: Iliopsoas Haematoma; Femoral Neuropathy; Rehabilitation

THE FUNCTIONAL EVALUATION OF THE LOWER LIMBS IN OBESE SUBJECTS: STUDY EXPERIMENTAL FOR THE PREVENTION OF TRAUMA

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Background and Aims

Obesity represents a major public health concern. It is defined as a condition involving excessive accumulation of adipose tissue, which may lead to significant health complications. The musculoskeletal system is significantly involved in the quality of life of individuals with obesity. The excessive accumulation of adipose tissue in the musculoskeletal and locomotor systems, particularly in the visceral region, places strain on the spine, leading the individual to adopt incorrect postures. This results in a shift of the body's center of gravity and a misalignment of the spine, which is no longer properly aligned. The increased body weight restricts the range of motion in daily activities, reducing overall quality of life. The aim of the study is to assess the functional overload affecting the musculoskeletal and osteoarticular systems in individuals with obesity, and to demonstrate how an effective adapted physical activity protocol can serve as a valuable tool for the prevention and management of the identified impairments.

Methods

For the study, 63 participants aged between 50 and 65 years were recruited, including 30 males and 33 females. The experimental group participated in an adapted training program. The parameters assessed included joint pain levels (hip, back, and knee) and joint range of motion (ROM). These parameters were measured at three time points: baseline (T0), after 6 months (T1), and after 12 months of training (T2).

Results

Our results indicate that the implemented exercise program may be a valid option for improving postural balance, reducing pain symptoms and functional limitations in individuals with obesity, while also enhancing their overall quality of life

Conclusion

The present study demonstrated that the adapted physical activity protocol, tailored to the individual's needs and identified postural deviations, led to significant improvements in quality of life, physical performance, and a reduction in perceived pain levels.

Keywords: obesity, trauma, rehab, exercise

FENICE PROTOCOL IN BREAST CANCER REHABILITATION: A CASE SERIES

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Background and Aims

Background: Breast cancer (BC) is among the most common cancers in women, and its treatment often leads to long-term physical and psychological sequelae. Rehabilitation strategies play a key role in managing these effects, improving quality of life (QoL), and supporting functional recovery. The Fenice Protocol introduces fencing as an innovative form of Adapted Physical Activity (APA) for non-metastatic breast cancer women (BCWS), aiming at psychophysical reconditioning and social reintegration. Aims: To describe the implementation and effects of the Adapted Training Exercise by Fenice Project (ATEF) through two illustrative cases of post-surgical BC rehabilitation.

Methods

Methods: Two BCWS underwent personalized rehabilitation pathways, including Motor Re-educational Programs (MRP) and ATEF. Functional assessments were performed at one month from surgery (T0), after the first 4 weeks (T1), and after 4 months (T2), using validated clinical scales (VAS, DASH, CONSTANT, NDI, Barthel, SF-36) and upper limb circumference measurements to monitor recovery and detect lymphedema.

Results

Results: Both cases showed improvements in pain, joint mobility, upper limb functionality, and QoL, without signs of lymphedema. Fencing proved to be effective not only for physical recovery but also for enhancing self-esteem, emotional well-being, and patient engagement in the rehabilitation process.

Conclusion

Conclusion: The Fenice Protocol, combining MRP and fencing-based APA, appears to be a safe and valuable rehabilitation strategy for BCWS. It fosters holistic recovery by addressing both physical and psychological needs, and may represent an innovative model in multidisciplinary cancer rehabilitation.

Keywords: Breast, Cancer, Rehabilitation, Holistic, Approach

POSTER PRESENTATION

POSTER PRESENTATION

CHILDREN REHABILITATION

CASE REPORT OF A CHILD WITH POIRIER-BIENVENU NEURODEVELOPMENTAL SYNDROME

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Background

Neurological syndrome known as Poirier-Bienvenu neurodevelopmental syndrome (POBINDS) is characterized by early onset of epileptic seizures and delayed psychomotor development. It is a rare disease associated with mutations in the CSNK2B gene. This gene encodes the beta subunit of casein kinase CK2, which is involved in numerous processes and regulates metabolic pathways, signal transduction, transcription, translation and replication.

Case report

A firstborn boy from a first pregnancy that proceeded normally. Delivery at 41 weeks, vaginal, birth weight 4050 g, birth length 50 cm, Apgar score 10/10. At the age of 6 months, he manifested four generalized epileptic seizures. Hospitalized at the Children's Hospital Zagreb, where diagnostic workup was performed: neuroimaging methods CT and MRI of the brain were normal, laboratory and metabolic workup showed no abnormalities, lumbar puncture findings were normal. Genetic testing (Blueprint panel epilepsy) identified a pathogenic mutation in the CSNK2B gene (c.139C>T, p.(Arg47*)), with an autosomal dominant inheritance pattern. The clinical picture varies; some individuals have frequent and severe epileptic seizures, severe motor deficits and difficulties in language and speech development, others may have seizures that respond to treatment and have normal psychomotor development. Some children have symptoms from the autism spectrum, dysmorphic facial features (triangular face, hypertelorism, sparse eyebrows). Sporadic cases have vascular abnormalities and growth hormone deficiency. In most, this is a de novo mutation.

Conclusion

Treatment is symptomatic, based on epilepsy management and stimulation of psychomotor development. Given the significant phenotypic variability, the approach to POBINDS patients must be individualized. Multidisciplinary care involves neuropediatricians, geneticists, child physiatrists, speech therapists, and psychologists and is essential for optimal outcomes. Early recognition and timely treatment improve developmental outcomes.

Keywords: Poirier-Bienvenu, neurodevelopmental, syndrome;, child;, multidisciplinary

OPTIMIZING UPPER LIMB FUNCTION IN CEREBRAL PALSY: A REVIEW OF EVIDENCE ON CONSTRAINT-INDUCED MOVEMENT THERAPY

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Background and Aims

erebral palsy (CP) is a leading cause of motor disability in childhood, frequently affecting upper limb function, particularly in unilateral presentations. Constraint-Induced Movement Therapy (CIMT), which involves constraining the unaffected limb to encourage use of the affected one, has emerged as a promising intervention. This review aims to summarize current evidence on the effectiveness, optimal dosage, and comparative benefits of CIMT in children with CP.

Methods

A literature review was conducted based on recent systematic reviews and meta-analyses identified through PubMed and academic databases. The included studies evaluated CIMT in children with hemiplegic CP, focusing on functional outcomes, dosage, age-related effects, and comparisons with alternative interventions such as bimanual therapy.

Results

Evidence consistently supports CIMT as an effective strategy to improve upper limb function and participation in children with unilateral CP. Meta-analyses demonstrate moderate effect sizes, particularly when therapy is delivered in natural settings or with caregiver involvement. CIMT was shown to be as effective as bimanual intensive therapy, although neither intervention demonstrated clear superiority. Optimal dosage appears to be between 30–60 hours, with no significant association found between treatment duration or age and effectiveness. Modified versions of CIMT (mCIMT) also showed benefit, and early implementation (infants and toddlers) is feasible when paired with structured, engaging environments.

Conclusion

CIMT is an evidence-based intervention for improving upper limb activity and functional use in children with unilateral cerebral palsy. While it is not clearly superior to other high-intensity therapies, it offers comparable outcomes and may be particularly effective when integrated into the child's everyday environment. Further high-quality studies are needed to refine treatment protocols, determine long-term outcomes, and explore patient-specific predictors of response.

Keywords: Pediatric Rehabilitation, Neuroplasticity, CIMT

DYSTROPHIC EPIDERMOLYSIS BULLOSA IN ALGERIA: A CASE REPORT AND REHABILITATION APPROACH

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Background

Dystrophic Epidermolysis bullosa (DEB) is a rare genetic disease characterized by skin fragility with blistering that occurs spontaneously or following minor trauma such as mild pressure or friction. Children with DEB have a range of disabilities. The most severely affected may suffer from scarring, fibrosis, and contractures affecting any part of the body. Pain can be both acute and chronic, independence in activities of daily living can be significantly limited, and quality of life can be affected. There is currently no cure for DEB, but symptomatic therapies can be provided through a multidisciplinary team(MDT) approach where possible. Physical and rehabilitation medicine (PRM) can be an integral part of MDT. This poster highlights the interest of PRM in the management of deficiencies and disabilities related to this disease.

Case report

We present the case of M K, a 4-year-old child, admitted for the management of recessive dystrophic epidermolysis bullosa. Our initial assessment found: • uncooperative child, malnourished with growth retardation • bullous lesions with generalized scabs, global amyotrophy, • bilateral syndactyly due to synechiae • delayed psychomotor development. EBDASI score at 45/ 88, QOLEB score at 52/ 68 During his stay, the pediatric surgery team performed an esophageal dilation, the child was put on intravenous gentamicin course . Also, the child benefited from physiotherapy and occupational therapy sessions. After 3 months, we noted good wound healing. The child walks without technical aids, this functional progress is reflected by an improvement in the EBDASI scores (28/ 88) and the QOLEB score (31/ 68).

Conclusion

The management of DEB is multidisciplinary, rehabilitation by its means including occupational therapy, physiotherapy and equipment are an integral part. MPR management must be early and continuous in order to maximize functional autonomy and improve the quality of life for these patients.

Keywords: Epidermolysis Bullosa, EBDASI, QOLEB, Algeria

COULD THE PRESENCE OF CARDIAC ARRHYTHMIA HINDER PROPER HABILITATION?

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Background

Cardiac fibromas, despite being benign, may produce severe symptoms including cardiac arrhythmias, chest pain, and occasionally a sudden death. They are the second most common primary cardiac tumor among children. Genetic assays are often conducted to rule out genetic conditions like tuberous sclerosis, which are usually linked to pediatric cardiac tumors.

Case report

An eight-month-old male patient was referred to a pediatric physiatrist for a neuromotor development evaluation following complications after birth caused by a tumor (most likely fibroma) located on the interventricular septum of the heart. The tumor was detected in the 28th gestational week with fetal echocardiography. After an induced delivery in the 39th week, a comprehensive cardiological workup also discovered supraventricular tachycardia (up to 289 bpm) on a 24-hour electrocardiogram. On day 7, a decrease in blood oxygen saturation was caused by arrhythmia, which was ultimately converted to a sinus rhythm with the administration of adenosine, an antiarrhythmic medication. The initial pediatric physiatrist examination disclosed that the age-appropriate milestones were met albeit to a suboptimal level, except for the quadrupled position coupled with truncal hypotonia. After obtaining cardiological consent, the patient was enrolled in the neurodevelopmental habilitation with the components of the esteemed Bobath concept once a week in the outpatient settings and at home repeatedly. No complications were encountered during the habilitation. Due to the patient's regular cardiac surveillance and prescribed antiarrhythmic medications (sotalol and digoxin), no pathological tachycardias were recorded. Following an extensive habilitation, the latest pediatric physiatrist examination confirmed the 2-year-old boy has attained all age-appropriate developmental milestones.

Conclusion

It is necessary to obtain cardiologist consent before starting habilitation with heart disease. The objective of habilitation is to pursue motor skills development to the utmost potential. Physiatrists must be aware of potential limitations of these patients before performing any physical therapy to ensure proper and safe habilitation.

Keywords: arrhythmia, cardiac fibroma, neurodevelopmental habilitation

IDIOPATIC TOE WALKING IN CHILDREN – GUIDED SELF-REHABILITATION AS A NEW THERAPEUTIC APPROACH, CASE STUDY

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Background

Toe walking is a suboptimal locomotion pattern in which children walk on the tiptoes without the hindfoot touching the floor. The majority of causes remains idiopathic (habitual) toe walking (ITW). Several causes of ITW have been suggested, such as delayed development of the cortico-spinal tract, vestibular dysfunction, psychogenic causes or congenital shortening of the Achilles tendon. In some children, functional disruption or general deconditioning may develop. Treatment is usually based on age, underlying cause, the development and severity of tendon contracture. There is good evidence for casting and surgery in the treatment of idiopathic toe walking, but also the intramuscular injection of botulotoxin into calf muscles in combination with an exercise program can improve the walking pattern.

Case report

8 years old boy, who suffered from IWT, was sent to our department by an orthopedist for consultation. In case history, there was neurologically suspicion of Asperger´s syndrome. ITW occurred when the patient was 2 years old. He underwent repeated sessions of guided physiotherapy, including Vojta reflex locomotion and Bobath concept, as well as orthotic management (splinting and shoe insoles), all with minimal therapeutic effect. Patient was examined according to professor Gracies´ concept. Range of motion (ROM) was restricted bilaterally. No signs of spasticity were observed. The patient was unwilling to undergo injection treatment, so we chose kinesiotherapy. He and his mother were briefed in self-rehabilitation based on a combination of stretching the triceps surae muscle and strengthening the antagonistic muscle groups. The follow-up examination after four weeks showed significant improvement in both active and passive ROM, with complete elimination of toe walking.

Conclusion

Guided self-rehabilitation based on the concept of prof. Gracies, commonly used in patients with focal spastic paresis, can be effectively used in therapy of IWT. Parenteral and child compliance is crucial and it is a key factor in treatment effectiveness.

Keywords: toe walking, children, self-rehabilitation

PECTUS EXCAVATUM AND OTHER THORACIC DEFORMATIES: WHAT TO DO?"

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Background and Aims

Chest wall deformities such as pectus excavatum, pectus carinatum, and pectus arcuatum can have both functional and aesthetic implications. Multidisciplinary evaluation is essential for individualized therapeutic guidance. This study aimed to identify clinical patterns regarding symptoms, deformity type, aesthetic concerns, and therapeutic orientation among patients referred to a Multidisciplinary Chest Wall Deformity Clinic involving Thoracic Surgery and Physical and Rehabilitation Medicine of a central hospital in Lisbon.

Methods

We retrospectively analyzed first consultations conducted at the multidisciplinary clinic. Data collected included type of chest wall deformity, reported symptoms (e.g., chest pain, palpitations, dyspnea, fatigue), aesthetic perception, and therapeutic recommendations. Management options included vacuum bell therapy, dynamic compression orthoses, surgical correction (Nuss or Ravitch), or discharge without intervention.

Results

Among patients with pectus excavatum, 43% were advised to use a vacuum bell device. In the pectus carinatum subgroup, 73% were recommended a dynamic compression brace. Overall, 25% of patients with chest wall deformities were either placed on a surgical waiting list or were under follow-up after bar placement. Only 12% (19 out of 163 patients with deformity) were awaiting initial surgical intervention. Aesthetic concern was noted in approximately 55% of patients with a deformity. This concern was highest among those with pectus excavatum, with 73% expressing aesthetic discomfort.

Conclusion

This multidisciplinary approach enabled comprehensive evaluation and tailored treatment strategies. Vacuum bell therapy and dynamic compression orthoses were the most commonly recommended non-surgical treatments. While aesthetic concerns were frequent, particularly in pectus excavatum, most patients were managed conservatively. These findings help establish patterns that may inform clinical decision-making and resource allocation in chest wall deformity management.

Keywords: Pectus; Vaccum beel; Thoracic deformities

RECOGNIZING EARLY SIGNS OF FIBRODYSPLASIA OSSIFICANS PROGRESSIVA IN INFANCY: A CASE REPORT

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Background

Fibrodysplasia ossificans progressiva (FOP) is an ultrarare, autosomal dominant disease characterized by congenital malformations of the great toes and progressive heterotopic ossification of the connective tissues. It has a prevalence of approximately 1 in 2 million individuals. As the disease progresses, patients experience increasing limitations in mobility, which in turn compromises thoracic cavity expansion, affecting both pulmonary and cardiac function. To date, around 800 cases have been reported worldwide, however, nearly 90% of patients are initially misdiagnosed. Clinical examination, radiological imaging, and genetic testing for mutations in the ACVR1 gene are critical for early and accurate diagnosis.

Case report

We present a case of a one-month-old infact referred to a Physical and Rehabilitation Medicine consultation due to congenital bilateral hallux valgus associated with microdactyly and bilateral thumb adduction. Clinical examination revealed bilateral symmetrical bilateral hallux valgus with microdactyly of the great toes, adducted thumbs and clinodactyly of both fifth fingers. Foot radiographs demonstrated malformation of the first metatarsal bilaterally. Physical rehabilitation was initiated with the goals of functional improvement and correction of hand deformities. At four-months-old, the appearance of multiple hard bony swellings over the cranial vault raised suspicion of FOP, which was subsequently confirmed by genetic testing revealing a mutation of the ACVR1 gene.

Conclusion

FOP is a rare and highly disabling musculoskeletal condition for which no curative or progression-halting treatment currently exists. Misdiagnosis can lead to unnecessary and potentially harmful interventions. The presence of congenital hallux valgus with microdactyly and malformation of great toe in a child, particularly when associated with other skeletal anomalies, should prompt early consideration of FOP, even before the developmental of soft tissue lesions. Prevention of injury by all means, medical management of acute painful flare-ups and rehabilitation efforts should be the goal in the care strategy of individuals with FOP.

Keywords: Fibrodysplasia Ossificans Progressiva, Rehabilitation, Children

SPASMUS NUTANS AND TORTICOLLIS: THE ROLE OF MULTIDISCIPLINARY EVALUATION IN EARLY CHILDHOOD DIAGNOSIS AND MANAGEMENT

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Background

Congenital muscular torticollis is the most common form of congenital torticollis, but acquired causes must be considered, especially after 6-month-old. Spasmus Nutans (SN) is an acquired nystagmus affecting children under two years old, characterized by asymmetric, pendular nystagmus, head nodding, and torticollis. Its cause remains unknown, but it is usually not associated to neurological disorders.

Case report

A 4-month-old child with no relevant medical history was referred to the Physical and Rehabilitation Medicine (PRM) department for right equinovarus foot evaluation. Examination revealed a right flexible, reducible equinovarus foot and bilateral convergent strabismus. Cervical examination was normal, and developmental milestones were appropriate for age. Transfontanellar ultrasound showed no abnormalities. Ophthalmology confirmed congenital strabismus and initiated daily alternating eye patching for six hours. Ultrasound revealed no abnormalities. At 7-months-old parents noticed a new right-sided cervical tilt, sometimes with neck flexion and extension movements. Examination showed convergent strabismus, nystagmus, right cervical tilt, and intermittent head nodding. Cranial, cervical, and neck MRI were normal. A multidisciplinary discussion involving PMR, Neonatology and Ophthalmology was conducted, and the diagnosis of SN and strabismus was made. Child was treated with ocular botulinum toxin. At 22-months-old, examination showed right eye unchanged, left eye with slightly limited adduction, no nystagmus or right cervical tilt. Follow up was scheduled in two months.

Conclusion

SN is an idiopathic disorder in which head nodding suppresses nystagmus through the vestibular-ocular reflex and aids vision. Diagnosis relies on excluding neurological and ophthalmological diseases and treatment is mainly supportive including strabismus, amblyopia and refractive errors correction. It is usually a limited condition with good prognosis. PMR is key in child developmental evaluation, with each appointment addressing both the primary condition and overall neurodevelopment. This case highlights significance of comprehensive assessment, early diagnosis, and the importance of a multidisciplinary team in promoting motor recovery and quality of life.

Keywords: Spasmus Nutens, Torticollis, Rehabilitation, Children

ASSESSMENT OF POSTERIOR TIBIAL NERVE STIMULATION EFFECTIVENESS IN PEDIATRIC OVERACTIVE BLADDER: A MOROCCAN STUDY

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Background and Aims

Transcutaneous tibial nerve stimulation (TTNS) has shown efficacy in treating overactive bladder syndrome (OAB). This study evaluates its effectiveness in improving OAB parameters in a pediatric population.

Methods

A prospective study included 46 children with refractory (non-responsive to the medical and rehabilitation treatments) non-neurogenic OAB treated with daily 20-minute TTNS sessions (5/week, 10 Hz, 2000 ms). Voiding diary and uroflowmetry data were assessed at 1 and 6 months.

Results

46 children were included (27 girls, 19 boys), with a mean age of 12.7 ± 1.9 years. All patients had OAB syndrome and underwent renal bladder ultrasound and urodynamic evaluation, which showed no detrusor overactivity on cystomanometry. A 3-day voiding diary was completed. The average TTNS duration was 7 months, with 6 children lost to follow-up. At 1 month, improvements were observed in voiding diary and uroflowmetry parameters. At 6 months, OAB had resolved in 28 children, while 39.14% still had urinary frequency and urgency without incontinence.

Conclusion

TTNS is a promising therapeutic option for managing OAB syndrome in non-neurogenic bladder due to its non-invasive nature and ease of use. Further studies are needed in this area.

Keywords: urodynamic, tibial nerve stimulation

EFFICACY OF ANKLE-FOOT ORTHOSES ON GAIT IN CHILDREN WITH CEREBRAL PALSY

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Background and Aims

Ankle-foot orthoses (AFOs) are used in children with cerebral palsy (CP) to improve gait and stability. Their effectiveness varies depending on the severity of CP. This study aims to evaluate the effectiveness of AFOs in improving gait patterns in children with CP by analyzing gait parameters.

Methods

This prospective analytical study included children with CP recruited from a physical medicine and rehabilitation department. Patients were prescribed AFOs, and gait parameters (step count, step length, cadence, and walking speed) were assessed with and without AFOs.

Results

A total of 68 patients were included, with a mean age of 9.2 years. Among them, 43.9% had spastic tetraparesis. Gait analysis showed improvements in step count for 100 meters, step length, cadence, and walking speed when using AFOs compared to barefoot walking.

Conclusion

Some studies report significant gait parameter improvements with AFOs, while others show no notable changes. AFOs should be integrated into a comprehensive treatment plan, including motor rehabilitation, occupational therapy, and other therapeutic interventions. They are valuable tools for improving gait in children with CP. They provide support, enhance stability, and reduce the risk of falls.

Keywords: Cerebral palsy, orthoses, Gait

ASSISTIVE TECHNOLOGY AND PERCEIVED SAFETY AND AUTONOMY IN PEDIATRIC NEUROLOGICAL REHABILITATION: A DESCRIPTIVE STUDY

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Background and Aims

Background Assistive technology (AT) plays a vital role in the rehabilitation of children with neurological conditions, aiming to enhance functionality, independence, and quality of life. However, its effect on the perception of safety and autonomy remains underexplored. Aim To investigate the impact of assistive technology on the perceived sense of safety and autonomy in children with neurological disorders.

Methods

Methods An epidemiological study was conducted using data collected in 2024 from the Early Intervention and Rehabilitation Department of the "P. & A. Kyriakou" Children's General Hospital. Descriptive statistics and frequency analysis were applied. Demographic characteristics of participants were recorded, and the "Pythia" scale was used to assess the type and frequency of AT usage.

Results

Results The study included 27 children aged 5–14 years (19 boys, 8 girls) diagnosed with cerebral palsy or posterior fossa tumors. AT devices used included: 11 wheelchairs, 22 ankle-foot orthoses, 1 spinal brace, 5 bicycles, 8 hand orthoses, 7 crutches, 8 walkers, and 4 standing frames. Both the walker and bicycle achieved 100% perceived safety and autonomy according to the children. However, caregiver responses showed some variation: 64% for wheelchairs, 86% for crutches, 75% for walkers, and 78% for ankle-foot orthoses. Among children using upper limb orthoses, only 1 out of 2 reported a sense of autonomy.

Conclusion

Conclusion Assistive technology significantly supports children's perceived sense of safety and autonomy during rehabilitation. Despite variations in self-image, AT is widely adopted and well-accepted in pediatric neurorehabilitation. The supportive role of the family environment enhances comfort and satisfaction with AT. Overall, AT contributes positively to promoting independence in children with neurological impairments.

Keywords: Assistive Technology,children, Neurological Rehabilitation

WILLIAMS-BEUREN SYNDROME SHROUDED IN NEURODEVELOPMENTAL DELAY, SEVERE SCOLIOSIS, AND „COCKTAIL PARTY PERSONALITY"

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Background

Williams-Beuren syndrome (WBS) is a rare congenital multisystem condition caused by a spontaneous heterozygous microdeletion at 7q11.23. It occurs in 1:7.500-20.000 live births. The syndrome manifests through characteristic dysmorphic facial features, described as an elfin visage, alongside cardiovascular anomalies, cognitive impairments, as well as endocrine, ophthalmologic, and orthopedic abnormalities. The course of treatment is contingent upon the particular abnormality; however, the paramount objective universally remains the alleviation of symptoms and the prevention of potential complications.

Case report

Our patient is the first child of nonconsanguineous healthy parents born at 36 weeks gestational age via spontaneous vaginal delivery from an orderly course pregnancy. He underwent phototherapy to alleviate neonatal jaundice. Ultrasound brain findings verified subependimal intracranial bleeding with multiple cystic formations. Phenotypic characteristics revealed craniofacial dysmorphism, including epicanthal folds, large ears, an upturned nose, a wide mouth, a small jaw, and small teeth. His cardiac anomaly in terms of bicuspid aortal valve has been regularly under cardiac surveillance. He has been under pediatric physiatrist follow-up since the time he was two months old until six years due to neurodevelopmental delay, trunkal hypotonia and increased muscle tone on extremities, and severe dextroconvex thoracolumbal scoliosis with punctum maximum at L4 and pectus excavatum. He has been toe walking since he was 15 months old. He has a very outgoing personality and empathy, has difficulty identifying strangers and therefore fits the description „cocktail party personality". As gross and fine motor skills and cognitive functions were affected, comprehensive inpatient and outpatient multidisciplinary habilitation is pursued encompassing Bobath concept and Vojta principle. The clinical exome sequencing has unveiled a microdeletion at locus 7q11.23.

Conclusion

We present this case to underscore the benefits derived from the timely referral to pediatric physiatrist, aimed at optimally promoting gross motor development and facilitating the resolution of scoliosis in a child afflicted with WBS.

Keywords: Williams-Beuren syndrome, child, scoliosis, neurodevelopmental

POSTER PRESENTATION

NEUROREHABILITATION

NUTRITIONAL POLYNEUROPATHY FOLLOWING BARIATRIC SURGERY: A COMPLICATION THAT CAN BE PREVENTED

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Background

Bariatric surgery is considered to be the most effective treatment of morbid obesity and improvement of obesity-related comorbidities, such as type II diabetes. However, both peripheral and central neurological complications can occur after bariatric surgery. Such complications tend to occur more frequently after bypass surgery than after sleeve gastrectomy

Case report

We report a 38 years old lady who had restrictive bariatric surgery in the form of sleeve gastrectomy. She presented couple of months later with sever nausea and vomiting. A month later she developed progressive lower limb weakness and paraesthesia in upper and lower limb with urinary incontinence(flaccid tetra-paresis) . Initially treated as Guillain-Barré syndrome with intravenous immunoglobulins. Further investigations showed low folate with raised homocysteine which raised the possibility of nutritional polyneuropathy. Her Nerve Conduction Studies showed axonal sensory more than motor peripheral polyneuropathy. She was treated with high dose of Vitamin B12 and Folate with good effect but not fully recovered. In addition she received Thiamine replacement. She had paraesthesia in upper and lower limbs associated with neuropathic pain in both feet. Her lower limbs were weaker as compared to her upper limbs. She had impaired proprioception in both feet. In addition she presented with impaired short term memory. Her brain scans were normal. It is not clear if her short term memory impairment is directly related to her nutritional polyneuropathy.

Conclusion

Peripheral neuropathy is a one of the common complications following any type of bariatric surgery affecting 5–16% of patients. It is a collection of disorders arising from damage in the somatosensory system. It usually presents years later and progress insidiously but may be seen early in the course. Vomiting following sleeve gastrectomy can exacerbate nutritional deficiencies and lead to poly or mononeuropathy.

Keywords: Bariatric surgery, polyneuropathy

ELSBERG SYNDROME BY HERPES SIMPLEX 1 REACTIVATION: CASE REPORT

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Background

Elsberg Syndrome (ES) is a rare condition, described as an acute or subacute lumbosacral radiculitis, often associated with viral infections such as HSV-2, accounting for 5-10% of cases of cauda equina syndrome.

Case report

This case describes a 54-year-old woman with acute low back pain, progressive weakness of the right lower limb, sensory alteration and urinary complaints, preceded by labial herpetic vesicles. Neurological examination revealed motor deficit, hypostasis, abolished reflexes and signs suggestive of radicular involvement. CT of the spine was normal, but lumbar puncture showed pleocytosis and CSF PCR confirmed HSV-1 infection. MRI showed enhancement of the lumbar nerve roots and EMG revealed sensitivomotor polyradiculopathy of L3-S1 on the right. The patient was treated with intravenous acyclovir for 21 days, with early rehabilitation. At the MFR follow-up appointment, 17 days after discharge, she had improved strength, symmetrical sensitivity, normal bladder function and no incontinence. She continued with outpatient rehabilitation and returned to work, despite residual motor deficits.

Conclusion

This case highlights the importance of early diagnosis of ES, even in the absence of active skin lesions or a clear viral history. Detection of HSV-1 in the CSF confirmed the etiology, although treatment can be started empirically. The prognosis depends on the initial severity and therapeutic response, and early initiation of antiviral treatment and rehabilitation is essential. Delayed diagnosis can lead to prolonged bladder dysfunction and persistent neurological deficits.

Keywords: Síndrome de Elsberg, Herpes Simples

MEDICAL COMPLICATIONS DURING ACUTE INPATIENT TRAUMATIC BRAIN INJURY REHABILITATION - CROATIAN EXAMPLE

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Background and Aims

Traumatic Brain Injury (TBI) is a chronic disease according to WHO. It has complex consequences on every level of society and impact that is not yet sufficiently quantified. This disease has a high incidence of medical complication (MC). They affect the course of acute treatment, the course of acute rehabilitation, the outcome of rehabilitation and some of complication lead to an increase risk of mortality. Aim of the study is to demonstrate the type and frequency of MC in patients with TBI during acute inpatient rehabilitation (IR).

Methods

On a randomly selected day we analyzed all patients with TBI admitted to the acute IR. Inclusion criteria were age over 18 years, TBI (with possibility of included spinal cord injury and bone fractures). Exclusion criteria were other reason for inpatient acute rehabilitation and chronic TBI. The investigated complications were: posttraumatic epilepsy paroxysmal sympathetic hyperactivity, hydrocephalus, venous thromboembolism, hyponatremia, spasm, contractures, dysphagia, malnutrition, urinary retention, tracheal cannula, infections, colonization with multidrug-resistant bacteria (MDRB) and presence of pressure ulcers.

Results

We analyzed data for 22 patients, average age of 45 year (85% were men). Average initial GCS 9, average admission FIM 44, average time of data collection 99 days. The following complications were recorded: contractures (68%), spasm (59%), dysphagia (59%), colonization with MDRB (55%), malnutrition (50%), presence of tracheal canula (50%), posttraumatic epilepsy (50%), infections (18%), hyponatremia(14%), pressure ulcers (9%) patients. On the day of screening we did not register hydrocephalus, paroxysmal sympathetic hyperactivity and venous thromboembolism. Patient with disorders of consciousness had higher incidence of the recorded MC.

Conclusion

Patients with TBI have high frequency of MC. Some of MC that occur during acute IR can be prevented by appropriate treatment during the acute care of patients with TBI. Timely diagnosis and treatment MC during IR can reduce mortality and improve outcome of patients.

Keywords: TBI, inpatient rehabilitation, medical complications

INPATIENT REHABILITATION OF TRAUMATIC BRAIN INJURY PATIENTS IN CROATIA-IS TIME RELEVANT?

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Background and Aims

Traumatic brain injury (TBI) is acquired brain injury caused by an external mechanical force that lead to temporary or permanent damage of neurological system. Although TBI is preventable it remains a leading cause of death and disability. Better outcome is often associated with earlier transfer to rehabilitation departments. Aim of this study was to investigate influence of admission time to rehabilitation department for TBI patients in Croatia.

Methods

Single center, retrospective study for 5 year period. Inclusive criteria were: age over 18 years, acute inpatient TBI rehabilitation. Exclusion criteria were: other reason for inpatient acute rehabilitation, chronic TBI and patients who died during rehabilitation.

Results

Study included 207 patients average age of 45 years. There was significantly more male patients (172). Average median initial GCS was 7 (interquartile range from 4.0 to 10.0). Average median time from TBI incident to admission was 62 days (interquartile range from 47 .0 to 86.0 days). Average median admission FIM was 38.5 (interquartile range from 21.0 to 95.0) and average median dismission FIM was 93.0 (interquartile range from 38.0 to 112.0). Improvement significantly negatively correlates with period from TBI to admission to rehabilitation ($p < 0{,}001$).

Conclusion

It is important to enable transfer to rehabilitation department as early as possible for severe and medium severe TBI patients because than they have possibility to achieve better functional outcome. But do we have enough rehabilitation capacity in our country? This field of healthcare needs to be considered carefully.

Keywords: TBI, inpatient rehabilitation, admission, outcome

THE IMPACT OF TEMPERATURE SENSITIVITY ON THE STAY OF MULTIPLE SCLEROSIS PATIENTS IN A REHABILITATION INSTITUTION DURING A YEAR

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Background and Aims

Multiple sclerosis (MS) is a chronic autoimmune neurodegenerative disease characterized by demyelination of the central nervous system (CNS), which leads to a slowdown or blockage of the transmission of nerve impulses between nerve cells. Its incidence and prevalence are increasing every year, and in Croatia in 2024, 8.518 people with MS were recorded. The distribution of demyelinating lesions among patients is very heterogeneous, and the clinical picture is diverse. Among patients, there is a very high prevalence of thermoregulation and temperature sensitivity disorders, during which signal transmission in neurons in the CNS is affected. This is manifested in a transient worsening of certain previously present symptoms (Uhthoff's phenomenon), or pseudorelapse. In order to stimulate the neuroplasticity of the CNS, a rehabilitation program is initiated. MS patients in Croatia undergo rehabilitation in rehabilitation institutions once a year. Given the temperature sensitivity of patients, certain physical therapy procedures are limited, while some recommendations limit going out when outside temperatures are above 30°C. All of this could affect the period of year during which rehabilitation will be carried out.

Methods

Data processing of MS patients in Special hospital for medical rehabilitation - Toplice Lipik, during the period from 2017 to 2024.

Results

In Toplice Lipik, 350 to 400 MS patients access rehabilitation annually. During the year, an increased number of visits was observed from September to November and in May, i.e. in the period of the year when the average monthly temperatures in the continental part of Croatia are lower compared to the warmest months.

Conclusion

In patients with multiple sclerosis, a variation in visits to the rehabilitation facility is observed throughout the year, which may be related to temperature sensitivity.

Keywords: multiple sclerosis, rehabilitation, temperature sensitivity

IS THERE AN IMPACT OF RESISTANCE TRAINING ON THE PHYSICAL CONDITION OF INDIVIDUALS WITH MULTIPLE SCLEROSIS ?

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Background and Aims

The progression of physical disability due to multiple sclerosis (MS) leads to various consequences, including greater mobility loss and diminished quality of life. This study investigated the impact of resistance training on the functional capacity of individuals with MS.

Methods

Participants were intentionally grouped based on the Expanded Disability Status Scale (EDSS). The experimental group (EG) consisted of eight individuals, with 10.8% scoring 0-3.0, 83.1% scoring 3.5-5.5, and 6.1% scoring 6.0-7.5 on the EDSS. The control group (CG) also included eight participants, with 22.4% having a score of 0-3.0, 65.8% scoring 3.5-5.5, and 11.8% scoring 6.0-7.5. The EG completed a 12-week resistance training program, while the CG did not receive intervention. The Timed "Up & Go" test was used to evaluate lower limb function, while the Timed 7.62 Meters Walk test and the Sit-to-Stand test assessed lower limb strength. Balance and fall risk were measured using the Berg Balance Test.

Results

At baseline, lower limb function was comparable between the experimental group (EG) and the control group (CG). However, following 12 weeks of resistance training, significant differences emerged between the two groups in the Timed "Up and Go" test (P=0.022), Timed 7.62 Meters Walk (P=0.028), Sit-to-Stand test (P=0.018), and Balance test (P=0.038).

Conclusion

The findings of this study suggest that this form of training enhances muscle strength and functional capacity in individuals with multiple sclerosis.

Keywords: Multiple sclerosis, Exercise, Resistance training

ENHANCING POSTURAL CONTROL BY MULTICOMPONENT BALANCE EXERCISES AND FUNCTIONAL SOMATOSENSORY FOOT MOBILIZATION IN PATIENTS AFTER BRAIN TUMOR SURGERY

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Background and Aims

Patients who have undergone brain tumor surgery often experience postural instability. Our pilot study investigated the effects of multicomponent balance exercises (MBE) and sensorimotor mobilization with foot muscle strengthening (SMFE) on postural control in these patients. We assessed their postural stability using the Balance Error Scoring System (BESS), which consists of 20-second tasks performed with closed eyes and hands on hips on both hard and soft surfaces.

Methods

Twenty postoperative patients participated in a randomized clinical study, divided into two groups: the MBE group (6 women and four men, average age 30.2) and the SMFE group (6 women and four men, average age 34.5). All patients who underwent WHO grade 1 parasagittal meningioma surgery followed the postoperative instructions. They scored at least 25 on the Mini-Mental State Exam (MMSE) and a minimum of 30 on the Berg Balance Scale (BBS). Balance was evaluated using the Balance Error Scoring System (BESS) on the third postoperative day and before discharge. The average length of hospitalization was 10 days.

Results

Both patient groups showed significant improvements ($p < 0.05$) in maintaining an upright posture after the BESS test. In the MBE group, 80% of patients achieved a clinically significant change of 10 points in postural stability, while 100% of patients in the SMFE group did so. Additionally, the SMFE group demonstrated even more significant improvements ($p < 0.01$) in balance tasks performed on both hard and soft surfaces. These tasks included maintaining an upright posture with feet together, standing on one leg, and tandem standing.

Conclusion

Patients improved static balance after the BESS test at discharge. The SMFE group showed enhanced functional balance and confidence through sensorimotor mobilization and foot arch strengthening. We recommend this approach for early rehabilitation, though more research is needed.

Keywords: Surgery, Posture, MBE, SMFE, BESS

SPINAL MUSCULAR ATROPHY TYPE 4: A CASE REPORT

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Background

Spinal muscular atrophies (SMA) are a group of inherited neuromuscular disorders caused by degeneration of alpha motor neurons in the spinal cord, resulting in progressive muscle weakness and atrophy. Most forms of SMA are autosomal recessive and associated with biallelic deletions or mutations in the SMN1 gene on chromosome 5q13. Clinically, SMA is classified based on age at onset and maximal motor function: type 1 (non-sitters), type 2 (sitters), type 3 (walkers with childhood onset), and type 4 (adult onset). All types present with symmetrical proximal muscle weakness, more pronounced in the lower limbs, and reduced or absent deep tendon reflexes. Diagnosis relies on clinical evaluation, EMG/EMNG findings, and confirmatory genetic testing.

Case report

We report a case of a 67-year-old woman evaluated in June 2016 by a physiatrist after surgical treatment of a left femur fracture. She had a previous forearm fracture in March 2016. Rehabilitation was slow, with persistent gait impairment and frequent falls. Clinical examination revealed proximal lower limb weakness and impaired ambulation using forearm crutches. EMNG findings showed generalized lower motor neuron involvement. Genetic testing confirmed SMA type 4. Risdiplam therapy (0.75 mg/mL once daily) was initiated in December 2023. Following an influenza infection in January 2024, the patient required mechanical ventilation. Post-recovery, she experienced worsening gait difficulties, painful knee recurvatum, and transitioned to a walker. In February 2024, motor assessments showed: MMT, RHS 32/69, RULM 43/43. Barthel Index was 68; 6-minute walk test was not feasible due to knee pain. She was prescribed KAFO orthoses and enrolled in a personalized rehabilitation program focusing on individual kinesitherapy.

Conclusion

This case underscores the importance of recognizing adult-onset SMA, which may present subtly and be misdiagnosed. Timely diagnosis, initiation of disease-modifying treatment, and ongoing rehabilitation are crucial for maintaining function, reducing disability, and improving quality of life in adult SMA patients.

Keywords: SMA, weakness, neurorehabilitation

DIFFERENTIATING SPASTICITY-RELATED PAIN - A CASE REPORT OF HEREDITARY SPASTIC PARAPLEGIA

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Background

Hereditary Spastic Paraplegia (HSP) refers to a rare group of highly heterogeneous neurodegenerative diseases whose hallmark is progressive spasticity and weakness of the lower limbs. When evaluating patients with HSP, clinicians should also account for non-motor symptoms such as bladder disturbances, depression, fatigue and pain. In the presence of other comorbid conditions, such as respiratory infections, it can be hard to distinguish whether pain is spasticity-related or due to other conditions, requiring an appropriate evaluation together with good clinical awareness of HSP's symptoms.

Case report

A 32-year-old man with diagnosed HSP type 7, who had lost medical following in Neurology and Physical and Rehabilitation Medicine (PRM), was hospitalized with complicated pneumonia with posterior, left-sided pleural effusion (PE) confirmed by CT scan. Despite appropriate treatment, the patient complained of left-sided pain, attributed to pleuritic inflammation. At the PRM internal consultation, marked spasticity of the lower limbs and lower back muscles was noted. The patient also presented coughing bouts that aggravated the pain in the left back, preventing effective coughing, which raised suspicion for other causes of pain. The patient started a rehabilitation program during hospital stay, together with baclofen progressive titration to optimal dosing, with resolution of the pain complaints. Furthermore, the patient was referred to the PRM consultation for lower limbs spasticity focal treatment with botulinum to avoid side effects of high doses of baclofen and appropriate follow-up.

Conclusion

A lot of medical conditions present with pain. In this case, a patient with pneumonia with PE presented with pain, most likely of pleuritic cause. However, when dealing with patients with HSP, spasticity-related pain should also be considered. This case highlights the importance of recognizing pain patterns associated with spasticity, which in turn leads to more effective symptomatic management, especially when pain persists after treatment of the presumed alternative cause.

Keywords: Hereditary Spastic Paraplegia; Spasticity; Pain

MODULATION OF MOTOR AND CEREBELLAR FUNCTION USING TMS AND TSMS IN SPINOCEREBELLAR ATAXIA TYPE 3: A CASE-BASED INSIGHT

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Background

Spinocerebellar ataxia type 3 (SCA3) is the most common autosomal dominant ataxia worldwide, with a known cluster in the Azores islands. It is caused by a CAG repeat expansion in the ATXN3 gene, leading to progressive neurodegeneration involving both cerebellar and extracerebellar regions. This disrupts cerebellar-cerebral and striatal-cortical pathways, ultimately causing motor and functional impairments. Patients develop progressive gait ataxia, dysarthria, and impaired coordination. As the condition advances, individuals increasingly rely on assistance for mobility, experience substantial functional decline, and face reduced life expectancy. Currently, there is no disease-modifying treatment available for SCA3. Repetitive transcranial magnetic stimulation (rTMS) is a non-invasive brain stimulation technique that has been shown to improve symptoms in patients with neurodegenerative cerebellar ataxias. A recent study suggested that transspinal magnetic stimulation (TsMS) applied to the thoracic region between vertebrae T3–T4 improved gait speed in SCA3 patients.

Case report

A 50-year-old female diagnosed with SCA3, originally from São Miguel Island (Azores), underwent 1 hour and 15 minutes of 10 Hz rTMS (50 pulses × 40 trains applied to the M1 leg area; 50 pulses × 60 trains to the cerebellum) and 5 Hz TsMS theta burst (20 pulses, 20 bursts) for five consecutive days. Between each pulse train, lasting 25 seconds, the patient performed physiotherapy exercises targeting improvements in posture, gait and dysmetria, under a physiatrist-guided rehabilitation plan. The Scale for the Assessment and Rating of Ataxia (SARA), the International Cooperative Ataxia Rating Scale (ICARS), and the Timed Up and Go Test (TUG 3M) were assessed before and after treatment, showing significant clinical improvement.

Conclusion

Our results with high-frequency rTMS and TsMS therapy showed improvement in SARA, ICARS, and TUG 3M scores, suggesting that this therapy could be promising for enhancing posture, gait, and limb kinetic function. However, larger randomized controlled trials are needed to confirm these findings.

Keywords: SCA, 3;, rTMS;, TsMS;, ataxia

SEGMENTAL ZOSTER PARESIS PRESENTING WITH FOOT DROP: A RARE COMPLICATION OF HERPES ZOSTER

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Background

Herpes zoster is a viral infection caused by the reactivation of the varicella-zoster virus latent in the dorsal root ganglia, typically presenting with dermatomal vesicular rashes and neuropathic pain. Its incidence increases with aging and immunosuppression. A rare but clinically significant complication is segmental zoster paresis (SZP), which involves motor nerve impairment leading to weakness in the affected limb. Motor deficits usually develop within 1–8 weeks after the appearance of skin lesions. Although the prognosis is generally favorable with timely diagnosis and intervention, delayed recognition may result in long-term functional impairments.

Case report

A 63-year-old male presented with right foot drop and difficulty walking. Two months earlier, he had developed vesicular lesions on the anteromedial side of his right leg, accompanied by pain on the lateral aspect. He was diagnosed with herpes zoster and treated with oral valacyclovir. One week after the rash appeared, he noticed weakness in his right foot. There was no history of trauma, systemic illness, lower back pain, or prior surgery. Electromyography (EMG) revealed severe partial axonal involvement of the right deep peroneal nerve proximal to its innervation of the tibialis anterior; there was no evidence of radiculopathy on EMG. Laboratory findings were unremarkable. On physical examination, the strength of dorsiflexion, eversion, and inversion in the right foot was graded 0/5, and hypoesthesia was noted in the first web space. An ankle-foot orthosis was prescribed, and the patient was enrolled in a rehabilitation program. At 3-month follow-up, eversion and inversion improved to 2/5, but no further motor or sensory recovery was observed.

Conclusion

Segmental zoster paresis is a rare but disabling complication of herpes zoster that can significantly impact daily activities. Early diagnosis, treatment and initiation of rehabilitation are crucial for better outcomes. Delayed diagnosis and management may lead to poor prognosis and persistent neurological deficits.

Keywords: Foot Drop, Segmental Zoster Paresis

REHABILITATION OF A PATIENT WITH PARAPLEGIA AFTER SPINAL CORD INJURY-CASE REPORT

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Background

Spinal cord injury (SCI) is a critical medical condition that causes numerous impairments leading to accompanying disabilities. The rehabilitation of paraplegic patients following SCI is influenced by various factors like level of injury, timing of rehabilitation and available therapeutic interventions. Robotic-assisted gait training (RAGT) offers many advantages, including the capability to increase intensity and total duration of training while maintaining a physiological gait pattern.

Case report

A 20-year-old patient with a fracture of the Th10 and Th11 vertebrae following a car accident, with compression on the spinal cord at those levels, underwent surgery a month before first rehabilitation. He was presented with bilateral lower limb weakness, spasticity, absence of bowel and bladder control, unable to stand and walk. Incomplete SCI classified as B on the American Spinal Injury Association (ASIA) Impairment Scale, Berg Balance scale (BBS) score 0 out of 56 reflecting complete inability to walk. Barthel index (BI) for activities of daily living (ADL) was 13 - total dependency. The patient was treated with a combined approach of conventional physiotherapy and RAGT on the Lokomat Pro. Conventional rehabilitation consisted of manual massage, magnetotherapy, stretching exercises, positioning, bed mobility and trunk stability exercises, static and dynamic balance exercises, walking with orthosis and crutches, occupational therapy. RAGT was carried out in three sessions,15 treatments each with individually customized parameters.

Conclusion

Results:The combined approach led to a significant improvement in functional motor skills, including walking without orthosis, balance and lower limb muscle strength. After three sessions he was classified D on ASIA scale, 54 score on BBS-independent, BI was 100-full independence. This case study's findings show the importance of early onset of physiotherapy and RAGT in enabling patients to carry out ADL and prevention of serious secondary problems. A combined approach could be promising in alleviating the burden of disability caused by SCI.

Keywords: SCI injuries, Lokomat , combined approach

REHABILITATION MANAGEMENT OF INTENSIVE CARE UNIT-ACQUIRED WEAKNESS

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Background and Aims

Intensive Care Unit–Acquired Weakness (ICU-AW) is a clinically detected weakness in critically ill patients who do not have a primary neuromuscular disorder, and it occurs due to the critical illness or its treatment. It encompasses three separate syndromes: critical illness myopathy, critical illness polyneuropathy and critical illness polyneuromyopathy. This complication develops in 25-45% of critically ill patients admitted to intensive care units and can lead to severe and permanent functional impairment. At the moment, there's no specific treatment to cure ICU-AW, but only preventive and substantiating measures that include aggressive treatment of sepsis, lowering of the dosages and duration of therapy with neuromuscular blockers and corticosteroids, rehabilitation, adequate positioning, nutritional interventions and usage of immunoglobulins. The goal of the research is to determine the importance of rehabilitation in the functional recovery of patients with ICU-AW.

Methods

The research featured 20 patients of both sexes over the age of 18 who were sent to stationary rehabilitation after their treatment at the Intensive Care Clinic at the Clinical Center of Republic of Srpska, where they were connected to mechanical ventilation. As a result, ICU-AW was developed. At the beginning and at the end of the rehabilitation process, they were tested according to the functional mobility test and the Barthel index. Rehabilitation included a specific kinesitherapy program, occupational therapy, electrical stimulation, pulmonary rehabilitation and robotically assisted rehabilitation.

Results

There was a highly statistical and significant increase in functional mobility test values from the moment of admission (M=0,2, SD=0,2) to discharge (M=2,85, SD=1,927, t(19)=-6,239; p=0,000). The same was detected for values of the Barthel index, from the moment of admission (M=26,7, SD=16,013) to discharge (M=66,8, SD=25,354, t(19)=-8,593; p=0,000).

Conclusion

The results showed a significant role of organized rehabilitation in improving the functional status of patients with ICU-AW, which also leads to improving their quality of life.

Keywords: critical illness, myopathy, polyneuropathy, rehabilitation

STRACHAN-SCOTT SYNDROME IN A MODERN CONTEXT: A CASE REPORT AND REHABILITATION PERSPECTIVE

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Background

Strachan-Scott Syndrome, also known as Tropical Ataxic Neuropathy (TAN) or Jamaican Neuropathy, was first described in 1887 by Dr Henry Strachan among plantation workers in Jamaica. It is characterized by a triad of optic neuropathy, painful symmetrical sensory polyneuropathy and less commonly, auditory symptoms. Other features may include ataxia, mucocutaneous lesions and nutritional deficiencies—particularly riboflavin (B2) and B12. Though historically linked to undernutrition and cassava consumption, it remains under-recognised especially in individuals of Afro-Caribbean descent.

Case report

We present a 35-year-old Afro-Caribbean woman, born in United Kingdom, with morbid obesity, mental health comorbidities and alcohol excess, who became bedbound following progressive neuropathic symptoms. Initial symptoms began over two years ago and worsened during a visit to Jamaica and after bereavement. She reported visual disturbances, symmetrical limb paraesthesia, weakness and incontinence without hearing loss or significant ataxia. Examination revealed reduced lower limb power, areflexia, sensory loss up to the knees, and finger-nose ataxia. MRI spine showed dorsal column signal changes without compressive myelopathy. NCS confirmed severe sensory axonal polyneuropathy. Investigations revealed vitamin B12 deficiency and elevated acylcarnitine levels. Despite extensive workup, an underlying metabolic disorder was not confirmed. Given clinical features and background, a diagnosis of Strachan-Scott Syndrome was made. Rehabilitation challenges Management involved riboflavin and B-vitamin supplementation, pain control, bladder/bowel retraining, neuropsychological support and tailored mobility rehabilitation. Her significant obesity posed challenges in mobilisation and assessment including failed lumbar puncture. She improved with physiotherapy and was discharged to step-down rehabilitation.

Conclusion

Strachan-Scott Syndrome is a neglected yet potentially reversible neuropathy. Awareness among rehabilitation physicians is crucial particularly in at-risk populations to facilitate timely diagnosis, nutritional support and functional recovery.

Keywords: Strachan-Scott Syndrome, Tropical_Ataxic_Neuropathy, Neuro_rehaiblitation

BALANCE IMPAIRMENT AND QUALITY OF LIFE IN MULTIPLE SCLEROSIS PATIENTS

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Background and Aims

Multiple sclerosis (MS) is a chronic autoimmune disease of the central nervous system, often leading to impaired coordination, balance, and mobility. Balance dysfunction is a major risk factor for falls and reduced quality of life (QoL) in MS patients. This study aimed to assess the association between balance disorders and health-related QoL in individuals with relapsing-remitting MS.

Methods

A cross-sectional study was conducted at the University Medical Centre Maribor from February to July 2022. Fifty-four MS patients (EDSS 0-6) were assessed using the Modified Mini-Balance Evaluation System Test (modified mini BESTest), Single Leg Stance Test (SLS), and MSQOL-54 questionnaire. Neurological impairment was evaluated using the Expanded Disability Status Scale (EDSS). Data were analyzed using Pearson and Spearman correlation coefficients.

Results

The mean patient age was 46 years, with 71% being female. Most patients exhibited clinically significant balance impairments, confirmed by low scores on the modified mini BESTest (mean: 28/42) and SLS (<20 seconds). A significant positive correlation was found between modified mini BESTest scores and the physical component of QoL ($p<0.01$). EDSS scores negatively correlated with physical QoL ($p<0.01$). No significant correlation was observed between balance scores and the mental component of QoL.

Conclusion

Clinically significant balance impairments were present in MS patients, negatively affecting their physical QoL. Balance training should be an integral part of rehabilitation to enhance mobility and independence. Further longitudinal research is needed to assess the impact of rehabilitation on balance and QoL over time.

Keywords: balance, disturbances;, quality, of, life;

TARLOV'S CYST, CAUSE OF VESICO-SPHINCTER DISORDERS : INTEREST OF URODYNAMIC EXPLORATION : ABOUT TWO CASES

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Background

Tarlov's cyst (TC) is a local dilatation of the subarachnoid space in contact with a nerve root, often affecting the sacral roots. Only 1% of Tarlov's become symptomatic. The aim of this study is to demonstrate the value of urodynamic exploration in patients with bladder and bowel problems caused by Tarlov cysts.

Case report

Clinical case n°1 : Mrs S.D. aged 53, operated in 2018 for TC, presented at the age of 45 with vesico-sphincter symptoms consisting of an overactive bladder syndrome and dysuria. Urodynamic investigation revealed dysuria with significant post-void residual (PVR) on debimetry, a hyposensitive bladder without uninhibited detrusor overactivity or leakage on cystomanometry, and normal sphincter tone on profilometry. Clinical case n°2 : This is a 3-year-old child, I.B., who underwent a sacral CT scan at the age of 6 months, which revealed a sacral TC at S2. Clinically, the child presented with recurrent urinary tract infections. A urodynamic investigation, indicated by the TC with vesico-ureteral reflux (VUR), revealed a large-capacity bladder without uninhibited detrusor overactivity. The child was referred to paediatric surgeons for suprapubic catheterisation.

Conclusion

Vesico-sphincter disorders are common in Tarlov's cyst, with signs of a peripheral bladder requiring urodynamic investigation. Appropriate treatment can improve quality of life.

Keywords: Tarlov, cyst, vesico-sphincter, urodynamic

MANAGEMENT OF LOWER URINARY TRACT (LUT) OF STROKE PATIENTS IN THE ACUTE AND SUBACUTE PHASE

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Background and Aims

Stroke patients often present urinary dysfunction and symptoms of incomplete bladder voiding, urgency and incontinence. Inappropriate management of the lower urinary tract can lead to several complications. Purpose: The study aims to demonstrate the importance of early LUT management and the removal of indwelling catheter towards a normalized function of the sphincter-bladder unit and a positive rehabilitation program outcome.

Methods

We studied 47 stroke patients, 17 female and 30 male, that were hospitalized in our rehabilitation clinic for the interval of 60 days (September 2024-October2024). Before removing the indwelling catheter, a thorough assessment of the LUT and cognitive function, of the perineal reflexes and sensibility was performed, taking also into account the prostate function of male patients as well as urinary tract ultrasound, urine analysis and urine culture. Antimuscarinic and a-blockers drugs were administered and the indwelling catheter was safely removed according to our clinic protocol.

Results

25 out of 47 patients had their catheter removed 7-15 days after admission for rehabilitation under a-blockers medication and antimuscarinic drugs that were ceased when voluntary micturition with low post micturition urine volume was achieved. Unsuccessful catheter removal was analyzed per patient case.

Conclusion

The early removal of the indwelling catheter of stroke patients can lead to a normalized LUT function and at the same time allows an unburdened rehabilitation program including hydrotherapy , having positive effect on the cerebral function assuring continence.

Keywords: Lower, urinary, tract, Cerebral, stroke

EFFECTS OF REPETITIVE TRANSCRANIAL MAGNETIC STIMULATION ON MULTIPLE SCLEROSIS FATIGUE, SENSORY DISTURBANCES, AND OPTIC NEURITIS: A CASE REPORT

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Background

Multiple sclerosis (MS) is a chronic immune-mediated disorder of the central nervous system, leading to demyelination and neurodegeneration, which cause motor, sensory, and visual impairments among others. While disease-modifying therapies aim to slow progression, symptom management remains crucial. Repetitive transcranial magnetic stimulation (rTMS), a non-invasive neuromodulation technique, has shown promise in alleviating MS-related fatigue, spasticity, and cognitive impairment. However, its effects on sensory disturbances and optic neuritis remain underexplored. This case report investigates the potential of rTMS in treating these symptoms, contributing to growing evidence supporting its role as a versatile intervention for MS-related impairments.

Case report

A 27-year-old male bank accountant was diagnosed with relapsing-remitting multiple sclerosis (RRMS) after experiencing progressive symptoms, including left upper and lower limb hypoesthesia, fatigue, and right eye vision loss. MRI confirmed multiple demyelinating lesions. Initial treatment with high-dose glucocorticoids provided partial relief. Due to concerns about long-term medication effects, he opted for repetitive transcranial magnetic stimulation (rTMS). A 5 Hz protocol was administered over two weeks, resulting in significant improvements in fatigue, sensation, and vision. His Fatigue Severity Scale dropped from 6.2 to 2.7, and his EDSS score improved from 3.5 to 1.5. Follow-ups confirmed sustained benefits with no relapses. The patient regained functional independence, returning to full-time work with restored mobility and vision.

Conclusion

Our findings support the utility of 5 Hz rTMS over the motor cortex in improving sensory symptoms, vision, and fatigue in MS patients, reinforcing prior reports on the benefits of high-frequency stimulation on fatigue and suggesting that it could be beneficial in improving sensory symptoms and vision in Multiple sclerosis patients.

Keywords: NIBS, rTMS, neuroplasticity, MS,neuromodulation

THE USE OF POINT-OF-CARE KINEMATIC ANALYSIS IN THE TREATMENT OF FOCAL SPASTICITY

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Background

Kinematic assessment in the treatment of focal spastic paresis offers valuable insights into the factors influencing gait and overall movement in patients, thereby guiding treatment interventions, such as botulinum toxin injections and physical therapy. The kinematic evaluation of candidates for botulinum toxin therapy could refine treatment targeting. In clinical practice, the availability of a kinesiological laboratory presents an obstacle for most ambulatory specialists. Nonetheless, it is essential to distinguish between the various contributors to movement impairments, including muscle weakness and reduced motor control, as these factors significantly affect rehabilitation approaches for individuals with spastic paresis.

Case report

We present a case series of patients with focal spastic paresis of the lower limb after ischemic stroke, where point-of-care gait kinematic evaluation, using high-speed video recorder with kinematic software, that was used for determining candidate muscles for botulinum toxin treatment. The evaluations were performed as a part of gait testing commonly used with prof. Gracies' therapeutic concept of focal spastic paresis. Gait speed, stride length, and joint goniometry were measured and evaluated. After analysis, the muscle map was established, and ultrasound-guided application of the botulinum toxin with electrophysiological verification of the contractibility of the selected muscles was performed. After 1 month, patients were reevaluated and the measurements compared with prior data. The muscle compensation strategies, spastic co-contractions and synkinesis were evaluated to appraise selected spastic muscles. The kinematic feedback leads to increased motivation for self-rehabilitation among patients and also inspires them as they experience measurable progress in their movement abilities.

Conclusion

The integration of personalized goals and innovative treatment methodologies, coupled with continuous evaluation of movement through kinematic analysis, ultimately contributes to more effective rehabilitation. This approach not only facilitates the alignment of kinematic assessments with patients' specific rehabilitation goals, but also optimizes the management of spastic paresis and enhances patient engagement in the treatment.

Keywords: Kinematic analysis, focal spasticity, botulinumtoxin

INCIDENCE AND RISK FACTORS OF PRESSURE ULCERS IN PATIENTS WITH SPINAL CORD INJURY IN SUBACUTE REHABILITATION

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Background and Aims

Pressure ulcers are among the most common complications within the first year following a spinal cord injury (SCI), significantly impeding the rehabilitation process. The aim of this study was to determine the incidence of pressure ulcers among SCI patients during first two rehabilitation courses, to analyze the associated risk factors.

Methods

A retrospective analysis of 135 SCI patients admitted to the National Rehabilitation Centre "Vaivari" 2018 - 2021 was conducted. Data were collected from medical records during first two specialized subacute inpatient rehabilitation courses, included ASIA, SCIM, Braden assessments.

Results

A total of 135 medical records of patients with SCI were analyzed, males 68.15%. Based on the Braden Scale, high or very high risk of developing pressure ulcers was identified in 41.48% of patients during the first rehabilitation course, in 13.33% during the second. Pressure ulcers were observed in 15.56% of cases during the first rehabilitation course, with 38.10% of these classified as deep (Stage III–IV). During the second course, pressure ulcers occurred in 11.11% of cases, with 33.33% considered deep. Pressure ulcers were present in 28% of patients in high risk and in 9.68% in very high risk during the first rehabilitation course. In the second, ulcers were present in 57.14% of high-risk and 18.18% of very high-risk patients. Pressure ulcers were more frequent in male patients ($P = 0.02$). However, patients with complete spinal cord injury had a higher incidence of pressure ulcers ($P = 3.83 \times 10^{-5}$). Reduced mobility and limited self-care ability, were associated with an increased risk of developing pressure ulcers ($P = 8.18 \times 10^{-4}$ and $P = 5.14 \times 10^{-6}$).

Conclusion

The risk of pressure ulcers is highest during the early subacute phase following spinal cord injury. Key risk factors include the completeness of the lesion, as well as impaired mobility and self-care abilities.

Keywords: spinal cord injury, pressure ulcers

PHYSICAL THERAPY AND REHABILITATION OF A PATIENT WITH HEREDITARY SENSORIMOTOR POLYNEUROPATHY CHARCOT-MARIE-TOOTH TYPE 1A - CASE REPORT

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Background

Charcot-Marie-Tooth disease type 1A (CMT1A) is the most common inherited sensorimotor polyneuropathy, caused by a duplication of the PMP22 gene. It is characterized by slowly progressive distal muscle weakness, sensory loss, and foot deformities. Although there is no cure, physical rehabilitation plays a key role in preserving function and alleviating secondary musculoskeletal symptoms. (1,4,6)

Case report

We present a female patient with a genetically confirmed diagnosis of hereditary sensorimotor polyneuropathy CMT1A, initially diagnosed at the National Academy of Sciences of Macedonia six years ago. She reported chronic pain in the neck and right shoulder radiating to the arm with tingling, as well as right hip and buttock pain radiating to the right leg. The patient also experienced longstanding upper limb weakness. Clinical examination revealed preserved cervical lordosis, reduced lumbar lordosis, and increased thoracic kyphosis. Cervical and lumbar spine movements were globally reduced. Both upper extremities showed generalized muscle hypotrophy, particularly in the interosseous muscles of the hands, along with tremor. The range of motion in the shoulders was preserved but painful on the right. Reflexes were symmetrical, and sensory function remained intact. A tailored rehabilitation program was initiated, including physical therapy (pain management and spinal mobility) and kinesitherapy (postural correction, strengthening, and coordination). Progress was assessed using Manual Muscle Testing (MMT), the Timed Up and Go (TUG) test, the 6-Minute Walk Test (6MWT), and the Visual Analog Scale (VAS) for pain. These showed gradual improvement in strength, mobility, and pain

Conclusion

This case illustrates how individualized rehabilitation can improve function and reduce secondary symptoms in CMT1A. Continued therapy is essential to maintaining independence and quality of life in hereditary neuropathies.(2,3)

Keywords: Charcot-Marie-Tooth Disease Rehabilitation Neuropathy Management

RELATIONSHIP BETWEEN PEAK COUGH FLOW AND IMMEDIATE EFFECT OF ONE-WAY SPEAKING VALVE PLACEMENT ON DYSPHAGIA

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Background and Aims

With the application of a one-way valve to the cannula, air flows into the lungs through the tracheostomy cannula, bypassing the pharynx. We tried to find out the difference in dysphagia improvement when one-way valve is applied according to the peak cough flow (PCF) value, which is one of the expiratory flow indicators.

Methods

Video fluoroscopic swallowing study was consisted of a total two sessions. All patients underwent a first session before one-way valve application. After initial session, patients cleared residue and penetration & aspiration materials, and then applied one-way valve on tracheostomy tube (T tube). After applying one-way valve on T tube, we measured PCF. After measuring PCF, we examined second session. And then, radiologic review was performed. Before and after one-way valve apply, PCF, penetration-aspiration scale (PAS, 1~8) and functional dysphagia scale (FDS) were measured.

Results

Total thirteen patients were recruited. Seven patients improved with aspiration after one-way valve apply, and six patients had no change before and after one-way valve apply. When compared between two groups, there were no difference at age, tracheostomy duration and FDS. However, the improvement group showed a statistically significantly higher PCF value than the no improvement group.

Conclusion

In patients with high PCF, one-way valves can be actively applied to improve swallowing function. Further studies should be needed to find the applicable PCF cut-off value.

Keywords: peak cough flow, one-way valve

EARLY VFSS IN ACUTE STROKE PATIENTS WITH DYSPHAGIA

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Background and Aims

We hypothesized that intensive videofluoroscopic swallowing study (VFSS) helps to choose a proper feeding. This study was to investigate a usefulness after early VFSS in stroke patients with dysphagia.

Methods

VFSS was performed within 7 days after stroke onset. We enrolled the patients who dieted the food via nasogastric tube. Patients were divided into 3 groups according to their brain lesion, cortical lesion (CL), subcortical lesion (SCL) and brainstem/cerebellar lesion (BCL). On the result of VFSS, we checked tendency of changing dietary method and discrepancy of predicting the aspiration risk between the DST and the VFSS.

Results

One hundred sixty three patients met our inclusion criteria; 61 patients were enrolled to the CL group, 54 to the SCL, and 48 to the BSL group. Patients who had aspiration risk, which penetration aspiration scale (PAS) scores were 6 to 8, were noted in three groups on the VFSS (47.5% in CL, 59.3% in SCL, and 47.9% in BCL). 79.2 % of patients were needed to change their feeding methods after VFSS and patients who could have a normal regular diet (NRD) was only 20.8%. 64.4 % of patients were needed to change their feeding methods after VFSS. Among them, 37.4% of patients should restrict the control of their feeding methods due to aspiration risk. Aspiration pneumonia was observed in 12 patients (7.4%) after VFSS during 3 weeks.

Conclusion

Early VFSS for acute stroke patients provides a more proper feeding method and helps to manage dysphagia effectively

Keywords: early VFSS, acute stroke, dysphagia

REHABILITATION OF FUNCTIONAL MOTOR DISORDERS: A LITERATURE REVIEW

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Background and Aims

Functional motor disorders represent a "gray area" in neurology. They are not caused by structural damage to the nervous system, but rather by a disruption in the brain's ability to receive and send signals. Symptoms include muscle weakness, paralysis, tremor, dystonia, gait disturbances, among others. The aim of this study is to define the importance of rehabilitation in the treatment of this spectrum of disorders

Methods

Articles were searched on PubMed (MEDLINE) using the MeSH terms "functional motor disorders" and "rehabilitation," and the most relevant articles were selected.

Results

Rehabilitation in its various forms is an understudied topic that lacks robust randomized clinical trials. The literature review found retrospective studies, one prospective study, and case reports. The symptoms were heterogeneous, and rehabilitation programs were not standardized. Despite these limitations, the studies showed that rehabilitation is an important treatment approach, with improvement seen in up to 70% of patients. One randomized trial showed promising results in hospitalized patients with gait disturbances in a 3-week program. The most commonly used approach combined motor relearning with a behavioral component.

Conclusion

Functional motor disorders are complex, have multifactorial etiology, and are challenging to diagnose. Rehabilitation aims at functional and movement recovery, and although not yet supported by strong scientific evidence, it has shown beneficial effects for patients when integrated into a multimodal treatment plan.

Keywords: Functional Motor Disorder; Rehabilitation

BRACHIAL PLEXUS INJURY OUTCOME FOLLOWING REHABILITATION AND NEUROLYSIS

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Background

Traumatic brachial plexus injury (BPI) is a disabling injury of the upper extremity (UE) and a devastating life-altering event, with pervasive detrimental effects on a patient's physical, psychosocial, and financial well-being often requiring prolonged rehabilitation periods. Surgical intervention is often inevitable to obtain complete restoration of the UE.

Case report

A 33-year-old male was transported to the emergency after being stabbed with a knife in the right supraclavicular region from a random attacker. Examination indicated a 3.5 cm penetrating wound which resulted in superior trunk dissection, pneumomediastinum, and subcutaneous emphysema. Immediate stitching of the gaping wound using suture patterns turned out to be malpractice. Protective posture, deltoid hypotrophy, tiny active shoulder movements were observed on the physiatrist examination. The rehabilitation encompassed the Bobath concept and PNF along with plyometric training. First four months it was performed under the physiotherapist's supervision for five consecutive days, and for the next two months once a week. Active UE abduction up to 45° in standing, hardly capable up to 90° in supine, initial elbow flexion with prone hand, and forward flexion up to 60° were measured by goniometer. Initial NMR revealed compressive edema along the course of C5 and C6 roots with its dislocation. The second revealed the disruption of right C6 in the lateral truncal aspect with nerve retraction. EMNG findings did not show a meaningful recovery. Nine months after BPI, external neurolysis of C5 and C6 roots together with subscapular nerve was performed. Three months after, elbow flexion with hand supine was obtainable up to 140°,and UE abduction up to 160°.

Conclusion

The extensive rehabilitation reached its optimal obtainable level after nine months which was still unsatisfactory in terms of biceps flexion and UE abduction respectively. Complete range of motion of the UE was manageable three months after the surgical reconstruction of BPI.

Keywords: brachial plexus injury, rehabilitation, neurolysis

IATROGENIC INJURY IN HAEMORRHAGIC STROKE – A RARE COMPLICATION

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Background

The placement of a peripheral arterial line is a common procedure in clinical practice, with peripheral nerve injury being a rare iatrogenic complication. We report a case of peripheral neuropathy following arterial line placement in the brachial artery.

Case report

A 58-year-old woman presented with a neuromotor picture of grade 4 hemiplegia on the MRC (Medical Research Council) scale, left-sided hemihypoaesthesia and dysmetria, and a wide-based gait. She was admitted for an intensive rehabilitation programme following a cerebellar haemorrhagic stroke. In addition to stroke-related symptoms, the patient reported paraesthesia over the median nerve territory, starting at the left antecubital fossa. Examination revealed atrophy of palmar interosseous muscles, hypoaesthesia in the median nerve territory, and inability to flex the second metacarpophalangeal joint of the left hand. Although affecting the plegic limb, these findings were not attributed to the stroke, prompting further investigation. Electromyography revealed partial left median nerve injury, with severe axonal sensory-motor involvement, above the emergence of motor branches to the pronator teres muscle. Ultrasound of the antecubital fossa showed a small lesion suggestive of a neuroma, nerve swelling, and possible resorbing perineural haematoma. Review of the patient's acute hospitalisation revealed the placement of an arterial line in the left brachial artery due to loss of peripheral venous access. This was temporally associated with the onset of the reported symptoms and clinical signs. Given the absence of significant functional impact, we opted for conservative management with follow-up consultation to assess the potential need for referral to a specialised consultation.

Conclusion

Given the clinical and temporal correlation, we can assume that the median nerve injury occurred at the antecubital fossa during the placement of the arterial line in the left brachial artery. Although this is a frequently performed procedure, it carries risks that must be recognised and addressed promptly.

Keywords: neuropathy, iatrogenesis, electromyography

CHRONIC INFLAMMATORY DEMYELINATING POLYNEUROPATHY WITH ATYPICAL PRESENTATION – A PARANEOPLASTIC SYNDROME?

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Background

Chronic Inflammatory Demyelinating Polyneuropathy (CIDP) is an acquired immune-mediated neuropathy, usually presenting with symmetrical, insidious sensorimotor deficits, responsive to immunomodulatory therapy. However, atypical presentations, such as acute onset or severe motor impairment, may resemble other neuropathies and hinder diagnosis. In such cases, paraneoplastic syndromes should be considered. Although rare, the association between CIDP and malignancy is documented and justifies further investigation when clinical presentation or imaging findings raise suspicion.

Case report

We present the case of a 73-year-old man, previously independent, with a history of poorly controlled type 2 diabetes mellitus, dyslipidemia and atrial flutter. He developed acute-onset tetraplegia, initially suspected to be Guillain-Barré syndrome, for which he received intravenous immunoglobulin without clinical improvement. During hospitalization, motor worsening occurred, with associated dysphagia and facial paresis. Lumbar puncture revealed marked hyperproteinorrachia, and electromyography demonstrated an acquired demyelinating sensory-motor polyneuropathy with signs of secondary axonal damage, consistent with CIDP. He was treated with plasma exchange and high-dose corticosteroids, resulting in partial improvement of upper limb strength, while severe lower limb motor deficits persisted, in correlation with follow-up EMG findings. A PET-FDG scan revealed a suspicious pulmonary lesion, raising the possibility of a paraneoplastic syndrome and prompting lung biopsy. Histological analysis showed resolving atelectasis without evidence of malignancy, and follow-up with a chest CT was recommended in two months. The patient was admitted to an intensive rehabilitation unit, where he remains, showing functional improvement and having started gait training with third-party assistance.

Conclusion

This case highlights an atypical presentation of CIDP, initially difficult to distinguish from an acute polyradiculoneuropathy, followed by targeted investigation for a possible paraneoplastic syndrome. Despite the absence of confirmed malignancy, this case reinforces the importance of considering paraneoplastic causes in patients with unusual clinical or imaging features. A multidisciplinary approach and broad diagnostic work-up were essential for proper diagnosis and therapeutic management.

Keywords: CIDP, Paraneoplastic, Electrodiagnosis, Neurorehabilitation

BRIDGING DISCIPLINES TO RESTORE LIVES: A CASE OF INTERDISCIPLINARY NEURO-REHABILITATION IN HYPOXIC BRAIN INJURY

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Background

Hypoxic brain injury (HBI) is a devastating condition caused by oxygen deprivation, often leading to profound cognitive and motor disabilities. Recovery depends on early intervention and sustained, specialized long-term rehabilitation. We present the journey of a 36-year-old woman (EE), who after cardiac arrest in September 2022, underwent a complex interdisciplinary rehabilitation from a minimally conscious state to functional reintegration.

Case report

Initially admitted with a Glasgow Coma Scale (GCS) of 4, EE required ICU care. After stabilization, rehabilitation began at Santo-Stefano Rehabilitation, Villa Fastiggi, Italy. Initial Phase (Oct 2022–May 2023): In a minimally conscious state with severe diffuse spasticity and requiring enteral feeding, she received passive mobilization, cognitive stimulation, and reintroduction of oral feeding. Mid Phase (Sept 2023–July 2024): Orthopedic surgeries addressed contractures and joint issues, including tendon lengthening and total hip replacement. Rehabilitation emphasized mobility recovery, weight-bearing, and continued cognitive, speech, and swallowing therapy. Final Phase (July–Aug 2024): EE gained partial independence in activities of daily living (ADLs), independent wheelchair use, and ambulation with two crutches. Functional scores showed remarkable gains: FIM score increased from 18 to 103; CRS-R cognitive score improved from 9 to 24; mobility rose from 10% to 75%.

Conclusion

Physiatrists, neurologists, internists, ward physicians, orthopedic surgeon, physical therapists, psychologists, speech therapists, social workers, nurses and health-care assisitants collaborated daily, each in his/her vital role in clinical monitoring, skin care, emotional support, and fostering early mobility. This case is a testament to the power of true interdisciplinary collaboration. At Santo-Stefano Rehabilitation-Villa Fastiggi, each professional's contribution built a pathway to recovery, proving that even in severe brain injuries, structured teamwork can reawaken potential, save brains and restore lives.

Keywords: Neuroplasticity, Neuro-Motor Recovery, Interdisciplinary Team

AID2GAIT - REAL-TIME BIOFEEDBACK FOR MONITORING ROBOTIC ASSISTED GAIT TRAINING IN CHILDREN WITH CEREBRAL PALSY: A PRELIMINARY STUDY

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Background and Aims

Cerebral Palsy (CP) is a non-progressive neurological disorder affecting movement and posture. Robotic Assisted Gait Training (RAGT), using exoskeletons, has shown promising results in promoting motor control and neuroplasticity. Patient engagement, influenced by motivational and psychophysical factors, is crucial for therapy effectiveness. This case study, part of the PRIN 2022 PNRR "AID2GAIT" project, evaluates motivation, neuroplasticity, and physiological parameters in a paediatric patient undergoing RAGT.

Methods

Conducted at the Padre Pio Rehabilitation Centers Foundation (FG), the study involved a paediatric CP patient over 12 RAGT sessions with the pediatric Lokomat® system over 30 days (3 sessions/week). Physiological and kinematic data were collected during sessions T0, T1, and T2. Clinical scales WeeFIM and GMFM-88 were evaluated at T0 and T2. Heart rate variability (HRV) was monitored via Garmin Vivosmart 5® smartwatch, facial temperature via FLIR A400® thermal imager, and brain activity via fNIRS (functional near-infrared spectroscopy), measured by Cortivision® PhotonCap. Wavelet analysis of hip/knee movements estimated active participation.

Results

WeeFIM showed mobility and locomotion improvements; GMFM-88 reported an 11.6% total increase. HRV rose by 7.5%, indicating higher engagement. Facial temperature decreased from T0 to T2 (e.g., nose -2.4%, nostrils -31.2%), except for the perioral area, suggesting reduced fatigue and increased well-being. Wavelet power from exoskeleton data increased by 22.1%, reflecting greater active contribution. fNIRS results indicated increased cortical activity.

Conclusion

RAGT improved both physical condition and engagement in the patient, supporting its potential in paediatric neurorehabilitation. These results highlight the importance of integrating multimodal monitoring tools to personalize therapy in real-time. Further studies will validate this approach in larger populations and explore predictive models for long-term outcomes. This work was supported by the European Union – Next Generation EU, Mission 4, Component 1, CUP D53D23021770001, Project Name: AID2GAIT.

Keywords: robotic, gait, neuroplasticity, cerebral palsy

SPASTICITY PREDICTIVE FACTORS OF INPATIENTS WITH STROKE DIAGNOSIS DURING THEIR HOSPITALIZATION IN A REHABILITATION CLINIC

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Background and Aims

To study and analyze the incidence and onset time of regional spasticity of stroke patients suffering from their first stroke that are inpatients in a rehabilitation clinic. To analyze the predicting factors of early spasticity

Methods

342 stroke patients that were treated as inpatients immediately after their stroke in our rehabilitation clinic were assessed during the period of July 2023 and July 202 . 89/342 patients demonstrated spasticity and from them 71/89 patients were selected fulfilling the criteria of onset of rehabilitation hospitalization 7-90 days (Mean Value 17,8 days) after their stroke onset.

Results

89/342 presented signs of spasticity (34.2%) inclusive of patients with mAshworth scale of 1 and Brunnstrom recovery scale of 2. 41/71 of patients were men (57,7%) and 30/71 women (42.25).Ischaemic 57/71(80,28%) and 14 hemorrhaging (7.10%). Left hemiplegia 34 /71(47.8% and right hemiplegia 37/71 (52.11%). Age span 22.85% >80 y.o , 30.5% (71-80) , 25.71% (61-70), 11.45% (51-60) and 4,41% (41-50).24.28% of patients had comorbidities and 55.7 % were smokers and13.0% obese. Admission Barthel Index ranged 2-24/100 with mean value of 9/100 38/71 (53,52%) of patients received im Botulinum Toxin treatment and 26/71(36.6%) were treated only with per os antispastic drugs.

Conclusion

(34.2%) of patients with diagnosis of first Stroke had spasticity onset at the acute and subacute phase. Sex , hemiplegia side and age are not relevant to the appearance of hypertonia. Patients with lower Barthel Index and ischaemic type of stroke with lifestyle characteristics as obesity and smoking tend to manifest spasticity after stroke. Therefore it is important during the admission of stroke patients in a rehabilitation clinic to systematically assess on a weekly basis the muscle tone to detect signs of early onset spasticity. The training of the nursing and therapeutic staff to detect hypertonia signs is crucial to diagnose and treat early spasticity.

Keywords: Spasticity, Stroke, Botulinum, Toxin

LOWER URINARY TRACT MANAGEMENT PROTOCOLL OF PATIENTS WITH SPINAL CORD INJURY. THE CONTRIBUTION OF THE NURSING STAFF

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Background and Aims

Purpose: To demonstrate the contribution of rehabilitation nurses to the management of lower urinary tract dysfunction (LUTD) of spinal cord injury (SCI) patients

Methods

A micturition dysfunction protocol was implemented to our SCI patients with neurogenic bladder dysfunction that were admitted to our rehabilitation clinic, in order to prevent complications , to reassure a without residual volume or incontinence bladder emptying , with low bladder detrusor pressure. We analyzed the bladder-sphincter mechanism of the LUT. The study includes patients with cervical, thoracis and lumbar spinal cord injury as well as patients with cauda equina syndrome. All patients during admission to the rehabilitation clinic had indwelling catheter. To all patients with suprasacral lesion anticholinergic drug was administered to prevent risk of detrusor hyperactivity. The patients were assessed my medical rehabilitation specialist team, urinary tract ultrasound and urine analysis and urine culture were performed. To all male patients with suprasacral lesion an a-blocker was added to their medication before removing the indwelling catheter

Results

Patients with incomplete SCI were set under a protocol of intermittent catheterization in order to supervise their neurogenic bladder and alter the prescribed medication according to their needs. Patients with complete suprasacral SCI were treated with antimuscarinic drugs and were educated in intermittent catheterization technique so as to assure a regular bladder voiding under low intradetrusor pressure. Patients with sacral spine lesions present significant difficulty in the management of their neurogenic bladder.

Conclusion

The training of the rehabilitation clinics nursing staff and their involvement in the management of SCI patients neurogenic bladder is crucial to the success of the process, the lower urinary tract safety , a successful rehabilitation program and the social integration of the patient

Keywords: LOWER URINARY, SPINAL CORD INJURY

A RARE CASE OF PARSONAGE-TURNER SYNDROME INVOLVING ONLY THE RADIAL NERVE

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Background

Parsonage-Turner Syndrome (PTS) is a rare neurological disorder characterized by sudden onset of severe shoulder pain followed by progressive motor and sensory deficits, primarily affecting the upper limbs. Although traditionally considered a proximal brachial plexopathy, involvement of distal or mixed nerves (sensory and motor nerves) is less commonly reported. The syndrome have multifactorial etiologies, including autoimmune mechanisms, infections, trauma, and post-vaccination responses. Diagnosis is predominantly clinical, supported by electrodiagnostic studies, and management typically involves conservative measures, including pain control and rehabilitation. PTS often remains underdiagnosed, and atypical presentations may further complicate timely recognition.

Case report

We present the case of a 61-year-old right-handed male with a history of focal epilepsy of vascular origin, presented with sudden right shoulder pain which gradually decreased in intensity and began to exhibit neuropathic features over the course of seven months. Diagnostic workup included EMG and imaging studies. EMG revealed a partial axonal lesion of the right radial nerve. Imaging studies were unremarkable, and viral and immunological tests were negative. The patient showed distal upper limb weakness (wrist and finger extension G 2/5) with preserved proximal strength and hypoesthesia in the dorsal hand. These findings were consistent with PTS. A rehabilitation program was initiated focusing on proprioceptive re-education and strengthening of the wrist and finger extensors. After two months, there was functional improvement, with the Cochin Hand Functional Scale score improving from 81/90 to 59/90.

Conclusion

This case highlights a rare presentation of Parsonage-Turner Syndrome with exclusive radial nerve involvement. Clinicians should maintain a high índex of suspicion for PTS in patients presenting with distal upper limb weakness and sensory changes preceded by severe pain, even when classical proximal nerve involvement is absent. Early recognition and a multidisciplinary approach, including targeted rehabilitation, are crucial for optimizing functional recovery and minimizing long-term disability.

Keywords: Parsonage-Turner Syndrome; radial nerve; rehabilitation

PERIPHERAL FACIAL PALSY AND BOTULINUM TOXIN: FIVE YEARS OF CLINICAL EXPERIENCE IN A HOSPITAL-BASED REHABILITATION SETTING

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Background and Aims

Peripheral facial palsy (PFP) can cause functional and psychosocial impairment due to facial asymmetry, involuntary movements and synkinesis. A considerable number of patients develop persistent sequelae requiring targeted rehabilitation. Botulinum toxin (BTX) injection is a valuable therapeutic option to manage synkinesis and muscular hyperactivity in chronic PFP, improving facial symmetry and quality of life. We aim to characterize the clinical profiles of patients with PFP treated with BTX at a hospital-based rehabilitation service over a 5-year period (2020–2025) and describe treatment patterns (target muscles, dosages, adverse events).

Methods

We conducted an observational, retrospective study, analysed dose evolution over successive sessions using a mixed-effects model, and explored the relationship between initial and final doses via Pearson correlation.

Results

Fifteen patients (66.7% female, mean age 58.3 years) with PFP were included. All underwent initial rehabilitation with physiotherapy and a home exercise program. Due to refractory synkinesis and/or asymmetry, they were referred a median of 15 months after the initial diagnosis for BTX treatment, receiving a mean of 4.5 sessions. Treatment objectives included improving symmetry (100%), reducing synkinesis of the orbicularis oculi (86.7%) and/or platysma (13.3%), and minimizing oral mucosa trauma (20%), pain (13.3%), and tearing (13.3%). The most frequently injected muscle was the orbicularis oculi (100%), followed by the inferior tarsal (93.3%) and frontalis (66.7%), which received the highest total doses. Least frequently injected muscles included the procerus, nasal, depressor anguli oris and levator alaeque nasi (all 6.7%). A mixed-effects model suggested a 0.053-unit dose increase per session. Pearson correlation indicated a moderate positive correlation between initial and final doses. 26.7% of patients reported minor adverse events. Satisfaction was commonly reported after two treatment sessions.

Conclusion

BTX injections are safe and effective for managing late complications of PFP. Our findings suggest a gradual dose increase over time, with higher initial doses predicting higher final doses.

Keywords: Peripheral facial palsy, botulinum toxin

SUBACUTE COMBINED DEGENERATION: FUNCTIONAL OUTCOMES OF TWO PATIENTS FOLLOWING STRUCTURED, MULTISTAGE REHABILITATION

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Background

Subacute Combined Degeneration (SCD) is a rare complication of vitamin B12 deficiency that primarily affects the posterolateral columns of the spinal cord, leading to sensory and motor deficits. Early diagnosis and a structured rehabilitation program (RP) are crucial for improving functional outcomes and quality of life. This case report illustrates the clinical variability of SCD and the impact of timely rehabilitation.

Case report

Two female patients, aged 60 and 49, presented to the emergency department with progressive, symmetrical, ascending paraesthesia in the lower limbs and gait instability. Neurological examination revealed impaired proprioception, positive Romberg sign, wide-based gait, and diminished lower limb strength. Laboratory evaluation revealed megaloblastic anemia, pancytopenia, and vitamin B12 deficiency in the older patient; the younger, with chronic alcohol consumption, had macrocytosis and folate deficiency with normal B12 levels. Both were negative for anti-parietal cell and anti-intrinsic factor antibodies. Neuroimaging showed a normal spinal MRI in one case and a T2 hyperintense lesion from the bulbomedullary junction to T11 in the other. Electromyography in the latter revealed symmetrical, axonal sensory-motor polyneuropathy with marked sensory predominance. SCD was diagnosed and they began a multidisciplinary RP with physiotherapy and occupational therapy, initially in a hospital setting, then in a rehabilitation centre, and later as outpatients. After 10 weeks of inpatient rehabilitation, both showed notable functional gains: motor FIM scores improved from 71 to 84 in one case and from 50 to 60 in the other. Both gained independence in activities of daily living and progressed from wheelchair use to walking-stick assisted ambulation upon discharge. At six months, one no longer required a walking aid and was preparing to return to work; the other continued to use a cane.

Conclusion

These cases highlight the heterogeneity of SCD and the vital role of intensive, multidisciplinary rehabilitation in functional recovery and reintegration in metabolic myelopathies.

Keywords: Subacute Combined Degeneration, Rehabilitation

CLINICAL IDENTIFICATION OF PATIENTS WITH COVERT AWARENESS

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Background and Aims

Covert consciousness is a state of residual consciousness after a severe brain injury or neurological disorder that represents a diagnostic challenge in routine clinical practice and research. It is mandatory to improve the clinical ability to identify those patients with suspected covert cognition and those who would benefit from complementary functional studies for diagnostic and prognostic purposes. Objective: To investigate the relationship between the number of subtle neurological signs indicative of covert cognition as measured by the Motor Behavior Tool - revised (MBT-r) scale with the severity of the disorder of consciousness as measured by the traditional score and with the additional index of the Simplified Evaluation of Consciousness Disorders (SECONDs) scale.

Methods

Twenty-nine subjects with chronic disorders of consciousness secondary to brain injury acquired in the context of inpatient rehabilitation were included. Multivariate linear regression analysis was performed to evaluate the association of the MBT-r score (independent) with the traditional score and the additional SECONDs index (dependent), correcting for age.

Results

The regression equation was statistically significant $F(1,20)=16.994, p<.001$. The R^2 value was .46, indicating that 46% of the change in MBT-r score can be explained by the regression model including the additional SECONDs index. The regression equation was -0.35 + .13* (Additional Index), where the MBT-r score increases .13 for each point of the additional SECONDs index.

Conclusion

Our findings show that the MBT-r designed to capture clinically relevant aspects related to clinical suspicion of masked awareness correlates with the SECONDs Additional Index which was designed to document subtle clinical changes even in the same diagnostic category.

Keywords: consciousness, injury, assessment, scale, SECONDs

NEUROPLASTICITY AND MOTOR RELEARNING IN REHABILITATION FOLLOWING NERVE TRANSFER SURGERY: A CLINICAL CASE REPORT

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Background

Peripheral nerve injuries (PNIs) involving critical motor nerves often lead to severe functional impairments, especially when direct repair is not feasible. Nerve transfer surgery has become a valuable alternative, relying heavily on neuroplasticity for functional recovery. Postoperative rehabilitation strategies, including Constraint-Induced Movement Therapy (CIMT), electrical stimulation, and task-specific training, play a crucial role in motor relearning by promoting cortical reorganization.

Case report

We present the case of a 27-year-old male with traumatic right peroneal nerve injury resulting in foot drop. In February 2024, he underwent nerve transfer surgery, redirecting a finger flexor nerve to the anterior tibialis to restore dorsiflexion. A comprehensive rehabilitation program was implemented, focusing on neuroplasticity through electrical stimulation, task-specific training, motor imagery, and CIMT. One year post-surgery, the patient demonstrated active dorsiflexion with inversion, preserved tibiotarsal joint amplitudes, and functional gait with an orthosis. Without it, slight steppage and inversion were observed.

Conclusion

This case underscores the essential role of tailored, neuroplasticity-oriented rehabilitation following nerve transfer surgery. Combining CIMT, task-specific training, and electrical stimulation contributed to substantial motor recovery. Nevertheless, residual deficits indicate the need for prolonged and individualized therapeutic strategies. Continued research is necessary to refine these protocols and optimize patient outcomes.

Keywords: Neuroplasticity, Nerve, Rehabilitation, Motor, Relearning

THE ANALGESIC EFFECT OF ELECTROTHERAPY IN PATIENTS WITH DIABETIC PERIPHERAL NEUROPATHY

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Background and Aims

Diabetic peripheral neuropathy (DPN) is a common complication of improperly regulated glycemia, affecting approximately 50% of diabetic patients, with half of them experiencing painful symptoms. Patients complain of pain, numbness, and tingling in the extremities. Both pharmacological and physical therapy methods are used in the treatment of painful diabetic peripheral neuropathy. The aim of this study is to demonstrate the analgesic effect of transcutaneous electrical nerve stimulation (TENS) and galvanic currents in patients with painful diabetic peripheral neuropathy.

Methods

The study included 18 patients diagnosed with diabetic peripheral neuropathy of the lower limbs, treated at the HO Polyclinic of the University "St. Cyril and Methodius" in Skopje, aged between 18 and 80 years. The patients were divided into two groups: 9 in the experimental group and 9 in the control group. The experimental group received 15 sessions of electrotherapy (TENS and galvanic currents), while the control group maintained regular foot hygiene and used orthopedic shoes. Pain levels in both groups were assessed using the Visual Analogue Scale (VAS) and the DN4 questionnaire for neuropathic symptoms, administered before and one month after the physical therapy intervention.

Results

The experimental group showed a significant reduction in pain compared to the control group. Neuropathic symptoms such as burning, tingling, and cold sensations in the lower limbs and feet were reduced in the experimental group, whereas these symptoms remained persistent in the control group.

Conclusion

Galvanic currents and TENS significantly reduced pain and neuropathic symptoms in patients with diabetic peripheral neuropathy.

Keywords: diabetic neuropathy, TENS, galvanic current

IMPROVING BALANCE IN DIABETIC PERIPHERAL NEUROPATHY THROUGH STABILOMETRIC PLATFORM REHABILITATION – A CASE REPORT

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Background

Diabetic peripheral neuropathy (DPN) is a common complication of diabetes mellitus, presenting significant challenges for rehabilitation management. This condition is caused by peripheral nerve damage, particularly in the lower limbs, resulting from prolonged hyperglycemia and is characterized by a variety of sensory, motor, and autonomic dysfunctions. The main cause of disability in these patients is balance disorders that increase substantially the risk of falls, consequent injuries, and a diminished quality of life. The integration of somatosensory, visual, and vestibular inputs is paramount for maintaining postural control and equilibrium.

Case report

We present the case of a 65-year-old male patient admitted in our rehabilitation department for numbness and burning sensations, muscle cramps and weakness, balance and gait disorders. He is known with a 20-year history of type 2 diabetes mellitus, diagnosed with stage II symmetrical distal peripheral neuropathy. The rehabilitation program, conducted over a 2-week period, included static and dynamic balance training using a stabilometric platform that includes virtual reality and visual feedback. Assessment was performed using the Michigan Neuropathy Screening Instrument (MNSI), Berg Balance Scale (BBS), Tinetti Balance and Gait Assessment, Timed Up and Go Test (TUG) and the platform evaluations, all of these being carried out before and after the rehabilitation treatment. At the end of the program, a significant improvement was noted, with the BBS score increasing from 49 to 52 points, Tinetti total score 18 to 26, indicating improved postural stability and functional mobility. Also demonstrated notable improvements in the most relevant stabilometric variables, with a marked reduction in sway path length and sway area, alongside a significant enhancement of the stability index.

Conclusion

The use of the stabilometric platform as a standalone rehabilitation tool resulted in meaningful improvements in balance disorders, underscoring its efficacy in managing diabetic peripheral neuropathy.

Keywords: diabetic, peripheral, neuropathy, stabilometric, platform

BALANCE EXERCISE FOR PATIENTS WITH PARKINSON'S DISEASE

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Background and Aims

Parkinson's disease is the second most common neurodegenerative disease and occurs in 2-3% of the population over the age of 65. Postural instability occurs early in the course of Parkinson's disease. Specific balance disorders include postural swaying, gait instability, slow turning, decreased trunk rotation, decreased ability to maintain balance in a tilted position, impaired anticipatory postural adjustment and decreased reactive postural responses. Reduced speed and amplitude of postural adaptation contribute to reduced stability during gait initiation and transition from sitting to standing, while impaired reactive postural responses contribute to an increased risk of falling. The aim of the study was to evaluate the effect of balance exercises in patients with Parkinson's disease.

Methods

Balance was assessed in nineteen patients (N = 19) with Parkinson's disease using the Berg Balance Scale (BBS) on the first and last day of rehabilitation. Rehabilitation included balance and proprioception exercises on the ground and training on a computerized balance platform. Physical therapy was performed five days per week for four weeks.

Results

The BBS score improved significantly after the balance exercises. The median BBS score before training was 50 (IQR 6) and after training 52 (IQR 6). The median difference was 3 (IQR 4). A paired t-test showed a statistically significant difference between the BBS scores before and after training: $t(18) = 2.28$, $p < 0.035$.

Conclusion

Rehabilitation based on balance exercises in patients with Parkinson's disease had a significant positive effect on balance. These results support the effectiveness of balance exercises in improving postural stability.

Keywords: Parkinson, postural instability, balance exercise

INTERVAL TRAINING IN PATIENTS WITH PARKINSONS DISEASE

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Background and Aims

Walking difficulties, characteristic of Parkinson's disease, gave us the goal to apply interval training on a treadmill as an additional exercise program and to compare it with the previous general exercise program, using appropriate standardized functional tests.

Methods

A prospective, experimental, double-blind study was conducted on a sample of 46 patients with an average age of 63.3±9.8 years. The participants were randomly selected and divided into two groups: an experimental group (EG) and a control group (CG). Over a 21-day rehabilitation period, both groups followed the same general kinesitherapy and occupational therapy program lasting a total of 80 minutes. The experimental group additionally participated in a treadmill program consisting of interval training, with 4 minutes of walking at maximum speed followed by 3 minutes of rest, repeated four times. At the beginning and end of the rehabilitation, standardized tests were used for assessment: the UPDRS, Tinetti Balance Scale, Timed Up&Go test, and the 10-meter walk test. The data were statistically analyzed using the chi-square and t-tests.

Results

A significant increase in velocity was observed in the experimental group (D velocity EG = 0.10 ± 0.19 and D velocity KG = 0.04 ± 0.11). UPDRS II, UPDRS III before and after treatment were significantly higher in the control group, but changes were almost identical in both groups, without significance (DUPDRS II p = 1.0 and DUPDRS III p = 0.65). Tinetti and 10m test were significantly higher in the experimental group before and after treatment, but no significance was observed between groups in terms of change (DTINETTI = 0.31 and D10m_test = 0.643). No significant differences were observed between the groups regarding UP&GO (DUP&GO = 0.439).

Conclusion

For a more valid results , it is necessary to include a more homogeneous and numerous sample and objective measurements of gait with a software program

Keywords: interval, training, treadmill, rehabilitation

THE ASSOCIATION OF BRAIN-DERIVED NEUROTROPIC FACTOR VAL66MET POLYMORPHISM WITH STROKE OUTCOMES: A CROSS-SECTIONAL STUDY

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Background and Aims

Stroke is the leading cause of long-term disability in the United States. Post-stroke recovery can be highly variable, suggesting the need to elucidate responsible mechanisms, such as brain-derived neurotropic factor (BDNF) Val66Met polymorphism. The aim of this study was to investigate the effect of BDNF Val66Met polymorphism on post-stroke outcomes including quality of life, physical fitness, cognitive function, quality of life, overall disability, and depression.

Methods

We included stroke participants enrolled in a Randomized Trial of Combined Aerobic, Resistance, and Cognitive Training who underwent a three-month exercise and cognitive training program. Of 131 participants enrolled in the trial, 89 participants (68%) had data available on BDNF Val66Met polymorphism and stroke outcomes (mean age, 57±10 years; 58% male; 54% White, and 49% Hispanic). The difference between Met-carriers and non-Met carriers were analyzed for 89 participants and in pair-matched analysis, using age (±5), sex, time since stroke (<3 months, 3-6 months, and >6 months after a stroke), and race (White, Black, or other/unknown race). Both main and ancillary studies were approved by the Institutional Review Board at the University of Miami.

Results

Twelve participants (13%) had one copy of the BDNF Val66Met (Val/Met heterozygotes) and none had two copies (Met/Met homozygotes). Comparing Met (n=12) and non-Met carriers (n=77) demonstrated no statistically significant differences in demographics or clinical characteristics, including motor or cognitive outcomes. In pair-matched analysis, the significant difference was observed for Center of Epidemiological Studies Depression (CES-D) scale, where Met carriers had significantly greater CES-D scores than non-Met carriers (24±16 vs 9±9, p=0.011). Regardless of the chosen CES-D cut-off scores (≥16 vs ≥20) more cases of depressive symptomatology were observed among those with the BDNF Val66Met polymorphism than those without it (p values = ≤0.05).

Conclusion

The BDNF Val66Met polymorphism is associated with depression but not physical and cognitive outcomes post-stroke.

Keywords: stroke, recovery, polymorphism, BDNF, depression

A RARE CASE OF BOTULISM AFTER HOMEMADE SAUSAGE INGESTION: INITIAL MISDIAGNOSIS AND ITS LONG-TERM FUNCTIONAL OUTCOME

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Background

Botulism is a rare neuroparalytic disease caused by botulinum toxin from Clostridium species. It presents with cranial nerve paralysis with descending progression and is often linked to consuming contaminated food. Diagnosis is confirmed through toxin detection. Treatment involves supportive care and antitoxin, with PMR essential for recovery.

Case report

A 45-year-old male with a history of dyslipidemia, obesity, and hyperuricemia, who was previously independent in ADL, presented to the Emergency Department (ED) with holocranial headache, nausea, photophobia, dizziness, and right upper limb paresthesia. A CT scan showed no significant findings, and he was discharged after symptomatic treatment. Two days later, he returned with worsening symptoms, including dysphagia and progressive global motor deficits. He reported consuming homemade sausages prior to symptom onset. Physical examination revealed peripheral facial paralysis, dysphagia, flaccid dysarthria, and symmetric tetraparesis (MRC G3), without sensory deficits. A lumbar puncture showed slight albuminocytological dissociation. Suspecting Guillain-Barré Syndrome, the patient was transferred to the ICU for respiratory failure risk, completing 5 days of immunoglobulin therapy. On day 8, he started physiotherapy, including speech and physical therapy. After 2 weeks, the diagnosis was confirmed with a positive C. botulinum neurotoxin test. Due to favorable clinical progression, the patient was discharged with outpatient rehabilitation. At 6 months follow-up, there was significant improvement in neuromotor function, particularly in orofacial motor skills and dysphagia. Muscle strength was grade 4+ globally, except for proximal thigh strength (grade 4). He regained independence in ADLs, needing minimal assistance for transitions, and was able to walk independently with slight postural imbalance. (video)

Conclusion

Although the antitoxin was not administered due to the delayed definitive diagnosis of botulism, the patient had a favorable clinical outcome. The physiatric treatment, tailored to improve orofacial motility, voice and swallowing training, along with global muscle strengthening and gait training, was essential in the patient's rehabilitation.

Keywords: Botulism; Misdiagnosis; rehabilitation

THE SILENT POISON: CHRONIC MERCURY TOXICITY MASQUERADING AS NEURODEGENERATIVE DISEASE

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Background

Heavy metal toxicity may lead to permanent dysfunction across multiple organ systems. The central nervous system, peripheral nervous system, renal, cardiovascular, and hematopoietic systems are most commonly affected. Mercury, a well-known environmental contaminant, is particularly neurotoxic. Chronic exposure often results in CNS dysfunction, with intention tremor being its most consistent neurological manifestation. Neurological deficits are typically slow to resolve and may be only partially reversible.

Case report

A 66-year-old male presented with progressive gait instability, hand tremors, gingivitis, and insomnia. Over six months, he experienced worsening balance, impaired coordination, and speech disturbances. Initial workup, based on a suspicion of encephalitis, included brain MRI and laboratory tests, which revealed only mild diffuse cerebral atrophy; routine labs were unremarkable. He was referred for orthodontic, psychiatric and psychological evaluation, and which continued as outpatient care. Six months later, his condition deteriorated, marked by aggravated speech impairment, vertigo, and further gait instability. Extended laboratory testing revealed serum mercury levels three times above the reference range. Cervical spine imaging showed changes consistent with transverse myelitis/myelopathy related to vitamin B12 deficiency. Detailed occupational history revealed chronic exposure to heavy metals at a waste disposal site. A multidisciplinary evaluation was initiated, including neurological, psychiatric and physiatric assessments. The patient was treated with vitamin B&E supplementations, antiparkinsonian and selenium, and referred for neurorehabilitation using the Bobath concept. Mild functional improvement was noted. Following a severe psychosocial stressor after a few months, he experienced a relapse with worsening speech, pronounced gait instability, nocturnal lower limb spasms, and loss of balance. Pharmacologic therapy was adjusted, and he underwent another cycle of physical and occupational therapy focused on adaptation strategies for daily living. Functional improvement in balance, coordination and performance in ADL followed.

Conclusion

This case underscores the value of thorough history-taking and individualized, multidisciplinary management in diagnosing and treating rare toxic exposures.

Keywords: Mercury, Toxicity, Neurological Rehabilitation

A META-ANALYSIS OF THE REHABILITATION EFFECTS OF EMGBFT COMBINED WITH MT ON LOWER LIMB FUNCTION AND ACTIVITIES OF DAILY LIVING IN PATIENTS AFTER STROKE

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Background and Aims

Lower limb dysfunction is a major problem in stroke patients. To systematically evaluate the rehabilitation effect of Myoelectric biofeedback(EMGBFT) combined with mirror therapy (MT) on lower limb function and daily living ability of stroke patients with hemiplegia.

Results

A total of nine randomized controlled trials involving 750 patients were included. The results showed that compared with the EMGBFT group alone, FMA-LE score [MD=2.82,95%CI (1.45, 4.20),P <0.05] and BBS score [MD=3.68, 95%CI (2.22,) in the combined group were significantly higher than those in the EMGBFT group alone. 5.15), P < 0.05] and MBI scores [MD = 7.21, 95% CI (3.92, 10.50), P < 0.05) were significantly improved; Compared with the single MT group, the combined group had FMA-LE [MD=3.28,95%CI (0.29,6.26),P <0.05], BBS [MD=3.20,95%CI (1.67,4.72),P <0.05] scores and MBI The scores [MD=5.43,95%CI (2.36,8.50),P <0.05] were significantly higher. Compared with conventional treatment group, FMA-LE score [MD=3.73,95%CI (3.23, 4.23),P <0.05] and BBS score [MD=6.18,95%CI (3.09, 9.26),P <0.05] and MBI score [MD= 9.55, 95%CI (2.29,16.80),P <0.05] were significantly increased.

Conclusion

Compared with EMGBFT or MT alone or conventional therapy, EMGBFT combined with MT can improve lower limb motor function, balance function and activity of daily living ability in stroke patients more significantly.

Keywords: myoelectric biofeedback, mirror therapy,stroke,Meta-analysis

POSTER PRESENTATION

CARDIOPULMONARY REHABILITATION

UNMASKING RESPIRATORY MUSCLE WEAKNESS DURING EFFORT IN MYOTONIC DYSTROPHY TYPE 1

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Background

Myotonic dystrophy type 1 (MD1), also known as Steinert's disease, is the most common monogenic autosomal dominant disorder affecting both skeletal and smooth muscles. Since treatment is symptomatic, early recognition of complications and timely, goal-oriented rehabilitation are essential.

Case report

A 50-year-old male with a confirmed diagnosis of MD1, under the care of a multidisciplinary team, was referred to a physical and rehabilitation medicine specialist for assessment of functional status and rehabilitation needs. At initial evaluation, hand muscle stiffness and weakness were observed. Following occupational therapy, the patient was referred for assessment of cardiorespiratory capacity based on a recommendation for respiratory rehabilitation. Isolated hypercapnia was identified despite otherwise normal pulmonary function tests, with the cause determined to be extrapulmonary–specifically, weakness of the respiratory muscles. The patient reported no signs of cardiorespiratory deconditioning. A 6-minute walk test showed normal performance (655 meters, minimum SpO_2 94%, expected blood pressure response to 140/90 mmHg). Maximal inspiratory pressure at rest (Pimax = 65 mbar) was within normal limits. Cardiopulmonary exercise testing, conducted using a RAMP protocol, revealed a VO_2max of 34.1 mL/kg/min (92% predicted), an oxygen pulse at 101% predicted, and a breathing reserve of 50.2%, all indicating preserved aerobic and ventilatory capacity. However, the VE/VCO_2 slope was elevated at 35.6, and VE/VCO_2 at the first ventilatory threshold was 27.9–both above normal, indicating reduced ventilatory efficiency. This finding, together with desaturation to 88% at peak exertion, confirmed exertional respiratory dysfunction since cardiopulmonary causes were excluded earlier. The patient was referred for targeted respiratory rehabilitation focusing on aerobic conditioning and strengthening of respiratory muscle function.

Conclusion

The aim of this case report is to highlight the importance of assessing cardiorespiratory capacity both at rest and during exertion to guide effective and personalized rehabilitation planning.

Keywords: myotonic, dystrophy, respiratory, muscles, weakness

THE ROLE OF CARDIOPULMONARY EXERCISE TESTING IN OSTEOARTHRITIS REHABILITATION: EMPHASIS ON BODY MASS REDUCTION

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Background and Aims

Osteoarthritis (OA) is a leading cause of disability worldwide, often aggravated by excess body weight, which increases biomechanical stress on joints and accelerates disease progression. Effective weight management, particularly through structured physical activity, is a key component of OA rehabilitation. However, exercise prescription must be individualized to ensure safety, efficacy and adherence, especially in patients with compromised joint function. The aim is to evaluate the role of cardiopulmonary exercise testing (CPET) in the development of personalized rehabilitation programs for patients with OA, with a specific emphasis on interventions aimed at body mass reduction.

Methods

CPET provides an objective, comprehensive assessment of cardiovascular, pulmonary and musculoskeletal function during graded exercise. Parameters such as peak oxygen uptake, ventilatory thresholds, heart rate kinetics and respiratory parameters offer critical insights into functional capacity and exercise limitations. These data support the formulation of individualized aerobic training zones and guide selection of appropriate exercise modalities.

Results

In overweight or obese individuals with OA, CPET- guided rehabilitation enables the safe implementation of low-impact, aerobic exercise modalities that optimize caloric expenditure while minimizing joint load. Strategically planned training improves metabolic efficiency, supports sustainable weight loss and enhances overall physical function. Furthermore, the use of CPET improves patient stratification, monitoring and outcome prediction, ultimately enhancing long-term adherence and therapeutic outcomes.

Conclusion

CPET is a valuable tool in the management of OA, particularly when body mass reduction is a therapeutic goal. Patients with osteoarthritis have high prevalence of comorbidities which requires individualized, risk-adapted exercise prescriptions. By enabling precise exercise prescription, it contributes to improved functional outcomes, reduced symptom burden and better quality of life for patients with OA. Incorporating CPET into rehabilitation protocols represents a step toward more personalized, evidence-based care for patients with osteoarthritis.

Keywords: cardiopulmonary exercise testing, osteoarthritis, rehabilitation

COMPREHENSIVE NURSING OF ECMO ASSISTED FLOW DYNAMICS MONITORING UNDER EVIDENCE-BASED NURSING PRACTICE

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Background and Aims

To explore a comprehensive nursing strategy for hemodynamic monitoring during extracorporeal membrane oxygenation (ECMO) assisted period in evidence-based nursing practice, in order to improve the treatment efficiency of critically ill patients.

Methods

The system searched UpToDate, Cochrane Library, JBI Evidence Based Healthcare Database, and PubMed (2010-2025), used AGREE II tool to evaluate guideline evidence, and combined with the ECMO nursing expert consensus of the Chinese Nursing Association, developed a nursing process that includes three core elements: standardized monitoring techniques, complication warning, and team collaboration. Systematically evaluate the hemodynamic characteristics of ECMO patients and the limitations of monitoring techniques, and construct a multidimensional nursing intervention plan.

Results

Standardized nursing significantly reduced ECMO related hypoperfusion events (by 30%) ($p<0.01$), improved the accuracy of hemodynamic parameter collection in ECMO patients ($p<0.01$), and reduced the incidence of catheter-related thrombosis (OR=0.42, 95% CI 0.31-0.57), verifying the synergistic effect of precise hemodynamic monitoring and comprehensive nursing.

Conclusion

The evidence-based ECMO nursing system can optimize hemodynamic management and provide individualized and precise nursing support for critically ill patients. In the future, multi center research needs to be deepened to improve the evidence chain.

Keywords: Evidence based nursing, ECMO

HOW TO INDIVIDUALIZE AEROBIC TRAINING IN STROKE PATIENTS?

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Background and Aims

Stroke is one of the leading causes of disability and mortality worldwide. Patients after stroke often have reduced cardiorespiratory fitness and physical activity levels, which is associated with an increased risk of cardiovascular diseases. Cardiopulmonary exercise testing (CPET) can be used to determine cardiovascular disease risk and indicate aerobic exercise in stroke patients. The aim of this study was to demonstrate the role of CPET in the stroke rehabilitation.

Methods

Review of recent studies on CPET after stroke.

Results

Early aerobic training has a positive effect on aerobic capacity, walking speed and endurance in the stroke recovery. CPET should be performed as soon after stroke as patients are medically stable. Prior to CPET, patients shouldn't have contraindications such as unstable angina or uncontrolled hypertension. Blood pressure, heart rate, ECG, oxygen saturation and clinical symptoms are closely monitored during the test. The exercise mode (cycle ergometer or treadmill) is determined based on the patient's motor deficits. Cycle ergometry is safer for patients with balance or gait disorders. CPET evaluates parameters such as peak oxygen consumption (VO_2peak), ventilatory threshold and respiratory exchange ratio, which help to determine aerobic capacity and training zones. The VO_2peak is a predictor of functional independence and long-term survival in stroke patients. CPET is terminated when the patient becomes symptomatic or when maximal effort is reached. Aerobic exercise in subacute and chronic stroke patients should be performed three to five days per week for at least eight weeks. The intensity must be moderate (training zone assessed by CPET). Patients should start with 20 minutes per exercise and gradually increase duration.

Conclusion

Aerobic exercise improves cardiorespiratory fitness and physical activity levels in stroke patients and helps reduce the risk of a second stroke. CPET is critical for assessing aerobic fitness and exercise intensity and for monitoring long-term recovery in stroke patients.

Keywords: CPET, stroke, aerobic capacity

ASSESSING AWARENESS AND MANAGEMENT OF PATIENTS WITH OBESITY AMONG PHYSICAL MEDICINE AND REHABILITATION PHYSICIANS IN SPAIN: A PIONEER SURVEY STUDY

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Background and Aims

Obesity is a chronic and multifactorial disease that significantly impacts the adult population, contributing to disability and leading to economic consequences. People with obesity have significantly lower number of disability free years, what leads to an increase demand of rehabilitation. AIM The aim of our survey is to analyze the current situation in Spain in relation to awareness and management of patients with obesity in the Physical Medicine and Rehabilitation (PMR) services, as it has never been studied before in our county.

Methods

In this cross-sectional study, an online survey was sent out from the Spanish Society of Rehabilitation (SERMEF) to their PRM members from May 1st to July 31st 2023. It was developed by the obesity working group and it included 22 questions. Data was collected in REDcap.

Results

205 (10.07%) PRM physicians participated, half of them (n=102, 49.8%) worked with obese patients and 99% (n=201) considered obesity a disease. 52.2% (n=107) recognized that obesity influences functional prognosis of patients that receive rehabilitation treatment. However, 83.3% (n=184) considered that the facilities at their working areas were not adapted to the needs of obese patients, and only 9.8% (n=20) felt they had received enough training to asses properly this kind of patients. Only 21%(n=43) had an interdisciplinary unit to manage morbid obesity, and in those only half of the units had a PRM doctor who worked 2 ±1.61 hours/week.

Conclusion

This study shows that despite PRM physicians are aware of the implications of obesity in functional outcomes, improvements in the management in hospitals of these patients including PRM departments are required. Multidisciplinary units for addressing obesity should be developed including PRM physicians to get better functional outcomes .

Keywords: obesity, Survey, facilities, exercise

STUDY OF THE PREVALENCE AND CHANGES IN COGNITIVE IMPAIRMENTS IN PATIENTS ENROLLED IN A CARDIAC REHABILITATION PROGRAM

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Background and Aims

Cognitive deficits are common after cardiovascular events, with mild impairments often harder to detect. While exercise is known to improve brain function, data on cognitive changes during cardiac rehabilitation is limited. This study used the Montreal Cognitive Assessment (MoCA) to assess cognitive function before and after rehabilitation, aiming to understand how structured programs impact cognitive outcomes. It also explores how factors like age, gender, educational level, and cardiac diagnosis influence cognitive performance.

Methods

Patients enrolled in the cardiac rehabilitation program at HGUGM Hospital (April–June 2023) completed the MoCA test at the beginning and end of the program. Data on age, gender, educatuinal level, cardiac conditions, and cardiovascular risk factors were collected. Changes in MoCA scores before and after rehabilitation were analyzed in relation to these variables.

Results

Seventy-five patients (average age 60) participated, with 79% being men. Ischemic heart disease was the most common condition (82%), and 54.7% had mild cognitive impairment (MoCA < 26). The mean MoCA score improvement after rehabilitation was 0.53 ± 0.59 ($p = 0.74$), with no statistical significance. A correlation coefficient of 0.7 was observed. Educational level was a key factor, with university-educated patients showing significantly higher scores (p 0.05), hypertension ($p > 0.05$), or obesity ($p = 0.94$).

Conclusion

Cardiac rehabilitation showed a trend toward cognitive improvement, with a mean MoCA increase of 0.53 ± 0.59 ($p = 0.74$). A correlation of 0.7 suggests a larger sample size could show significance. Educational level was a key factor, with university-educated patients showing higher scores (p 0.05).

Keywords: Cardiac, rehabilitation, cognitive, impairment, MoCA

THE ROLE OF NUTRITION AND DIETARY SUPPLEMENTS IN THE PREVENTION AND TREATMENT OF MALNUTITION IN PATIENTIS WITH COPD

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Background

Malnutrition is a significant comorbidity in chronic obstructive pulmonary disease (COPD), contributing to disease progression and reduced quality of life. This paper examines the role of medical nutrition therapy in the prevention and treatment of malnutrition in patients with COPD, emphasizing an evidence-based approach and its clinical implifications. Patients with COPD face increased metabolic demands, systemic inflammation, and reduced food intake, resulting in sarcopenia, osteopenia and cachexia. Recent studies have highlighted the efficacy of targeted nutritional strategies, including supplementation with essential amino acids, omega-3 fatty acids, vitamin D and antioxidants to improve respiratory function, muscle strength ang quality of life in patiens. Comprehensive nutritional assessments and personalized interventions are increasingly recognized as critical components of the care of patients with chronic obstructive pulmonary disease. Medical nutrition therapy plays a key role in the treatment of malnutrition and improving clinical outcomes in COPD.

Case report

The aim of the research is to determine the effect of pulmonary rehabilitation and individual medical nutritional therapy on muscle mass measured by the bioimpedance method before and after the implementation of physio-rehabilitation treatment.

Conclusion

Individually prescribed medical nutritional therapy, adequate and adapted physical activity with the participation of balneofactors, led to changes in body composition with the desired outcome of increasing muscle mass in patients with COPD.

Keywords: nutritional therapy, pulmonary rehabilitation, sarcopenia

CLINICAL EFFECTS OF AN INTEGRATIVE CHINESE-WESTERN MEDICINE APPROACH BASED ON THE "LUNG-KIDNEY CO-TREATMENT" PRINCIPLE ON INFLAMMATORY STATUS AND PULMONARY FUNCTION RECOVERY IN PATIENTS WITH AECOPD

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Background and Aims

This study aimed to evaluate the clinical effectiveness of an integrative Chinese-Western medicine approach based on the "Lung-Kidney Co-Treatment" principle in improving inflammatory markers and pulmonary function in patients with AECOPD.

Methods

A retrospective cohort study was conducted involving patients with AECOPD admitted to the Affiliated Traditional Chinese Medicine Hospital of Chongqing Three Gorges Medical College between January 2023 and December 2024. Patients who received standard Western medical therapy were assigned to the control group(n=54), while those who received an additional Chinese herbal formula based on the "Lung-Kidney Co-Treatment" principle were included in the intervention group(n=66).

Results

Baseline characteristics between the two groups were comparable (P>0.05). At 7-14 days post-treatment, the intervention group showed significantly better outcomes than the control group in the following parameters: WBC(7.2 ± 1.6×109/L vs 8.4 ± 2.1×109/L), NEU%(62.1 ± 8.5% vs 68.3 ± 9.3%), CRP(6.5 ± 2.8 mg/L vs 9.8 ± 3.4 mg/L), PCT(0.10 ± 0.05 ng/mL vs 0.15 ± 0.07 ng/mL), IL-6(10.2 ± 3.9 pg/mL vs 15.1 ± 5.2 pg/mL), TNF-α(10.6 ± 3.6 pg/mL vs 14.2 ± 4.8 pg/mL), FEV1/FVC(53.5 ± 8.3 vs 48.6 ± 7.5), and FEV1% pred (64.5 ± 10.2% vs 46.7 ± 8.4%) (all P<0.05). The 6-month hospital readmission rate was also significantly lower in the intervention group [9.1%(6/66) vs 24.1%(13/54), P<0.05]. Multivariate logistic regression identified the integrative treatment as an independent protective factor against readmission within 6 months[OR=0.32(95%CI,0.12-0.86), P=0.03].

Conclusion

The integrative Chinese-Western medicine approach based on the "Lung-Kidney Co-Treatment" principle was effective and feasible for AECOPD and reduced the 6-month readmission risk.

Keywords: AECOPD, lung-kidney co-treatment, risk factors.

POSTER PRESENTATION

PAIN TREATMENT AND REHABILITATION

FROM SENSORY DISTURBANCE TO DIAGNOSIS: A CASE OF DEJERINE-ROUSSY SYNDROME AFTER THALAMIC STROKE

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Background

Dejerine-Roussy syndrome, or poststroke thalamic pain, is a form of central pain that occurs after ischemic or hemorrhagic strokes involving the thalamus. It is characterized by chronic neuropathic pain, often presenting as allodynia, hyperalgesia, and dysesthesias. In addition to pain, patients may experience sensory deficits, including loss of touch and proprioception. The prevalence of thalamic pain varies, ranging from 3% to 25% among stroke patients. Diagnosis is primarily clinical, based on the patient's stroke history and characteristic symptoms. Treatment is challenging and typically involves a multimodal approach, including medications like antidepressants, anticonvulsants, and occasionally opioids, though responses are often variable.

Case report

A 65-year-old man, with a history of hypertension and chronic alcohol use, was admitted to an Internal Medicine unit after a left thalamo-capsular ischemic stroke. He presented with mild right-sided hemiparesis, hypoesthesia, and impaired sensation, predominantly in the distal upper limb. He underwent physiotherapy during his hospital stay. Despite favorable functional recovery, he continued to experience persistent sensory disturbances, including constant paresthesias, numbness, and paroxysmal dysesthesias. Initially, he was treated with pregabalin (25 mg + 100 mg), with only mild improvement. Following discharge, he was referred to a Physical and Rehabilitation Medicine outpatient consultation, where Dejerine-Roussy Syndrome was diagnosed. His treatment was adjusted with increased pregabalin (75 mg twice daily) and the introduction of amitriptyline (25 mg). A month later, he reported clear improvement, with less frequent and milder episodes of dysesthesias. He remains under follow-up in Rehabilitation Medicine, resuming therapy as an outpatient.

Conclusion

Dejerine-Roussy Syndrome significantly impacts quality of life, especially after a thalamic stroke. This case highlights the challenges of diagnosis and treatment, with the progression of sensory symptoms and partial response to initial treatment with pregabalin and a tricyclic antidepressant. A multidisciplinary approach is essential for optimizing rehabilitation and improving patient outcomes.

Keywords: Dejerine-Roussy, Thalamic pain, Stroke, Neuropathy

WHOLE BODY CRYOSTIMULATION IN REHABILITATION. WHAT IS THE EVIDENCE ?

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Background and Aims

Whole-body cryostimulation (WBC) is mostly used in sports for muscle recovery but it is emerging as a promising non-pharmacological intervention for a wide range of conditions (Multiple Sclerosis, Parkinson, chronic inflammatory or neuropathic pain, fibromyalgia, long Covid, spasticity). Repeated cold exposures have been shown to improve inflammation and autonomic imbalance and reduce symptoms like pain and fatigue. The treatment is safe after medical screening for recently revised contraindications. This presentation aims to provide up-to-date evidence on the benefits of WBC in various conditions of rehabilitation interest.

Methods

We will provide a narrative synthesis of the existing evidence at molecular, clinical and functional level on the use of WBC in a range of rehabilitation conditions.

Results

A synthesis of the reviews, RCTs, observational and case reports available in the literature will be provided.

Conclusion

The current state of the art suggests that WBC holds significant promise as an adjunctive therapy for several musculoskeletal, neurological and metabolic conditions of rehabilitation interest. Adverse events are rare and minor but proper medical screening and supervision is mandatory.

Keywords: whole-body, cryostimulation, rehabilitation, pain, fatigue

HYDRODISSECTION OF THE MEDIAN NERVE AFTER COMMINUTED TRAUMA OF THE HAND USING PRP – A CASE STUDY

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Background

Post-traumatic carpal tunnel syndrome (CTS) is a notable concern following an injury to the wrist. Early identification and intervention are crucial to prevent long-term neurological deficits, which may lead to chronic pain, paresthesias, and muscle weakness, disrupting the function of the hand. Ultrasound-guided hydrodissection of the median nerve involves separating the median nerve from surrounding fibrous tissues, thereby promoting neural mobility. The application of platelet-rich plasma (PRP) in conjunction with hydrodissection has shown potential in augmenting tissue regeneration and reducing inflammation.

Case report

We present a clinical case of posttraumatic CTS after osteosynthesis of a comminuted dislocated fracture of the second metacarpal at the carpometacarpal (CMC) joint, later converted to arthrodesis of the second and third CMC joints, significantly disrupting the function of the affected hand. Due to the severity of the injury, the wrist mobility and analytic exercises were prioritized in the early rehabilitation. CTS then gradually developed because of fibrosis of the wrist caused by bony fragments. The rehabilitation was compromised due to pain and paresthesias in the median nerve distribution, and the development of paresis of the innervated muscles. The grip function was disrupted by progressive ulnar deviation of the wrist, accompanied by progressive resting adduction of the thumb. Therefore, the USG examination of the wrist was performed. After the diagnosis of CTS, the patient underwent USG-guided hydrodissection of the median nerve using PRP. The gradual regression of the paresthesia and pain was recorded after intervention, peaking at 6 weeks. The patient continues rehabilitation with significant progression of the grip strength, function, and fine motor skills.

Conclusion

The use of USG-guided hydrodissection with PRP presents a novel therapeutic approach for patients with posttraumatic CTS. The dual approach seems suitable for rehabilitation progression and has the potential to improve patient outcomes significantly. It should be considered individually to optimize treatment strategy.

Keywords: Hydrodissection, post-traumatic, CTS, PRP

MACHINE BASED TRUNK MUSCLE STRENGTHENING IN THE PREVENTION OF LOW BACK PAIN IN ACTIVE NURSES AGED 45+: RESULTS OF A FEASIBILITY RANDOMIZED CONTROLLED STUDY.

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Background and Aims

Active nurses aged 45+ are at very high risk for low back pain (LBP). As evidence-based recommendations of regular trunk muscle training to prevent LBP in nurses remains unclear, this pilot study sought 1) to ascertain the feasibility of machine-based trunk muscle strengthening at the workplace to prevent LBP and disability and 2) to identify suitable and sensitive health and functional measures to be included in a confirmatory RCT.

Methods

Thirty-three active nurses older than 45yrs who reported LBP on at least six of 30 monitored days (intensity ≥3 on 11pts RSA) participated in this randomized, controlled cross-over trial. The intervention engaged participants to train back extensor and trunk flexor muscles for five months (2x/week) using machines. Controls remained without intervention. After six months, groups were switched. Evaluations were performed at baseline, five, and 11 months later. The primary outcome measures included daily pain and disability ratings, the Roland Morris Disability Questionnaire (RMDQ), the Multidimensional Pain Inventory (WHYMPI), and the Work Productivity and Ability Index (WPAI). Secondary outcomes were trunk strength, endurance and activity measures, and satisfaction with the intervention.

Results

82% of the participants completed the training sessions, 81% of whom expressed satisfaction with the intervention and indicated a willingness to repeat it. No significant changes were observed for the RMDQ or the WPAI at the conclusion of the intervention. The MPID exhibited a clinically relevant improvement among participants when allocated to the intervention. No correlation was found between secondary outcome and primary outcome measures.

Conclusion

A confirmatory study with active 45+ nurses who experience LBP that does not require medical attention would likely demonstrate that regular trunk muscle training would positively effect on psychosocial life aspects as measured with the WHYMPI. However, the efficacy of this intervention in enhancing back-related health (RMDI), or workability (WPAI), in these individuals appears improbable.

Keywords: Low, back, pain, prevention, training

SEX-BASED DISPARITIES IN POSTOPERATIVE PAIN AND REHABILITATION EFFICIENCY AFTER ELBOW ARTHROLYSIS: INSIGHTS FROM A MOROCCAN RETROSPECTIVE COHORT

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Background and Aims

Elbow arthrolysis is a standard intervention for post-traumatic stiffness, with pain management critical to functional recovery. While sex-based differences in pain perception are documented, their impact on postoperative outcomes after elbow arthrolysis remains understudied in North African populations. This study evaluated sex disparities in acute pain control, use of different analgesic classes, and rehabilitation metrics following elbow arthrolysis.

Methods

A retrospective cohort study included 120 patients (60 males, 60 females, aged 18–65 years) undergoing elbow arthrolysis between January 2020 and January 2025 at CHU Ibn Rochd's Physical Medicine Department. Exclusions: chronic pain or preoperative analgesic use. Pain intensity (Visual Analog Scale, VAS), consumption of analgesics (categorized by class, converted to standardized equivalents), rehabilitation duration, and range of motion (ROM) were assessed at 24h, 72h, 1 week, 3, and 6 months.

Results

Mean VAS scores at 24h were 7.2 ± 1.1 in females and 6.5 ± 1.3 in males (*p* = 0.003), decreasing to 5.8 ± 1.0 (females) and 5.1 ± 0.9 (males) at 72h (*p* = 0.02). At 1 week, scores were 3.4 ± 1.2 (females) and 3.1 ± 1.0 (males) (*p* = 0.15). Total analgesic consumption (standardized equivalents) was higher in females (35.2 ± 8.5 vs. 28.4 ± 7.1, *p* < 0.001). Rehabilitation duration averaged 32 ± 6 days in females and 28 ± 5 days in males (*p* = 0.01). ROM at 3 months measured 95° ± 12° (females) and 105° ± 14° (males) (*p* = 0.004), with 6-month values at 125° ± 15° (females) and 128° ± 13° (males) (*p* = 0.18). Residual pain at 6 months was reported by 22% of females and 12% of males (*p* = 0.04).

Conclusion

Sex-based disparities in acute pain, analgesic requirements, and early rehabilitation progress were observed post-elbow arthrolysis. These findings support sex-specific protocols to enhance postoperative care.

Keywords: Elbow arthrolysis, Postoperative pain, Analgesics

UNMASKING A CHRONIC LOW BACK PAIN: THE HIDDEN ROLE OF COPEMAN'S NODULES AND TARGETED THERAPY

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Background

Chronic low back pain (CLBP) is a common complaint with a broad differential diagnosis, often attributed to mechanical, inflammatory, or neuropathic causes. In clinical practice, musculoskeletal mimickers such as Copeman's nodules—fatty nodular formations typically associated with myofascial or ligamentous pain—are frequently overlooked. Physical and Rehabilitation Medicine (PRM) plays a crucial role in identifying these underdiagnosed entities and implementing targeted interventions.

Case report

We report the case of a 33-year-old female with a two-year history of daily mechanical low back pain, worse in the evening and exacerbated by prolonged sitting or standing, that was being followed up in reumathology appointment. Initial investigations, including CT imaging, were unremarkable except for mild degenerative changes. Despite symptomatic relief with muscle relaxants and analgesics, the pain persisted. Upon PRM evaluation, bilateral Copeman's nodules at L5 were identified as the likely pain generators. An ultrasound-guided corticosteroid-anesthetic (1mL Methylprednisolone + 1mL Ropivacaine) infiltration was performed in the nodules. At one-month follow-up, the patient reported complete resolution of pain (EVA 8/10 to 0/10).

Conclusion

This case highlights the importance of PRM in the assessment and management of chronic low back pain, particularly in identifying overlooked etiologies such as Copeman's nodules. A multidisciplinary approach enabled not only accurate diagnosis but also effective, minimally invasive treatment with rapid symptomatic improvement.

Keywords: copeman, nodules;, low, back, pain;

TERAPEUTICAL BENEFIT OF HIGH-INTENSITY LASER IN PATIENTS WITH KNEE OSTEOARTHRITIS - A RANDOMIZED COMPARATIVE SINGLE-BLIND STUDY

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Background and Aims

Knee osteoarthritis is a musculoskeletal disease characterized by degeneration and deterioration of articular cartilage. In addition to pharmacological therapy, physical modalities including low-intensity laser therapy (LILT) and high-intensity laser therapy (HILT), and kinesitherapy are used to treat knee osteoarthritis (KOA). To date, no research has been conducted in the Republic of North Macedonia that could be compared to existing research about the effects of HILT and LILT on functional ability in patients with KOA. The aim of this study was to compare the treatment effects of HILT and LILT in patients with KOA.

Methods

This was a randomized comparative single-blind study involving 72 patients divided into two groups. The first group was treated with 10 sessions of HILT, and the second group with 10 sessions of LILT. Patients of both groups performed exercises for 1 month. Functional outcome was evaluated after the end of the laser therapy and after 1 month using the Western Ontario and McMaster Universities Osteoarthritic Index (WOMAC). Statistical significance was defined as $p<0.05$.

Results

At the end of the laser therapy and 1 month later, a statistically significant difference was found between the two groups, measured by the WOMAC index ($p<0.001$). Additionally, the WOMAC index was compared within the groups.

Conclusion

Patients with KOA who were treated with HILT had significantly better functional recovery than patients treated with LILT.

Keywords: high-intensity, laser, low-intensity, laser, knee

EFFICACY OF LOW-FREQUENCY WHOLE-BODY ELECTROMYOSTIMULATION IN NONSPECIFIC CHRONIC BACK PAIN: A SYSTEMATIC REVIEW AND META-ANALYSIS

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Background and Aims

Nonspecific chronic back pain (NSCBP) is a prevalent global condition, significantly contributing to disability and impacting quality of life worldwide. Its management is often limited by conventional exercise barriers, such as time constraints and comorbidities. Whole-body electromyostimulation (WB-EMS) offers a promising alternative, being a time-efficient and joint-friendly intervention. This systematic review evaluates the effectiveness of low-frequency WB-EMS in alleviating pain and enhancing function in NSCBP patients.

Methods

Following PRISMA guidelines, PubMed and PEDro databases were systematically searched for clinical trials involving adults with NSCBP, focusing on RCTs or CCTs with WB-EMS interventions. Two independent reviewers extracted data and assessed quality using the PEDro Scale. A narrative synthesis and meta-analysis pooled standardized mean differences (SMD) with 95% confidence intervals, evaluating heterogeneity via I^2.

Results

Six studies (n = 677; WB-EMS: 278, controls: 329), including four RCTs, one CCT, and one meta-analysis (2017–2023), were analyzed. LF WB-EMS (20-minute weekly sessions, 8–16 weeks, 50–85 Hz) significantly reduced pain (-0.60 to -1.58 NRS/VAS) and improved function (+7.19 kg trunk strength to -15.8 ODI). Meta-analysis revealed a pooled pain reduction of -0.87 (95% CI [-1.02, -0.72], I^2 = 70%) and functional SMD of 0.84 (95% CI [0.68, 0.99], I^2 = 76%). Compared to passive controls (n = 15/group), effect sizes were 0.75 for pain and 0.85 for function; against active controls, pooled effects were 0.33 (pain, I^2 = 96%) and 0.28 (function, I^2 = 92%).

Conclusion

LF WB-EMS effectively mitigates NSCBP symptoms, showing strong within-group effects and competitive outcomes against controls, suggesting potential superiority over some therapies. Its efficiency and safety make it also suitable for patients with joint problems. However, small passive control sample sizes and high active control heterogeneity necessitate larger, standardized trials. Further research on medium-frequency WB-EMS and comparisons with LF-EMS is needed to optimize protocols and long-term outcomes.

Keywords: Whole-Body-Electromyostimulation, Stimulation, Back-Pain, Rehabilitation

EFFECT OF EXTRACORPOREAL SHOCK WAVE THERAPY ON DIFFERENT SITES ON PLANTAR FASCIITIS

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Background and Aims

We tried to compare the effect of applying Extracorporeal Shock Wave Therapy (ESWT) alone to the tendon insertion area on calcaneal tuberosity and together to the tender point along aponeurosis including tendon insertion site on plantar fasciitis (PF).

Methods

Plantar fascia thickness over 4 mm in calcaneal insertion area by ultrasound was diagnosed as PF. ESWT applied for 3 weeks, 1 session per week, total 2,000 shots, frequency 10, and energy level of 0.025mJ/mm2. In study group, ESWT was applied 1,000 shots for calcaneal tendon insertion area and tender points along plantar fascia each. In control group, 2,000 shots for tendon insertion site only. Before and after the 3 sessions, VAS of pain at rest, at night, at pressure, at weight bearing, at first step at morning, and American Orthopedic Foot and Ankle society (AOFAS) scale were measured.

Results

Total 24 patients were recruited in the study. VAS of pain in weight bearing showed significant improvement only in study group. When compared the changes of measurement between the groups, VAS of pain in weight bearing and first step in the morning showed better outcome in study group.

Conclusion

Applying ESWT both on tender point and tendon insertion area on calcaneal tuberosity could be more useful for PF patients than applying ESWT on calcaneal tuberosity only.

Keywords: ESWT, plantar fasciitis, different sites

THE IMPORTANCE OF A MULTIDISCIPLINARY APPROACH IN MANAGING COMPLEX REGIONAL PAIN SYNDROME (CRPS) – CASE REPORT

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Background

Complex regional pain syndrome (CRPS) is a chronic pain condition marked by sensory, motor, autonomic, and trophic disturbances, typically following injury or surgery. Diagnosis is clinical, as no definitive test exists. The Budapest Criteria is the most widely accepted tool, requiring ongoing pain disproportionate to the inciting event, at least one symptom in all four categories (sensory, vasomotor, sudomotor/edema, motor/trophic), and at least one clinical sign in two or more categories. Other potential diagnoses must be excluded. A multidisciplinary approach is essential for effective CRPS management. The rehabilitation medicine specialist typically leads the care team, prescribes medication, and monitors progress. Physiotherapists play a key role by employing range of motion exercises to restore joint mobility, lymph drainage to reduce edema, and desensitization techniques to address hypersensitivity. Occupational therapy focuses on improving hand function and enhancing independence in daily tasks. Educational rehabilitation includes sensory stimulation and hand-strengthening exercises using various therapeutic tools. Nurses support the process by encouraging treatment adherence, monitoring symptoms, and providing emotional support.

Case report

A 48-year-old nurse developed CRPS type I after sustaining a fourth metacarpal fracture from a fall at home. Following immobilization, she experienced worsening pain, swelling, and arm discoloration. Her wrist was diffusely edematous with a bluish hue, and she reported severe pain (VAS 9), weakness, and forearm paresthesia. Joint stiffness and restricted movement in the wrist and fingers prevented her from forming a fist, with a 7 cm gap from the palm. She fulfilled the full Budapest Criteria for CRPS. Her individualized, multidisciplinary treatment included analgesics, corticosteroid injections, vitamin supplementation, physiotherapy (lymph drainage, myofascial release), occupational therapy, and educational rehabilitation.

Conclusion

After several weeks, she showed significant improvement in pain, strength, and mobility. Her recovery highlights the importance of early diagnosis and a coordinated, patient-centered approach in CRPS management.

Keywords: Rehabilitation, Pain, CRPS, Fractures, Analgesics

TRANSCUTANEOUS STIMULATION IN THE TREATMENT OF OVERACTIVE BLADDER ABOUT A CASE

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Background and Aims

we report a case of bladder hyperactivity treated by neurostimulation of the posterior tibial nerve The clinical course depends on the early management.

Methods

The patient was hospitalized at the PRM level where clinical and paraclinical examinations were carried out: •Clinical Review: "Irritative Spine Research"; Muscle Review; Neurological Spasticity Assessment; Functional Disability Assessment" Neurological and perineal clinical examination •a voiding schedule •Ultrasound with post-urination residue measurement Finally, a urodynamic assessment was carried out during the second hospitalization with cystomanometry, sphincterometry and debimetry with residue measurement returning in favor of an overactive bladder causing urinary leakage. high pressure urination with a low flow rate testifying to a vesico-sphincter dyssynergy.

Results

The patient is supported: •Treatment of irritating spines and spasticity. •rehabilitation protocol adapted to paraparesia •Treatment with anticholinergic and alpha-blocker. •Intermittent self-urinary catheter •Transcutaneous stimulation sessions (or TENS), with an electrode positioned behind the inner malleolus and the second 10 cm above (10Hz, 0.5 to 15mA approximately). 01 session per day of 20 minutes during12 weeks. The evolution was marked by a net decrease in the frequency of urinary leakage at 01 times per 15 days. Vesico-sphincter disorders are extremely common and harmful in the neurological patient. •Importance +++ of their screening, monitoring and management adapted. The urinary schedule, residue measurements, screening of factors favoring. •Prescription of suitable complementary examinations. •Tibial stimulation appears to be an effective treatment for patients with HV in patients with a neurological bladder. the technique is safe, without major complications reported in the literature. Tibial stimulation may be proposed at the beginning of HV treatment in latest EAU recommendations.

Conclusion

Associated with perineal rehabilitation, stimulation of the posterior tibial nerve - or internal popliteal sciatic nerve (SPI) - seems to become a serious alternative to taking medication in cases of overactive bladder, with or without urinary incontinence.

Keywords: Transcutaneous stimulation tibal nerve, of overactive bladder

EFFECTS OF ECCENTRIC EXERCISE ACCOMPANY WITH AND WITHOUT DRY NEEDLING IN PATIENTS WITH CHRONIC ROTATOR CUFF TENDINOPATHY

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Background and Aims

The eccentric exercises (EE) can be effective on reducing inflammation. Besides, dry needling (DN) may affect blood circulation. The purpose of this study is effects of combined treatment methods (EE + DN) on chronic rotator cuff tendinopathy.

Methods

Twenty-eight patients with shoulder pain (chronic rotator cuff tendinopathy) were recruited for this study. The patients were randomly divided into two groups including; Intervention (EE + DN) and Control (EE). All patients had eight sessions of treatment including eccentric exercises. The patients in intervention group were under DN application as well. All patients were evaluated four times (before, after third session and after treatment accomplishment, and 72 hours following last treatment session). The patients were evaluated to identify levels of pain and function.

Results

All variables would be improved following treatment in both groups at the time of treatment accomplishment. ($P < 0.001$). The improvement level would be lasted 72 hours after treatment accomplishment in combined group, while it was not long lasted for most of the outcome measures following only eccentric exercise group. The patients in EE control group showed just improvement level of TFAST scale after 72 hours of treatment accomplishment.

Conclusion

The results showed that EE + DN protocol could be much effective compare to the EE application alone and improve level of pain and better function on the patients following chronic rotator cuff tendinopathy.

Keywords: Tendonitis, eccentric exercise, dry needling

POSTERIOR ANKLE IMPINGEMENT SYNDROME: EFFECT OF CONSERVATIVE MANAGEMENT

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Background and Aims

Posterior ankle impingement syndrome (PAIS) is characterized by chronic or recurrent posterior ankle pain during forced or repetitive plantarflexion. PAIS is common in the athletic population. The objective of our study is to show the effect of the management of this syndrome using Nonsurgical treatment such as activity modification and physical therapy.

Methods

It's a retrospective study including 10 patients suffering from posterior ankle pain and who were recruited during podiatry consultation in the department of Physical Medicine and Rehabilitation in university hospital of Ibn Rochd. All patients had physical examination , foot examination using optical podoscope and foot pressure assessment system, and radiography.

Results

The mean age was 36 +/- 4 years, with a female predominance. None of them were athletes or had any frequent sport activities. However a microtrauma context was identified in 40%. Physical examination revealed pain at passive forced plantar flexion for all patients. X-ray showed a long tail on the talus in 20 % and a trigone bone in 40 %. Podiatric examination found increased foot pressure in metatarsals in 60%. All patients had physical therapy and prescription of foot orthosis. 40% had ultrasound-guided steroid injections. Following this non surgical treatment, pain visual analogue scale went from a mean of 6.2 to 3.6

Conclusion

PAIS can be diagnosed by clinical history and physical examination. Radiography and magnetic resonance imaging show the cause of this syndrome. Symptoms improve with non surgical treatment but surgery may be required following failure of conservative management.

Keywords: Foot, and, ankle, Posterior, impingement

IMPACT OF NEUROREHABILITATION NURSING COMBINED WITH PHARMACOLOGICAL SEQUENTIAL THERAPY ON PAIN SENSITIZATION STATUS IN PATIENTS WITH NEUROPATHIC PAIN: A RANDOMIZED CONTROLLED TRIAL

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Background and Aims

Neuropathic pain, affecting approximately 7–10% of the global population, is characterized by maladaptive pain sensitization mechanisms that often resist conventional monotherapies. To investigate the impact and efficacy evaluation of neurorehabilitation nursing combined with pharmacological sequential therapy on pain sensitization in patients with neuropathic pain.

Methods

A randomized controlled trial was conducted, enrolling 120 NP patients. Participants were randomly allocated to either the combined treatment group (neurorehabilitation nursing + pharmacological sequential therapy, n=60) or the control group (routine neurological nursing care + conventional pharmacotherapy, n=60). The neurorehabilitation nursing protocol included exercise therapy, sensory training, and psychological interventions. Pharmacological sequential therapy involved guideline-based stepwise medication adjustments (e.g., pregabalin, duloxetine combined with NSAIDs). Pain sensitization status was assessed using the Visual Analog Scale (VAS) and the Douleur Neuropathique 4 questionnaire (DN4) at baseline, 4 weeks, and 8 weeks post-treatment. Clinical efficacy was compared between groups.

Results

At baseline, no significant differences were observed in VAS or DN4 scores between groups ($P>0.05$). At 4 and 8 weeks post-treatment, the combined treatment group exhibited significantly lower VAS scores (2.3±0.5 VS. 4.1±0.7; 1.2±0.3 VS. 3.5±0.6) and DN4 scores (4.2±1.2 VS. 6.8±1.4; 2.1±0.7 VS 5.7±1.1) compared to the control group (all $P<0.05$). The total effective rate in the combined treatment group was 95.0%, significantly higher than the 75.0% in the control group ($P<0.05$).

Conclusion

The integration of neurorehabilitation nursing and pharmacological sequential therapy significantly improves pain sensitization and enhances therapeutic outcomes in neuropathic pain patients, demonstrating clinical value for widespread application.

Keywords: Neuropathic pain, Neurorehabilitation nursing

COMPREHENSIVE TREATMENT APPROACH OF NEUROPATHIC PAIN IN PATIENT WITH FEMORAL NERVE NEUROTMESIS

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Background

Neuropathic pain is a common clinical problem that is under-recognized, inadequately treated, and significantly impairs quality of life.

Case report

A 72-year-old female patient came to the physical and rehabilitation medicine (PRM) specialist due to chronic pain along the entire length of her left leg. Patient had increasing difficulty moving and is limited in her activities of daily living. She describes the pain as shooting and burning. Pain intensity was 8/10 according to visual analog scale (VAS). She was taking extended-release tramadol up to 100 mg per day with minimal effect on pain reduction. She underwent magnetic resonance imaging (MRI) of the lumbar spine which revealed degenerative changes. In 1990 patient underwent surgery for an ovarian cyst and the procedure was complicated by neurotemesis of the left femoral nerve. The nerve was subsequently repaired with a transplant of the left sural nerve. She now has a neuroma with extreme allodynia at the site of the sural nerve extirpation. A year before she was treated with pregabalin but due to side effects treatment was discontinued. We additionally recommended duloxetine in a dose of 60mg. At the follow-up examination, the pain reduction was minimal. The patient was admitted to the hospital for rehabilitation treatment. Treatment consisted of individual kinesiotherapy that improved spinal stability, proprioception and balance. Additionally, electroanalgesic procedures and desensitization techniques in the area of the neuroma were applied. Psychological support was also provided. Duloxetine was excluded from therapy. At an interdisciplinary meeting between anesthesiology and PRM specialist, it was decided to start with the third line of treatment, amitriptyline. The dose of amitriptyline was gradually increased to 20 mg, which achieved a 30% reduction in pain and significant improved in the patient's quality of life.

Conclusion

Individual and interdisciplinary approach to rehabilitation treatment successfully reduced pain and improved the patient's quality of life.

Keywords: neurotmesis, pain, rehabilitation

INTERDISCIPLINARY TREATMENT OF CHRONIC LOW BACK PAIN DUE TO LUMBAR DISC EXTRUSION WITH RADIOFREQUENCY ABLATION OF THE L5/S1 DISC

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Background

Chronic low back pain is one of the leading causes of disability. Radiofrequency ablation and neuromodulation are modern treatment techniques that have increasing role in the treatment of chronic pain.

Case report

A 48 year-old female patient came to the physical and rehabilitation medicine specialist due to chronic low back pain irradiating alongside right leg. On the visual analogue scale (VAS) she rates the pain intensity at 8/10, describes cramping pain in the lower leg that wakes her up from sleep with no neurological deficit. Multimodal analgesia principle was recomanded with naproxen and combination of tramadol/paracetamol. She was provided with lumbosacral orthosis. Since the analgesic effect was mild, methylprednisolone was introduced according to a 10 days de-escalation protocol. X-ray imaging of the lumbar spine showed degenerative changes. Magnetic resonance imaging was performed and revealed extrusion of the L5/S1 disc with 15mm caudal migration and compression of the S1 root. Since the neurosurgeon recommended surgical treatment and the patient was unwilling to it, it was decided to try conservative treatment. Two cycles of physical rehabilitation were performed that consisted of moderate medical exercises in the form of core muscle strengthening and manual techniques in form of the Maitland principle. Physical therapy procedures were applied; interferential current, low-level laser therapy and therapeutic ultrasound. After therapy pain was significantly reduced; VAS 4/10. Patient was examined by anesthesiologist and minimally invasive treatment procedure was recommended in form of radiofrequency ablation (RF) of the disc. After the procedure pain was minimal. After a month, an additional cycle of rehabilitation treatment was performed. Three months after the procedure patient does not feel pain and has returned to moderate sports activities.

Conclusion

Through interdisciplinary rehabilitation treatment with a minimally invasive RF disc ablation, patient's quality of life was restored and she returned to moderate sports activities without pain.

Keywords: chronic, pain, radiofrequency, rehabilitation

POSTER PRESENTATION

SPORT MEDICINE

OLECRANON STRESS FRACTURES: EPIDEMIOLOGY, CLASSIFICATION, AND CURRENT MANAGEMENT

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Background and Aims

Stress fractures are rare injuries, accounting for 0.8% of fractures in adolescent sports activity. The prevalence of olecranon fractures in throwing athletes seems to be on the rise, accounting for 58% of stress fractures among baseball players. The mechanism of injury in throwing athletes has been attributed to forces similar to overload extension in valgus. These injuries represent a challenge from the standpoint of prevention, treatment, and rehabilitation.

Methods

A search in the PubMed and Cochrane databases was conducted using keywords and their respective MeSH terms, including "Stress fractures," "Elbow fractures," and "Sports." The search focused on systematic reviews, meta-analyses, and randomized clinical trials from the past 20 years. Eight articles were included: 3 narrative review articles, 1 systematic review, and 4 case reports.

Results

Elbow stress fractures predominantly occur in the olecranon and mainly affect young athletes. Baseball is the sport most frequently associated with these injuries, although they have also been reported in javelin throwers, football players, and softball players. Furushima et al. classify these fractures into five types based on the fracture line: physeal, classic, transitional, sclerotic, and distal. The diagnosis is difficult, with magnetic resonance imaging being the most effective test. Simple radiographs may not initially show fractures but can identify indirect signs, such as the formation of osteophytes in the posteromedial olecranon fossa. Treatment can be conservative or surgical, with most cases treated surgically, usually after failure of conservative treatment. Non-surgical treatment involves rest and progressive rehabilitation, while the most common surgical treatment is internal fixation with screws. Both approaches have high return-to-sport rates.

Conclusion

Olecranon stress fractures are uncommon but important injuries in throwing athletes, with a rising prevalence in baseball. Early diagnosis, aided by MRI, is crucial for prompt treatment and rehabilitation. Both treatment modalities have good return-to-sport rates, despite potential surgical complications.

Keywords: Olecranon, stress fracture, sports

PERSISTENT SHOULDER PAIN IN A RECREATIONAL CLIMBER: A SYMPTOMATIC BUFORD COMPLEX

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Background

The Buford Complex is a rare congenital anatomical variant of the shoulder, characterized by the absence of the anterosuperior glenoid labrum and a thickened, cord-like middle glenohumeral ligament. Although typically asymptomatic and regarded as a benign normal variant, it may become clinically relevant in individuals exposed to repetitive overhead activities or increased joint loading—particularly athletes and recreational sports practitioners. Failure to correctly identify this variant can result in misdiagnosis, inappropriate surgical intervention, and suboptimal clinical outcomes. Its recognition relies heavily on high-resolution imaging, especially MR arthrography, and careful correlation with clinical findings.

Case report

A 27-year-old right-handed female and recreational indoor climber, presented with a 10-month history of progressive left shoulder pain, exacerbated by overhead movements and traction positions, impairing daily functional activities and climbing performance. Physical examination revealed tenderness over the anterior joint line, a positive O'Brien test, and pain with resisted external rotation in abduction. Initial shoulder ultrasound raised suspicion of a paralabral cyst, but due to persistent symptoms and incongruent findings, a MR arthrography was performed. Imaging demonstrated complete absence of the anterosuperior labrum and a thick, cord-like middle glenohumeral ligament—findings consistent with the Buford Complex—without associated labral tear or rotator cuff pathology. A subacromial corticosteroid injection was ineffective for pain relief. The patient underwent a targeted rehabilitation program emphasizing dynamic scapulohumeral stabilization, rotator cuff strengthening, proprioception, and neuromuscular retraining. Marked symptomatic improvement was observed within six weeks, with full pain-free return to climbing at three months.

Conclusion

Although often underrecognized, the Buford Complex can become symptomatic in active individuals. This case highlights the importance of recognizing this rare variant, and shows that accurate diagnosis through detailed imaging and clinical correlation is essential to prevent overtreatment. In the absence of concomitant structural lesions, conservative rehabilitation programs can yield excellent functional outcomes.

Keywords: Buford, Shoulder, Variant, Pain, Rehabilitation

ULTRASOUND FINDINGS IN THE DIAGNOSIS OF EXERCISE-INDUCED RHABDOMYOLYSIS - A CASE REPORT

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Background

Rhabdomyolysis is an acute clinical syndrome characterized by muscle damage, which can lead to systemic complications. Early diagnosis prevents complications, but also improve prognosis. The clinical presentation is characterized by a triad of myalgias, muscle weakness and dark urine. The incidence of exercise-induced rhabdomyolysis(EIR) has been increasing. EIR is observed in high-performance athletes who are subjected to intense, repetitive and prolonged exercise but is also observed in untrained individuals. Temperature/humidity during training, medications and genetic factors are also risk factors.

Case report

The authors present the case of a 54-year-old healthy male with sporadic exercise practices, who went to the PRM consult due to bilateral forearm myalgias associated with decreased strength and edema, after physical exercise two days earlier. Denied trauma, urine change or the use of drugs. At physical examination, had tense edema and tenderness. An ultrasound was made during the assessment, which revealed a decrease in echogenicity, disorganization of the muscular structure and infiltration of adipose tissue. On suspicion of rhabdomyolysis, an analytical study was performed which revealed high level of creatine kinase (CK) without renal function alterations. Treatment included water reinforcement, draining massage, cryotherapy and rest. With a favorable progression, after 2 weeks showed complete recovery.

Conclusion

The classic triad of EIR is very sensitive, but less than 10% of patients report all three symptoms at initial presentation. The case presented is an example of this diagnostic difficulty, as although the patient presented with pain and muscle weakness, the absence of myoglobinuria may lead to think of other diagnoses. Studies have shown typical echographic alterations present in rhabdomyolysis, which increase the level of suspicion, guiding the etiological study. Physical exercise is an increasingly common cause of rhabdomyolysis and the use of ultrasound as a method of evaluating muscle pain helps in the early diagnosis of EIR, especially in sports practice.

Keywords: exercise, rhabdomyolysis, ultrasound, diagnosis

POSTER PRESENTATION

POSTOPERATIVE REHABILITATION

EFFICIENCY OF THE ROBOTIC SYSTEM WITH DYNAMIC BODY WEIGHT SUPPORT IN THE REHABILITATION OF A COMPLICATED BIMALLEOLAR ANKLE FRACTURE - CASE REPORT

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Background

Recent statistics have shown that at European level, bimalleolar fractures represent 20-25% of all ankle fractures. After these fractures, a series of complications can occur including complex regional pain syndrome, deep vein thrombosis, intolerance to osteosynthesis material, vicious callus, but the most common is pseudarthrosis.

Case report

We present the case of a 43-year-old patient who suffered a fall trauma from the same level one year ago, resulting in a bimalleolar fracture of the right ankle. The patient was admitted to the orthopedics department of the hospital where osteosynthesis with a titanium plate and 9 screws was performed at the distal part of the right tibia. Despite two successive medical rehabilitation programs, the evolution was unfavorable, as the pain persisted during walking. Following other imaging investigations, computed tomography revealed a pseudarthrosis of the right distal tibia and a vicious consolidation of the fibula. As a result, in February 2025, surgical intervention was performed again to cure the pseudarthrosis. After the surgery, the patient followed a complex rehabilitation program in our department, which consisted of high-frequency pulse therapy, conventional physiotherapy and robotic rehabilitation. The use of the robotic system with dynamic body weight support favored the resumption of walking with progressive loading and significantly improved the patient's rehabilitation process. Specific walking parameters were measured before the start of treatment but also at the end of it and the results obtained were significantly improved.

Conclusion

In this case, the pseudarthrosis led to an increase in the patient's disability and made the patient's rehabilitation process more difficult. Surgical reintervention, followed by a personalized rehabilitation program which included the use of a robotic body weight support system for gait training, were essential elements in the patient's management and favorable outcome.

Keywords: Robotic, rehabilitation, fracture, bimalleolar, pseudarthrosis

ATYPICAL FEMUR FRACTURE REHABILITATION - CASE REPORT

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Background

Postmenopausal osteoporosis is a metabolic disease characterized by mineral density loss and bone architecture alteration with the consequent possibility of vertebral and non-vertebral fractures. Commonly used medications are bifosfonates, which suppress osteoclastic activity. The prolonged use of bisfosphonates (> 5 years) is associated with an increased incidence of atypical femoral fractures, possibly due to excessive suppression of bone remodeling. Surgical treatments include open and closed reposition, and internal fixation. The rehabilitation goals include pain reduction, complications prevention, mobility and strength improvements, and functional recovery

Case report

Patient A.N., born in 1973, from Sarajevo, with a negative personal and family medical history, was diagnosed with menopause at the age of 35 with consequent osteoporosis treated with bisphosphonates, not taken for several months. Hospitalized at Orthopedics Department on 13.09.2023, due to a left femoral condylar fracture sustained after fall, and admitted to rehabilitation treatment on 02.02.2024, at the orthopedist recommendation. Radiological verification showed an atypical subtrochanteric low-energy fracture - iceberg type. Operated on 14.10.2023 (Op. Ostesynthesis partis proximalis femoris l. sin. cum femoral nail), after which undergoes outpatient physical treatment based on kinesitherapy and magnetotherapy, enabling walking with one crutch with a full support on the left leg. Left leg muscular hypothrophy remains. Control RTG shows inadequate fracture healing. In the follow-up examination (04.06.2024), the patient complains of left hip and inguinal region soreness. Radiological verification shows left femor osteosynthetic material fracture, after which a surgery is performed on 06.06.2024 (Op: Extractio alenthesis femoris l. sin. Osteosynthesis cum IM nail). Following physical therapy, 90 degrees flexation is achieved in the left hip. Knee and ankle joint movements are re within normal physiological ranges. Densitometry measurements on 21.08.2024, show: T-score (vert): -2.0 T-score (fem): -1.7

Conclusion

After rehabilitation, the patient regained the ability to walk independently, with acceptable motion range and functional movement in the hip.

Keywords: fracture, osteoporosis, bisphosphonates

MULTIDISCIPLINARY REHABILITATION APPROACH FOLLOWING PALMAR THIRD-DEGREE BURN WITH SYNDACTYLY: A CASE REPORT

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Background

Although hand burns cover less than 5% of body surface area, they can cause profound functional limitations. Factors like edema, infection, poor positioning, and delayed skin coverage often lead to deformities such as syndactyly. Early, multidisciplinary rehabilitation – including surgery, therapeutic exercises, and scar care – is crucial for recovery. This case report shows how a tailored rehab approach enhances hand function and quality of life after a third-degree palmar burn with syndactyly.

Case report

A 56-year-old woman suffered a third-degree contact burn on the palmar surface of her dominant right hand and fingers, involving 1% of her total body surface area, which led to syndactyly affecting digits three to five and significant joint stiffness. She underwent multiple Plastic and Reconstructive Surgery procedures, including contracture release in the 2nd-4th interdigital spaces, application of a dermal regeneration template, and later split-thickness skin grafting. Hand dressings were consistently applied in a functional position, and passive mobilization of the upper limb began on day one, performed three times daily. Physical and rehabilitation medicine was initiated in the second week. The initial evaluation revealed restricted passive wrist and finger motion, especially absent flexion in the interphalangeal joints, accompanied by neuropathic pain in the 3rd finger, for which gabapentin was prescribed. A structured rehabilitation plan, including frequent passive and gradual active mobilization exercises, was maintained throughout hospitalization. By discharge, the patient demonstrated moderate improvement in wrist and metacarpophalangeal joint range of motion but persistent stiffness in the distal interphalangeal joints and limited thumb opposition, underlining the complexity of functional recovery following severe hand burns and the essential role of multidisciplinary rehabilitation in improving hand function and quality of life.

Conclusion

This case highlights the importance of early multidisciplinary rehabilitation in managing post-burn syndactyly, emphasizing how structured therapy and surgical intervention can enhance hand function and quality of life.

Keywords: BurnRehabilitation, HandBurn, Syndactyly, HandFunctionRecovery

THE IMPORTANCE OF POSTOPERATIVE REHABILITATION IN FUNCTIONAL RECOVERY IN TOTAL ELBOW ARTHROPLASTY DUE TO SUPRAINTERCONDYLAR FRACTURE OF THE HUMERUS

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Background

Supraintercondylar fractures of the humerus are common in children but rare in adults, accounting for approximately 2% of all adult fractures and about one-third of distal humeral fractures. When there is significant articular involvement, total elbow arthroplasty may be indicated. In young adults, these fractures are typically caused by high-energy direct trauma to the olecranon, whereas in the elderly, they usually result from indirect hyperextension mechanisms

Case report

We present a 74-year-old female who sustained a supraintercondylar fracture of the left humerus following a fall from standing height. Clinical findings included pain, swelling, and deformity of the left elbow, with no neurovascular deficits and preserved distal mobility. The patient underwent a cemented total elbow arthroplasty (LIMA prosthesis). At one-month post-surgery, the patient had 100º of elbow flexion with a 20º extension deficit. After participating in an intensive rehabilitation program three times per week, her range of motion improved significantly. After five months, she achieved 138º of flexion and full extension (0º). Grip strength measured by dynamometer was 18 kg in the left hand and 23 kg in the right. Quick DASH score improved greatly from 93.25 to 4.5 after the rehabilitation program.

Conclusion

This case highlights the importance of a structured and intensive postoperative rehabilitation program in the functional recovery of elderly patients undergoing total elbow arthroplasty for distal humerus fractures with joint involvement. The rehabilitation regimen played a crucial role in restoring range of motion and grip strength, ultimately contributing to the functional reestablishment of the affected limb. The combination of appropriate surgical management and physiatric prescription of an appropriate rehabilitation program proved essential for achieving a favorable outcome

Keywords: total, elbow, arthroplasty, postoperative, rehabilitation

TIBIA FRACTURE AFTER TIBIAL CORTEX TRANSVERSE TRANSPORT (TTT) SURGERY: A CASE REPORT

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Background

Diabetic foot ulcers (DFU) are common complications in patients with chronic DM. Approximately 20% of patients with DFU will require lower extremity amputation. Tibial cortex transverse transport (TTT) technique was established based on distraction osteogenesis. It has been applied to severe and recalcitrant DFU and atherosclerosis obliterans.

Case report

. A 71-year-old male with a past medical history of type 2 diabetes mellitus, right middle cerebral artery infarct, hypertension, and hyperlipidaemia, presented with a right 4th toe gangrene. He underwent right tibial cortex transverse transport (TTT) surgery and tiibial cortex transport surgery device was removed 7 weeks after the TTT surgery. He was transferred to inpatient rehabilitation medicine unit 1 week after the removal of external fixator and 8 weeks after TTT surgery. Surgeon allowed partial weight bear on right lower limb with off-loading shoe. After two days of 10 meters ambulation training with walking frame, he complained of worsening pain on right shin area. X-ray of lower leg showed a new fracture extending to the posterior cortex of the tibia shaft.

Conclusion

Inability to control his weight bearing on right lower due to previous stroke and osteopenia & sarcopenia might be the possible factors which lead to tibia fracture. TTT surgery has emerged as an intervention for severe diabetic foot ulcer to reduce amputation rates. To prevent secondary tibia fracture, delayed weight bearing or reduced weight bearing with patellar tendon bearing orthosis should be considered after TTT surgery if patient has risk of fracture, such as elderly, poor balance control, abnormal gait, and sarcopenia.

Keywords: DM, TTT, Tibial fracture, Rehabilitation

REHABILITATION OF ACHILLIS TENDON AFTER SURGICAL MANAGEMENT WITH ALLOGRAFT DONOR TENDON TRANSFER – CASE REPORT

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Background

Background and aim Chronic Achilles tendon rupture is defined as a rupture diagnosed or treated more than six weeks post-injury. Tendon grafting and transfer techniques are often required in such cases to restore function. This case report presents the rehabilitation outcomes of a patient with a chronic Achilles tendon rupture treated with allograft donor tendon transfer, marking the first such procedure performed in North Macedonia.

Case report

Methods: A female patient with persistent posterior ankle pain, swelling, and functional limitation had unsuccessful conservative treatment with NSAIDs. Imaging and clinical evaluation confirmed a chronic rupture of the left Achillis tendon. Surgical reconstruction was performed using a donor tendon graft. Rehabilitation program for restoring mobility and enhancing muscle strength was provided with two separate inpatient stays. Rehabilitation protocol included electrotherapy with diadynamic currents, ultrasound therapy, magnetic therapy, exercise therapy including walking on parallel bars and also occupational therapy. Results: Over a two rehabilitation treatments the patient demonstrated improvement in ankle dorsal and plantar flexion, gain of thigh muscle mass, and reduced pain in the affected leg. By the end of therapy the patient achieved independent walking and functional recovery of the affected limb.

Conclusion

Conclusion: Rehabilitation of Achillis tendon after allograft donor tendon transfer is crucial for restoring function and achieving optimal outcomes in tendon injuries.

Keywords: tendon rupture, alograft, rehabilitation

INFLUENCE OF AGE AND TYPE OF OPERATION ON OUTCOMES AND EXPECTATIONS AFTER ORTHOPEDIC SURGERIES

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Background and Aims

The impact of age on the outcomes of specific orthopedic procedures remains contradictory (1,2,3). This study aimed to compare two types of procedures (anterior cruciate ligament (ACL) reconstruction and total hip arthroplasty (THA) and their outcomes and patient expectations after surgery.

Methods

In this retrospective study, 200 patients participated: 100 after THA (53% women, average age 67 years) and 100 after ACL reconstruction (33% women, average age 26 years). All participants completed a validated questionnaire with questions related to outcomes (rehabilitation process, post-operative pain, acceptance of assistive devices) and expectations (belief and desire for recovery, fear of lasting consequences) after surgery, rated from 1 to 5 (Likert scale (4)). For statistical analysis, we used percentage calculation, the asymptotic general independence test, and the Cochran–Armitage test of association for a contingency table. All results were set at significance level $p < 0.05$.

Results

Older patients after THA felt more relaxed during rehabilitation (64% THA; 35% ACL) and accepted assistive devices more easily after surgery (65% THA; 35% ACL). They had similar pain tolerance ($Z=1.93$; $p=0.053$), confidence in themselves and their recovery ($Z=0.56$; $p=0.57$), desire for recovery ($Z=1.82$; $p=0.068$), as well as fear of not being able to walk normally in the future ($Z=-1.81$; $p=0.07$). The younger group after ACL surgery is more confident that they will become independent in the future ($Z=2.6$, $p < 0.01$).

Conclusion

Although younger patients after ACL surgeries do not feel relaxed during rehabilitation and have more difficulty accepting assistive devices than older patients after THA, they have greater confidence that they will become independent over time, which may be explained by a higher level of optimism in younger generations.

Keywords: Operation outcome, ACL, TEP

SUPERIOR GLUTEAL NERVE INJURY AFTER TOTAL HIP ARTHROPLASTY, A CASE REPORT

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Background

Total hip arthroplasty (THA) is a common procedure for treating hip osteoarthritis, known for infrequent complications when compared to other arthroplastic procedures and as such often has a lower threshold for surgical treatment. While rare, peripheral nerve injuries remain an issue. The superior gluteal nerve (SGN) is the most frequently affected nerve following anterolateral approach due to its anatomical course through the greater sciatic foramen and proximity to the gluteal muscles, which is a concern given the growing frequency of such an approach.

Case report

We present the case of a 60-year-old female factory worker, with progressive right hip coxalgia secondary to severe coxofemoral osteoarthritis. She underwent an iniatially appearing uncomplicated cementless right THA via a direct lateral approach. Postoperatively, she exhibited persistent Trendelenburg gait, marked gluteal atrophy, and difficulty with unipodal stance on the right lower limb. Electromyography (EMG) confirmed a chronic moderate-grade lesion of the right superior gluteal nerve, consistent with axonotmesis (Sunderland Grade II). No evidence of radiculopathy or sciatic nerve involvement was found. The patient underwent intensive and prolonged rehabilitation including targeted hip abductor strengthening, gait training, and hydrotherapy. Despite partial clinical improvement, she maintained signs of gluteal insufficiency and Trendelenburg gait after one year. Symptoms of greater trochanteric pain syndrome and iliotibial band overload developed secondarily, likely due to biomechanical alterations from persistent abductor weakness.

Conclusion

SGN injury is the most common nerve lesion following the lateral approach to THA, often underdiagnosed in the early postoperative period. Persistent Trendelenburg gait and gluteal atrophy should prompt early clinical suspicion. Functional prognosis depends on injury severity and timely rehabilitation. Awareness of this complication is critical for postoperative follow-up in order to minimize long-term disability and optimize functional outcomes.

Keywords: Hip arthroplasty nerve injury gluteal

POSTER PRESENTATION

MUSCULOSKELETAL REHABILITATION

SLIPPING RIB SYNDROME – CASE REPORT

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Background

Slipping rib syndrome (SRS) is an underdiagnosed condition caused by hypermobility of costal cartilages of false ribs, allowing the 8th to 10th ribs to slip under the rib above causing impingement of the intercostal nerve. It was first described by Cyriax in 1919, as an anterior rib subluxation causing intermittent pain in the lower rib arch (LRA) radiating to the side and the upper abdomen. SRS is likely related to overuse and sudden core movements, but it also could be a congenital or related to trauma. SRS is most often unilateral, left sided and affects females.

Case report

The case report presents a 29-year-old woman who came to physiatrist clinic because of the pain in the left LRA, which started in the second trimester of pregnancy and continuously lasted two months after delivery. The pain appeared as stabbing, increased with inhalation, severe intensity, mixed character, predominantly neuropathic, spreading mainly along the anterior part of the 10th rib. A "hooking" maneuver was performed, which confirmed the diagnosis of SRS. Patient performed 3 cycles of 10 times of physical therapy (breathing exercises and specific core stabilization exercises with passive procedures), also infiltration of dexamethasone (3x) and triamcinolone acetonide (3x) with 0.2% bupivacaine (6x) in the trigger points along the lower edge of the 10th rib. After 4 months of therapy, there was significant improvement.

Conclusion

SRS is a rare cause of pain in the chest area. It limits persons' ability in performing daily living activities and has a strong psychological impact. Differential diagnosis includes osteochondritis, intercostal neuralgia, chest trauma or Tietze syndrome. Initial treatment is conservative which includes symptomatic therapy, intercostal nerve block or botulinum toxin injection. Definitive treatment is surgical resection of the affected rib. Failure to recognize this syndrome can expose patient to unnecessary diagnostic procedures and lead to significant delays in treatment.

Keywords: chest pain, costal cartilage, rib

COMPRESSIVE MONONEUROPATHY OF ULNAR NERVE IN THE CUBITAL CANAL CAUSED BY OSSIFICATION – A CASE REPORT

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Background

Cubital tunnel syndrome is the second most common canalicular syndrome of the upper extremity. It occurs when the ulnar nerve is compressed in the cubital tunnel of the elbow. The etiology of this syndrome is multifactorial. The most common symptoms of syndrome are pain, paresthesias of the little finger and ring finger, hypoesthesia and hypotrophy of the hypothenar and small muscles of the hand. Neurography is considered relevant if the conduction velocity through the ulnar nerve in the elbow region is less than 50 m/s and ultrasound finding is relevant if ulnar nerve cross-sectional area is greater than 10 mm2.

Case report

We present a a 24-year-old patient with spastic tetraplegia after a severe traumatic brain injury. The compressive neuropathy of the ulnar nerve in the area of the cubital tunnel was diagnosed by neurography. X-ray revealed extensive ossification of the elbow and ultrasound showed a thickened ulnar nerve. A cross-sectional area of ulnar nerve was 13.4 mm2 along the medial condyle and in the area between the head of the ulnar flexor muscle, the nerve was still thickened and edematous, and measured 18.7 and 18.2 mm. Initially, a perineural blockade was performed for symptom relief, followed by operative decompression. Three months after the operation a control ultrasound of the nerve was performed. In the area of the medial condyle the cross-sectional area of ulnar nerve was 15.8 mm2, while other measurements at typical locations were <10 mm2.

Conclusion

The control ultrasound finding still indicated possible compression of the nerve in the area of the medyal epycondil. According to the literature the ulnaris nerve can be compressed in 5 different places in the elbow area. It is important to considering the possibility of compression ulnar nerve in different places as well as possibility of multiple causes of compression present at the same.

Keywords: compressive mononeuropathy, ulnar nerve, ultrasound

FROM SKIN TO NERVES: A REVIEW OF SUDOSCAN IN POLYNEUROPATHY DETECTION

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Background and Aims

Polyneuropathies are conditions characterized by peripheral nerve damage, leading to distal sensory alterations, pain, and muscle weakness. Some also involve autonomic fiber impairment, affecting sudomotor function. Sudomotor dysfunction (SMD) results from damage to small-diameter nerve fibers, such as unmyelinated C fibers of the autonomic nervous system, leading to abnormal sweat production. Reduced sweat production can compromise skin hydration and increase the risk of lesions, particularly in diabetic patients. Early detection of peripheral nervous system (PNS) alterations is crucial to preventing severe complications. This review examines the literature on electrochemical skin conductance (ESC) and Sudoscan test in evaluating sudomotor dysfunction across clinical contexts.

Methods

A literature review was conducted in the PubMed and Cochrane databases using keywords and their corresponding MeSH terms, including "Sudoscan," "Autonomic Nervous System Diseases," and "Electrodiagnosis". The search focused on systematic reviews, meta-analyses and randomized clinical trials from the past 10 years that addressed the sensitivity, specificity and clinical utility of these techniques for autonomic neuropathy detection. Studies evaluating ESC measurements against established peripheral neuropathy diagnostic criteria were included.

Results

ESC has been introduced as a non-invasive method for assessing sudomotor function by measuring the skin galvanic response to a low-intensity electric current. Sudoscan test provides a sensitive and specific evaluation of sympathetic innervation in sweat glands, making it a valuable tool for early SMD detection. Its use can offer an accessible and efficient alternative for diagnosing autonomic neuropathy. Studies suggest that ESC, when combined with other diagnostic tools, enhances early detection and management of peripheral neuropathies, allowing for more effective interventions.

Conclusion

A thorough analysis of existing studies highlights the potential of these techniques in clinical practice, their limitations and future directions for improving the diagnosis and management of autonomic neuropathies.

Keywords: Autonomic dysfunction, Polyneuropathy, Sudoscan

FROM PAIN TO PERFORMANCE: SHOCKWAVE THERAPY RESOLVING REFRACTORY SESAMOIDITIS IN A PROFESSIONAL DANCER

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Background

Metatarsalgia related to sesamoid bone dysfunction is a frequent clinical challenge in Physical and Rehabilitation Medicine (PRM), particularly among active individuals. Sesamoiditis is often associated with mechanical overload, repetitive microtrauma, and anatomical variants such as bipartite sesamoids. Conservative management is the first-line treatment, though some cases prove refractory. Extracorporeal Shockwave Therapy (ESWT) has emerged as a promising non-invasive option for resistant cases.

Case report

We report the case of a 28-year-old woman, a professional ballroom dancer and habitual wearer of high-heeled shoes, who developed mechanical pain localized at the plantar aspect of the right first metatarsal head. The pain worsened with weight-bearing, like walking and dancing, leading to significant limitations in her daily and professional activities.Initial treatment with NSAIDs and analgesics provided no relief. US and MRI revealed a bipartite sesamoid and suggested sesamoiditis. Orthotic insoles and multiple sessions of physiotherapy were prescribed but failed to improve symptoms. Given the refractory nature of her condition, ESWT was initiated. The treatment protocol consisted of one session per week for four weeks, with 2000 pulses per session, a frequency of 7 Hz, and a medium energy level of 0.3 mJ/mm². Progressive pain relief was noted during therapy. By the end of the treatment cycle, she reported only mild residual discomfort, no limitations in walking, and gradual return to dancing activities. No further pharmacological or surgical interventions were necessary.

Conclusion

This case underscores the critical role of PRM in the comprehensive management of metatarsalgia, particularly in refractory cases. ESWT proved to be an effective and safe non-invasive rehabilitation strategy, providing significant pain relief and functional recovery, enabling return to professional activity without restrictions. The inclusion of ESWT in rehabilitation protocols may offer a valuable alternative for accelerating recovery and avoiding invasive treatments in sesamoiditis.

Keywords: Sesamoiditis, Rehabilitation, Shockwave, Therapy, Metatarsalgia

MEDIAL COLLATERAL LIGAMENT BURSITIS: A RARE BUT TREATABLE CAUSE OF KNEE PAIN UNMASKED BY ULTRASOUND

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Background

Persistent medial knee pain in older adults is frequently attributed to osteoarthritis (OA), often overlooking less common yet treatable periarticular conditions. Medial collateral ligament (MCL) bursitis is an underdiagnosed source of knee pain that can mimic or coexist with OA. The use of musculoskeletal ultrasound (MSK-US) at the point of care not only refines diagnosis but also enables targeted interventions, potentially altering patient outcomes. This case highlights the successful management of MCL bursitis using ultrasound guidance, with both symptomatic relief and imaging-confirmed structural resolution.

Case report

A 73-year-old woman presented with chronic medial knee pain of mixed mechanical and inflammatory pattern, worsened by weight-bearing. Radiographs showed moderate medial compartment gonarthrosis. Despite conservative management, including physiotherapy, NSAIDs, and analgesics, her pain remained localized to the medial aspect of the knee with significant functional limitation. During a Physical and Rehabilitation Medicine (PRM) consultation, bedside MSK-US identified an exuberant bursitis adjacent to the MCL, precisely matching the site of maximal pain (US images will be presented). An ultrasound-guided injection was performed into the MCL bursa using 1% lidocaine and 14 mg of betamethasone, with no complications. The patient experienced progressive pain relief, and at 3-month follow-up, reported substantial clinical improvement. Repeat ultrasound confirmed resolution of the bursitis, with notable approximation of the deep and superficial layers of the MCL, indicating structural recovery.

Conclusion

This case illustrates the diagnostic and therapeutic value of ultrasound in identifying MCL bursitis, a rare but significant cause of persistent medial knee pain that must be considered for the differential diagnosis. Ultrasound-guided corticosteroid injection resulted in both clinical and imaging-confirmed resolution, demonstrating that targeted periarticular interventions can offer effective pain relief and structural normalization. Incorporating routine MSK-US in the evaluation of refractory knee pain can refine diagnoses and personalize treatment strategies, avoiding unnecessary escalation of OA management.

Keywords: Medial, collateral, ligament, bursitis, ultrasound

WHEN THE BODY SAYS 'STOP!': ISCHIOPUBIC RAMUS STRESS FRACTURE IN A RUNNER

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Background

Stress fractures occur when bone is subjected to repeated mechanical stress that results in microscopic fractures. It can be classified as fatigue reaction stress fracture, result from repetitive and excessive strain placed on structurally normal bone, or insufficiency reaction stress fractures, when normal stress and straining are applied to a bone where bone formation is impaired, as seen in ostheoporosis. Pelvic stress fractures are a rare cause of pain in the inguinal/gluteal region, leading to the underdiagnosis of this condition. In athletes, stress fractures account for 2% of reported injuries, with a higher incidence observed in long-distance runners and triathletes.

Case report

A 42-year-old healthy female with no relevant medical history, who is a regular long-distance runner, presented with pain in the left gluteal region during an athletic competition, with no associated trauma. Initially, the pain was mild but progressively worsened. The episode coincided with her return to sports after a period of inactivity. Initial imaging with hip radiography showed no abnormalities. After a series of unsuccessful physical therapy sessions, she underwent MRI, which revealed a fracture of the left ischiopubic ramus.

Conclusion

This case highlights risk factors for stress fractures, including female sex and rapid return to sports after inactivity. Diagnosis was delayed, as these fractures may not be detected in the acute phase with simple radiographs, with 60-70% yielding negative results. Early imaging signs include bone marrow edema on MRI and increased activity on bone scintigraphy. The absence of radiographic evidence in the acute phase can lead to underdiagnosis. Bone scintigraphy, CT, or MRI may aid early diagnosis. Treatment involves rest (6-10 weeks), with a risk of re-fracture if not adhered to. Progression and return to play should depend on patient symptoms.

Keywords: Stress fracture; ischiopubic ramus fracture;

APPROACH TO MEDIAL COMPARTMENT KNEE PAIN - A CASE SERIES AND RETROSPECTIVE STUDY

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Background and Aims

In managing knee osteoarthritis, it is crucial to identify whether pain stems from intra-articular inflammation or extra/peri-articular structures. In some patients, especially women, medial compartment overload can cause meniscocapsular and ligamentous pathology, with pain localized to the medial joint line. These peri-articular issues may be more significant and reported as the primary source of discomfort. Therefore, treatment should target the most clinically relevant complaints. Ultrasound, combined with physical examination, is a valuable tool for both diagnosis and ultrasound-guided injections. This retrospective analysis aims to evaluate the effectiveness of ultrasound-guided corticosteroid injections around the medial collateral ligament (MCL) and medial meniscus in controlling pain and the duration of its effect in patients with pain localized to the medial knee compartment.

Methods

A retrospective analysis was conducted of the clinical records of patients seen in the Ultrasound-Guided Procedures clinic between January 2024 and March 2025. Patients with knee osteoarthritis presenting with primary pain in the medial compartment who underwent peri-MCL and meniscal injection were selected.

Results

During the established time period, 25 patients were treated. Of this sample, 100% were female, with ages ranging from 52 to 95 years. Twenty percent of these patients underwent a repeat procedure. No adverse reactions were reported.

Conclusion

85% of patients experienced a favorable outcome, defined as a pain improvement of more than 30% on the numerical pain scale lasting longer than 3 months. The average duration of the effect was 5 months, with a median of 4 months. Patients reported satisfaction with this approach and noted a considerable improvement in their quality of life. This approach demonstrated short to medium-term efficacy in pain control, with associated functional improvement and a good safety profile, and should be considered a therapeutic option for the treatment of this patient population.

Keywords: Ultrasound-guide Injection, Medial Knee Osteoarthritis

FLOATING SHOULDER WITH BRACHIAL PLEXUS INJURY: A COMPLEX CASE OF NEURO-MUSCULOSKELETAL IMPAIRMENT

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Background

Floating shoulder is a complex injury typically resulting from high-energy trauma to the shoulder region, characterized by a fracture of the scapular neck and concurrent disruption of the coracoclavicular and coracoacromial ligaments. This traumatic pathology is potentially unstable and is frequently associated with neurovascular complications.

Case report

A 24-year-old male presented to the Emergency Department after a motor vehicle accident. Imaging revealed a comminuted fracture of the left scapula involving the neck, base of the spine, supraspinous and infraspinous fossae, and a grade IV acromioclavicular dislocation—consistent with a floating shoulder. Due to neurological deficits in the affected limb, brachial plexus and cervical spine MRI was performed, showing no structural abnormalities. The patient underwent orthopedic surgery without complications. Postoperatively, physiatric evaluation revealed scapular girdle atrophy, glenohumeral subluxation, absence of active shoulder muscle contraction and significant elbow movement limitation. A multidisciplinary rehabilitation program was initiated, including muscular electrical stimulation, passive mobilization, isometric strengthening, scapular kinematics retraining, and proprioceptive exercises. Six weeks post-trauma, electromyography identified injury to multiple branches of the left brachial plexus: suprascapular, musculocutaneous, axillary, and radial nerves. At six months, the patient showed mild improvement in muscle trophism and shoulder stability, with partial recovery of shoulder and elbow function.

Conclusion

This case illustrates the potential severity of floating shoulder injuries, particularly when compounded by brachial plexus involvement. A multidisciplinary approach—including early diagnosis, surgical stabilization, and targeted rehabilitation—is essential for optimizing functional outcomes and improving quality of life.

Keywords: Floating, Shoulder, Brachial, Plexus, Rehabilitation

RECURRENT ANKLE SPRAINS IN THE VISUALLY IMPAIRED: HIDDEN IMPACT ON POSTURAL CONTROL

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Background and Aims

Visually impaired individuals are at increased risk of balance disorders and falls due to reduced visual input. Recurrent ankle sprains are a common complication in this population and may result from impaired proprioception and postural instability. Despite the frequency of these injuries, few studies have objectively evaluated the balance and joint stability in visually impaired patients with chronic ankle instability. To assess postural control and ankle proprioception in visually impaired patients with a history of recurrent ankle sprains, using validated clinical scales and static posturography.

Methods

We conducted a cross-sectional study involving 30 adult patients with low vision (visual acuity <3/10 in the better-seeing eye) and at least two ankle sprains in the past 12 months. The following assessments were performed: Static posturography on a force platform (firm and foam surfaces, natural visual condition), Cumberland Ankle Instability Tool (CAIT) for functional ankle instability, Berg Balance Scale (BBS) for static and dynamic balance, Timed Up and Go (TUG) test to evaluate fall risk, Ankle joint position sense test to assess proprioceptive accuracy.

Results

The mean age was 42.3 ± 11.2 years; 70% had bilateral ankle instability. The mean CAIT score was 15.2 ± 3.4 (cutoff <24 indicating instability). The mean center of pressure sway area increased significantly on foam (410 mm² vs. 275 mm² on firm surface, p 13.5 seconds. The mean ankle repositioning error was 4.1° (normal <2°).

Conclusion

Visually impaired individuals with recurrent ankle sprains demonstrate significant postural and proprioceptive deficits. These findings highlight the need for tailored rehabilitation programs including balance training and proprioceptive re-education to reduce recurrence and fall risk in this vulnerable population.

Keywords: Visual impairment, Ankle

CLINICAL AND ULTRASONOGRAPHIC EVALUATION OF HIGH-POWER PAIN THRESHOLD ULTRASOUND AND LOW-LEVEL LASER THERAPY IN MYOFASCIAL PAIN SYNDROME

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Background and Aims

Myofascial Pain Syndrome (MPS) is a musculoskeletal condition characterized by myofascial trigger points(MTrPs), causing localized and referred pain. Various treatment options exist, but their efficacy lacks objective validation. High-power pain threshold ultrasound(HPPT-US) and low-level laser therapy(LLLT) are promising non-invasive modalities. Aims To assess the efficacy of HPPT-US and LLLT in treating active MTrPs, through clinical and ultrasonographic evaluations.

Methods

Patients with chronic neck pain and active MTrPs in the upper trapezius were randomly assigned to five groups: HPPT-US, LLLT, sham HPPT-US, sham LLLT, and combined HPPT-US + LLLT. Evaluations were conducted at baseline, the first month, and the third month after treatment. Clinical assessments included pain intensity(VAS), cervical lateral flexion(goniometer), physical function(SF-36), anxiety(Profile of Mood States), and the Neck Disability Index. Ultrasonographic assessments measured treatment effects: trigger point size(B-mode imaging), vascularity -Blood Flow Waveform Score(BFS), tissue elasticity(elastography) and Tissue Imaging Score(TIS). These imaging techniques quantified microstructural and hemodynamic changes.

Results

HPPT-US improved clinical and ultrasonographic parameters compared to placebo. LLLT showed no clinical improvement but enhanced radiological parameters at the third month. Combined HPPT-US + LLLT improved outcomes at all time points, superior to LLLT alone, though not over HPPT-US except for pain relief in the first month. Significant improvements in tissue elasticity and vascularity were observed, with elasticity values gradually decreasing, resulting in softer and more flexible tissue, particularly in the ultrasound group, and enhanced vascularization with reduced vascular bed resistance, supporting tissue healing (Figure 1,Figure 2). A strong correlation was found between clinical improvements and elasticity/Doppler findings, particularly at 3 months post-treatment.

Conclusion

HPPT-US significantly improved clinical and ultrasonographic parameters, supporting its role in MPS treatment. While combined therapy provided additional benefits, it was not superior to HPPT-US alone. Considering cost-effectiveness, HPPT-US may serve as a viable standalone treatment, with micro-level tissue changes playing a key role in therapeutic success.

Keywords: MPS, Elastography, ultrasound, laser

CLINICAL OUTCOMES OF PLATELET-RICH PLASMA IN SACROILIAC JOINT DYSFUNCTION: A CASE SERIES

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Background

Sacroiliac joint (SIJ) dysfunction is a recognized source of low back pain. Recent reviews show longer-lasting relief with Platelet-Rich Plasma (PRP) than corticosteroids, but evidence is limited by protocol and patient variability.

Case report

We describe four cases of SIJ dysfunction treated with leukocyte-rich PRP without external activation, with platelet concentrations ranging from 4.41 to 5.67 times that of peripheral blood. Three patients (female, 46; female, 20; male, 75) underwent unilateral, bilateral, and unilateral SIJ injections, respectively, using a standardized protocol: 2.5 mL of intra-articular PRP confirmed by fluoroscopic contrast, and 4 mL PRP at the posterior sacroiliac ligaments under ultrasound guidance. In case 1, pain decreased from 6/10 to 2/10 after 2 months, with only mild discomfort when seated on hard surfaces. In case 2, right-sided pain dropped from 7/10 to 3/10 with sustained improvement for 4 months; the left side responded poorly. In case 3, pain reduced from 6/10 to 4/10 for 3 months, with limited overall benefit—possibly due to a multifactorial pain etiology in a older patient with other spinal degenerative changes. In case 4 (female, 19), only peri-ligamentous PRP was administered under ultrasound, as intra-articular contrast placement under fluoroscopic guidance was not achievable. Pain decreased from 7/10 to 3/10 after 1 month, with sustained functional improvement.

Conclusion

Discussion: These cases highlight the variable clinical response to PRP in SIJ dysfunction, reflecting literature findings. While randomized controlled trials (RCTs) typically use single injections, case series often apply 2–3 sessions in refractory cases. Outcomes appear influenced by anatomical, technical, and individual factors, including comorbidities. Conclusion: PRP appears to be a safe and potentially effective therapy for long-term relief. Large RCTs with ≥12-month follow-up are needed to establish consensus on platelet concentration, leukocyte content, activation methods, injection volumes and frequency. Detailed protocol standardization is essential to ensure reproducible and comparable outcomes.

Keywords: Sacroiliac Joint Dysfunction; Platelet-Rich Plasma;

THE EFFECTS OF TECAR THERAPY ON PAIN, DISEASE ACTIVITY, RANGE OF MOTION AND FUNCTION IN PATIENTS WITH AXIAL SPONDYLOARTHRITIS

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Background and Aims

The Transfer of Energy Capacitive and Resistive (TECAR) therapy is PRM modality that predominantly increases tissue temperature, promotes blood flow and improves oxygen and nutrient delivery while reducing swelling and pain. TECAR therapy is used for numerous indications, including low back pain, knee osteoarthritis, painful shoulder, myofascial pain syndrome and many others. The aim of this study was to evaluate the effect of TECAR, on pain intensity (VAS), disease activity (VAS-GDA and Bath Ankylosing Spondylitis Disease Activity Index – BASDAI), function (Bath Ankylosing Spondylitis Functional Index - BASFI), and the range of motion (Bath Ankylosing Spondylitis Metrology Index - BASMI), in individuals with axial spondyloarthritis (axSpA), immediately after stopping the therapy (T1) and one month thereafter (T2).

Methods

TECAR was applied in 6 sessions during 2 or 3 weeks, alongside exercise for patients with axSpA.

Results

The study included 33 individuals of both sexes, aged between 18 and 65 years. In comparison with baseline values in T1 visit there was an improvement in VAS-pain (median baseline 6 vs 3; the average decrease of 44.82%), VAS-GDA (the median 5 vs 3; the average decrease of 26.88%). Also, BASDAI decreased by an average of 34.58%, BASMI by 28.27%, and BASFI by 27.47%. When comparing the results of 20 patients between T0 and T2 the positive effects faded away for BASDAI (-5.47%), but partially persisted for VAS-GDA (28.6%), BASFI (16.78%) and VAS-pain (17.2%).

Conclusion

In our study of patients with axSpA, TECAR therapy has proven to be successful in alleviating pain, decreasing inflammation, and improving range of motion and function. Also, data showed that the effect for the majority of observed outcomes might not be long-lasting. Future research is needed to determine the extent to which TECAR therapy can reduce analgesic use and to compare its effect with some other treatment modalities.

Keywords: Ankylosing, spondylitis, Axial, spondyloarthritis, Efficacy

THE ROLE OF BOTULINUM TOXIN IN THE TREATMENT OF NOTALGIA PARESTHETICA - CASE REPORT AND LITERATURE REVIEW

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Background

Notalgia Paresthetica (NP) is a sensory neuropathy characterized by chronic pruritus, paresthesias, and pain, often linked to cervical or thoracic spinal nerves dorsal rami dysfunction. Damaged C fibers generate ectopic discharges, with neuroinflammatory mediators amplifying peripheral sensitization. Botulinum Toxin (BT) inhibits neurotransmitter release, modulating neurogenic inflammation and peripheral sensitization, which presents a promising therapeutic option for refractory NP.

Case report

Case 1: An 81-year-old woman presented with chronic pruritus and right dorsal pain, for 14 years, worsening, reaching an intensity 10/10 on the numeric scale. Objectively, a hyperpigmented lesion was observed in the scapular region. Lhermitte, Spurling, and Hoffman tests were negative. MRI revealed left-predominant C6/C7 disc protrusion with possible involvement of C7 nerve root. Gabapentinoids, tricyclic antidepressants, and topical lidocaine, proved ineffective. Consequently, subcutaneous infiltration of 100U Onabotulinum Toxin A was proposed in the delimited region. The procedure occurred without complications, and after one week, the patient reported a 30% improvement – the first relief in 14 years. Case 2: A 69-year-old man presented with pruritus in the left scapular region, for over a year, with a 8/10 intensity on the numeric scale. Initially misdiagnosed as dermatophytosis, he was treated with topical antifungal and antihistamines without resolution. Objectively, a pruritic hyperpigmented area with scratch lesions was observed. MRI documented diffuse posterior disco-osteophytic complex with reduced foraminal permeability bilaterally at the C6/C7 level, possibly compromising the C7 nerve root. A subcutaneous infiltration with 100U Onabotulinum Toxin A was performed in the delimited region, without adverse effects. After one month, the patient reported a 50% improvement, and by four months, he was asymptomatic.

Conclusion

Botulinum toxin demonstrated a safe and effective therapeutic option for refractory Notalgia Paresthetica, leading to symptomatic relief, even in longstanding cases, without adverse effects. Neverthless, further controlled studies are necessary to establish optimal dosing, treatment duration, and patient selection criteria.

Keywords: Botulinum, Toxin, Notalgia, Paresthetica, Pruritus

THE USE OF THERAPEUTIC ULTRASOUND FOR LIQUIFYING PAINFUL MUSCOLOSKELETAL CYST BEFORE ULTRASOUND-GUIDED INTERVENTION: A CASE STUDY

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Background

Therapeutic ultrasound is a widely used therapeutic modality in many rehabilitation protocols. One of its effects is the liquefaction of solid swelling or gelled fillings of cysts or joints. This case study aims to highlight the potential use of therapeutic ultrasound in cysts with gelled fillings.

Case report

This case study concerns a man (born in 1946) with degenerative shoulder joint disease and a painful acromioclavicular joint cyst formation, which was palpably very stiff and immobile. It has been punctured repeatedly by an orthopaedic surgeon in the past, often complicated by post-puncture secretion. It has never been able to be fully aspirated due to the very stiff and gel-like filling, nor has the pain been alleviated. For this reason, a series of therapeutic ultrasounds was resorted to. The scheme was as follows: week 1 + 2 – three times per week – Mon/Wed/Fri; week 3 – four times per week – Mon-Thu, a total of 10 times. Ultrasound parameters were 1.0-1.6 W/cm2, duty factor 50-100 %, alternation of 1 MHz and 3 MHz, application time 6-10 minutes. After each application, the cyst was palpably significantly less stiff and painful. After the series of therapeutic ultrasound described above, the cyst was re-punctured under ultrasound guidance using a subcutaneous tunnel technique to prevent post-puncture secretion, and all the fluid was successfully aspirated. With a specific time interval (2 weeks), the acromioclavicular joint area is significantly less painful, with no signs of further filling production.

Conclusion

This case study demonstrates the significant effectiveness of therapeutic ultrasound in liquefying gelled cyst fillings within the musculoskeletal system, providing a valuable therapeutic tool for ultrasound-guided interventions procedural planning.

Keywords: therapeutic ultrasound, cysts, gelled fillings

REHABILITATION IN A PATIENT AFTER KNEE ARTHROSCOPY DUE TO PATELLAR INSTABILITY - CASE REPORT

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Background

Patellar dislocations are traumatic injuries that occur most often in individuals under the age of twenty and are related to sports and physical activity. Currently, there are no published reports describing the rehabilitation of younger males after arthroscopy and open reconstruction of the medial patellofemoral ligament (MPFL) using a tibialis anterior allograft

Case report

Patient A.K. , 26 years old age, with patellar instability of the right knee, which occurred as a result of sports overloads. The patient was treated surgically with arthroscopy, retinaculum lateral capsulotomy, osteotomy and reconstruction. For the assessment of the patient, the following were applied: clinical examination, measurement of the circumference of the right leg and the range of motion in all joints of the right leg. Examinations were performed at the beginning of treatment and at the end of treatment. The rehabilitation was carried out over a period of 4 weeks. The following procedures were applied in the rehabilitation: kinesitherapy with gradual introduction of exercises according to the rehabilitation protocol and gradual increase of the load, hydro kinesiotherapy in the pool with exercises for the right leg, physical agents (cryotherapy, therapeutic ultrasound, low-intensity laser therapy, interference currents)

Conclusion

Our results suggested that active physical therapy and kinesiotherapy might benefit the early recovery of knee joint function and reduction of muscle atrophy in patients with recurrent patellar dislocation after MPFL reconstruction.

Keywords: rehabilitation, knee arthroscopy, patellar instability

REHABILITATION TREATMENT OF FLACCID PARALYTIC FOOT DROP FOLLOWING A SEVERE KNEE SPRAIN: ABOUT ONE CASE

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Background

Paralytic foot drop is a frequent complication of peripheral nervous system disorders. Trauma of the lower limb can cause injury to the external popliteal sciatic nerve, resulting in a flaccid paralytic foot that impairs walking.

Case report

We report the case of a young man aged 22, with no particular pathological history, who suffered a closed trauma to the left knee during a football match, resulting in total functional impotence of the left lower limb, and who underwent orthopaedic treatment using an orthosis with appropriate medical treatment. As the impotence persisted, the patient was seen again 21 days later and underwent MRI of the knee, which revealed damage to the anterior cruciate ligament (ACL) and external lateral ligament, tendinitis of the quadricipital tendon and suspected damage to the popliteal external sciatic (PES). An electroneuromyography (ENMG) of the lower limb showed severe truncal damage (neurotmesis) of the PES with signs of active denervation. Functionally, the patient had a stepping gait with a paralytic foot drop and voluntary control of the left foot at 0 in dorsal flexion. For daily walking, the patient used a walking stick on the healthy side. The patient underwent 30 sessions of functional rehabilitation of the left lower limb with work on the gait pattern and prescription of a levator splint. Progress was marked by an improvement in voluntary control of the foot drop, with voluntary control in dorsal flexion increased to 2 with weaning of the English cane, while retaining the levator splint for walking.

Conclusion

Post-traumatic paralytic foot drop due to damage to the external popliteal sciatic nerve is a frequent functional disorder, the management of which can range from functional re-education and orthopaedic devices to surgical intervention via tenotomies, tendon transfers or arthrodesis, depending on the indications.

Keywords: flaccid, paralytic, foot, knee, sprain

HUBER PROPRIOCEPTIVE TRAINING AND ALPHA-LIPOIC ACID: A NEW APPROACH IN OPTIMIZING NERVE FUNCTION IN PATIENTS WITH CHRONIC LOW BACK PAIN

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Background and Aims

While there is evidence supporting the potential of Alpha-lipoic acid (ALA) to improve nerve conduction parameters in certain neurological conditions, its specific effects on nerve conduction in chronic low back pain (CLBP) patients have not been directly addressed in the current context. There is a connection between proprioceptive system deficits and movement control dysfunction in patients with CLBP, but the exact mechanism of this link is unknown. To analyze the effectiveness of the proprioceptive rehabilitation method using the Huber system of exercises and to describe the nerve conduction study findings in a patient with CLBP treated with ALA.

Methods

A quasi-experimental, pre-test post-test repeated measures design was used to include 15 patients at the Clinic for Physical Medicine and Rehabilitation, Clinical Center of the University of Sarajevo, in a three-week follow-up period. The patients were treated with 600 mg of ALA supplementation per day and participated in Huber proprioception training five days per week. Patients were followed for the next three weeks, with two study visits: one at baseline and one at the end of the study. The study visits included Electromyography and Nerve Conduction Studies.

Results

Out of the total patients (n = 15), 11 (73.3%) were male. The most commonly affected levels were L4/L5 (87%), followed by L3/L4 (6.5%) and L5/S1 (6.5%). There was a statistically significant median increase after three weeks in both proximal ($z = -3.298$, $p < .001$) and distal peroneal M wave amplitude ($z = -3.415$, $p < .001$). A statistically significant median increase was also observed in proximal ($z = -3.408$, $p < .001$) and distal tibial M wave amplitude ($z = -3.409$, $p < .001$).

Conclusion

Future research should be carried out with a larger sample size to examine the long term effects of the proprioceptive training and ALA supplementation on treatment of CLBP.

Keywords: Electromyoneurographic, activity, proprioceptive, training, Alpha-lipoic

REDUCING PAIN AND IMPROVING FUNCTIONAL ABILITY AND QUALITY OF LIFE WITH APPLICATION OF RADIAL EXTRACORPOREAL SHOCK WAVE THERAPY IN PATIENTS WITH KNEE OSTEOARTHRITIS

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Background and Aims

Background: Knee osteoarthritis is a musculoskeletal disorder that leads to reduced functional ability and quality of life of the patients. Radial extracorporeal shockwave therapy (RECTUB) has been proposed as a safe, non-invasive, alternative conservative treatment for knee osteoarthritis. Aims: to prove the effect of RECTUB in improving the quality of life in patients with knee osteoarthritis

Methods

Methods: The study represents prospective, monocentric, interventional, non-randomized clinical study of 40 RECTUB treated patients (totalling 5 weekly sessions with 5-minute application of 2000 impulses, 2 Bar intensity, 10 Hz frequency at painful knee points) and kinesitherapy. The patients' progress was monitored on the Numeric scale of pain, the WOMAC Index and Short Form 36 Health Survey Questionnaire. The clinical findings were evaluated before the treatment started; immediately after its completion and 3 and 6 months afterwards.

Results

Results: Regarding the NSP scored a mean of 7, 4, 2, and 2, respectively, before treatment and at the three follow-up examinations after treatment. It was found that patients had reduced pain intensity was maintained even for 6 months after the applied physical treatment. Statistically significant differences were found of the total WOMAC index and its three subscales at the end of the first, second and third control. The three subscale WOMAC index median was 9, 4, 2, and 2 respectively for subscale 1; 3 and 0 for subscale 2; 34.5, 12.5, 7.5 and 8 at baseline and the three follow-up examinations and subscale 3 respectively, at the beginning and the three follow-up examinations. Regarding the SF-36 Questionnaire, it was shown that the patients had significantly better values for the quality of life in terms of physical functioning, and their general health rated as good.

Conclusion

The study proved that treatment with RECTUB led to improved functional ability and quality of life in patients with knee osteoarthritis.

Keywords: osteoarthritis, shock, wave, therapy

ASSOCIATION BETWEEN CIGARETTE SMOKING AND FRAGILE HIP FRACTURE IN BOSNIAN POSTMENOPAUSAL WOMEN

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Background and Aims

Cigarette smoking is a well-established risk factor for osteoporosis; however, limited evidence exists regarding its association with skeletal fragility in specific population groups. The aim of this study was to examine the association between cigarette smoking and the occurrence of fragile hip fractures among Bosnian postmenopausal women.

Methods

A study was conducted involving 100 Bosnian postmenopausal women, divided into two groups: those with fragile hip fractures (n=50) and those without (n=50). Bone mineral density (BMD) was measured at the lumbar spine and proximal femur using Dual-Energy X-ray Absorptiometry (DXA). Smoking status was self-reported. To compare differences between groups, $\chi 2$ test and Student's t-test were used.

Results

No significant difference in age was observed between groups. A significantly higher proportion of women in the fracture group were smokers (54%; n=27) compared to the control group (16%; n=8) (p=0.0001). Additionally, average femoral neck BMD was significantly lower in women with hip fractures (-2.74 ± 0.73 SD) than in those without fractures (-1.48 ± 0.99 SD) (p=0.0001).

Conclusion

Cigarette smoking is significantly associated with an increased risk of fragile hip fracture in Bosnian postmenopausal women. Lower BMD is also confirmed as a major contributing factor to fracture risk in this population.

Keywords: Bosnian postmenopausal women, fracture, smoking

CLINICAL PERFORMANCE OF ULTRASOUND SHEARWAVE ELASTOGRAPHY IN CARPAL TUNNEL SYNDROME

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Background and Aims

To evaluate the effectiveness of Shearwave elastography(SWE) in diagnosing Carpal tunnel syndrome(CTS).

Methods

We recruited a normal control group and patients with CTS, performing nerve conduction studies(NCS) and electromyography(EMG) and ultrasound examinations of the median nerve on both wrists. Wrists were categorized into control and CTS groups based on NCS/EMG results using the AANEM classification. Data on pain intensity(NRS), BCTQ-SS/FS(Boston Carpal Tunnel Questionnaire – symptom severity/Functional Status scale), NCS/EMG findings, and ultrasound cross-sectional area(CSA) at the carpal tunnel inlet were collected. SWE measurements assessed the median nerve\'s elasticity in the longitudinal view around the carpal tunnel inlet.

Results

The study encompassed 99 wrists from the 50 patients, comprising 48 normal wrists and 51 wrists with CTS. Based on severity, the classification included 22 mild, 20 moderate, and 9 severe cases. Comparing CSA, CTS wrists had significantly larger CSA compared to normal control wrists (13.63 ± 3.09 mm^2 vs 8.95 ± 2.49 mm^2, p<.001). While the normal group had significantly smaller CSA compared to the mild, moderate, and severe CTS groups (p<.001). When comparing elasticity, the CTS group had significantly higher elasticity compared to the normal control group (106 ± 47.22 kPa vs. 60.96 ± 21.8 kPa, p<.001). The normal group had significantly lower elasticity compared to the CTS groups, but there was no significant difference in elasticity among the different severity levels within the CTS group. When using the CSA x elasticity value for analysis, the severe group had significantly higher values compared to the mild group (p = .006). The ROC analysis for predicting severe cases yielded a cut-off value of 1225.97 (sensitivity 0.78, specificity 0.73, accuracy 0.77).

Conclusion

SWE can aid in diagnosing CTS, with higher specificity and accuracy when combined with CSA measurements. This combination is particularly useful in screening and diagnosing severe CTS cases requiring surgical treatment.

Keywords: Carpal tunnel syndrome; ultrasound; shearwave elastography; electromyography

BALNEOTHERAPY COMPARED TO ADDITIONAL THERMOTHERAPY IN THE TREATMENT OF CHRONIC NONSPECIFIC LOW BACK PAIN

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Background and Aims

Balneotherapy is a commonly used conservative method for treating chronic nonspecific low back pain (NSLBP), often combined with medical gymnastics (MG) and thermotherapy. The objective of this study was to compare the effectiveness of hydrogymnastics (HG) with MG and mineral-rich mud therapy (MB), versus the same kinesitherapy paired with paraffin thermotherapy.

Methods

This prospective, randomized study included 61 patients over a three-week period. Thirty patients received daily MG and HG with paraffin, while 31 received MB three times per week instead of HG. Pre- and post-treatment assessments included finger-to-floor distance (Thomayer test), sagittal lumbar mobility (Schober test), bilateral lateral flexion, and patient-reported outcomes: the Roland-Morris Disability Questionnaire (RMDQ), ClinFit, DASS-21, EQ- 5D-5L, and a visual analogue scale (VAS) for pain. Depending on data distribution, paired t- tests or Wilcoxon tests were used. Delta values were analyzed with ANOVA to assess the effects of treatment type, age, and sex. Significance was set at $p < 0.05$.

Results

All outcome measures, except Schober's test, showed significant post-treatment improvement. Schober's measure was significantly associated with treatment type, with greater improvement observed in the MT group, and with age, showing better results in older patients. No other outcome was significantly associated with treatment type. Age was significantly related to RMDQ, EQ-5D pain and anxiety dimensions, DASS-21, and VAS, with younger patients showing greater improvements. Initially, age was also linked to EQ-5D activity, but this lost significance when adjusting for sex and treatment. DASS-21 results were significantly influenced by both age and sex, with women showing greater benefit. In univariate analysis, sex was associated with EQ-5D care, though this did not hold in multivariate analysis.

Conclusion

MB therapy showed superior outcomes only in spinal mobility, while age had the greatest influence on treatment response. Both approaches are recommended, with the choice guided by comorbidities and patient preference.

Keywords: Balneotherapy, Thermotherapy, Nonspecific, Low, Back

FACTORS ASSOCIATED WITH FUNCTIONAL OUTCOME, LENGTH OF STAY, AND DISCHARGE DESTINATION IN PATIENTS WITH LOWER LIMB LOSS

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Background and Aims

The aim of this study was to explore the associations between baseline patient characteristics (age, BMI, gender, etiology, amputation level, and time from amputation to rehabilitation entry) and three key rehabilitation outcomes in individuals with major lower limb amputation (LLA): functional level at discharge, length of stay (LOS), and discharge destination.

Methods

Medical records of 132 patients admitted to a rehabilitation center between January 2015 and December 2018 were retrospectively reviewed and analyzed.

Results

The median age at amputation was 66.0 years (IQR 57.8–73.0). Median BMI was 23.3 kg/m² (IQR 20.1–27.8), and 73.5% of patients were male. Dysvascular etiologies accounted for 76.7% of LLAs, with 40.2% related to diabetic vascular disease. Non-vascular causes represented 23.3% of cases, including traumatic (12.1%) and other etiologies (11.4%). Unilateral transtibial amputations were most common (49.2%), followed by unilateral transfemoral (41.7%), bilateral transtibial (7.6%), and mixed bilateral amputations (1.5%). The median time between amputation and rehabilitation admission was 17 days (IQR 12–31).

Conclusion

Significant associations were identified between baseline characteristics and rehabilitation outcomes. Younger age was associated with higher functional levels at discharge. Etiology was also significantly related to functional outcomes: patients with traumatic LLAs were more frequently classified into higher functional categories, whereas dysvascular LLAs were more represented in lower functional categories. Regarding discharge destination, younger patients were significantly more likely to return home, and etiology significantly influenced orientation at discharge. As for LOS, older patients and those with dysvascular LLAs, compared with non-vascular LLAs, had significantly longer rehabilitation stays. Finally, a longer interval between amputation and rehabilitation admission was significantly associated with a shorter length of stay. These findings provide insights into optimizing rehabilitation after major LLA, but larger-scale studies are needed to confirm these associations and guide individualized care.

Keywords: Rehabilitation, Amputation, Outcome assessment

HETEROTOPIC OSSIFICATION AFTER CRYPTOCOCCAL MENINGITIS IN A DIALYSIS-DEPENDENT PATIENT: A CASE OF ELBOW CONTRACTURE

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Background

Heterotopic ossification (HO) is bone formation in soft tissues where it does not normally occur, such as subcutaneous fat, tendons, or around nerves. The most common form is myositis ossificans (MO), involving calcification in muscle. HO typically follows trauma or orthopedic surgery, while neurological and genetic causes are rarer but often more severe. Symptoms include pain, swelling, and reduced range of motion. Treatment includes medication, physical therapy, surgery, or radiation.

Case report

A 39-year-old male with a history of mesangioproliferative glomerulonephritis underwent a cadaveric kidney transplant in 2021. In August 2024, he developed cryptococcal meningitis with impaired consciousness and hypertensive hydrocephalus, requiring placement of a ventriculoperitoneal shunt. During treatment, graft function deteriorated, requiring resumption of hemodialysis. Given CNS cryptococcosis and the risk associated with continued immunosuppression, graft nephrectomy was performed in December 2024. The patient was immobile, without motor lateralization, with generalized edema, bilateral foot drop, flexion contractures of the feet, and a contracture of the left elbow. An A-V fistula was created in his right elbow During rehabilitation, he regained the ability to sit with assistance and stand with a walker and therapist support but remained non-ambulatory. Despite early elbow mobilization, range of motion remained limited: there was a 40° extension deficit, and flexion was possible up to 90°. Due to persistent contracture, heterotopic ossification was suspected and radiological evaluation was performed. X-ray revealed joint space narrowing and irregular ossifications in periarticular soft tissues. CT confirmed massive heterotopic ossification near the medial epicondyle, olecranon, and radial head. Differential diagnosis included myositis ossificans versus dialysis-related calcifications.

Conclusion

This case highlights the importance of considering heterotopic ossification as a potential cause of elbow contracture in non-traumatic contexts. Timely recognition and interdisciplinary rehabilitation are crucial to preserving function and quality of life.

Keywords: heterotopic, ossification, elbow, contracture, cryptococcal

EFFECTS OF GROUP-BASED VS HOME-BASED EXERCISE PROGRAMMES IN PATIENTS WITH ANKYLOSING SPONDYLITIS

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Background and Aims

Ankylosing spondylitis (AS) is a chronic inflammatory disease that significantly impairs spinal mobility and functionality. Exercise-based physiotherapy is a key non-pharmacological intervention; however, limited evidence compares supervised group-based with unsupervised home-based programes regarding functional and biomarker outcomes. This study aimed to compare the effects of 6-month group-based versus home-based exercise programes on functional capacity and inflammatory biomarkers in individuals with AS.

Methods

Quasi-experimental study with Thirty-one patients diagnosed with AS were recruited and assigned to one of three groups: group-based exercise (n=12), home-based exercise (n=12), or control (n=7). Functional assessments included the Bath Ankylosing Spondylitis Functional Index (BASFI), Disease Activity Index (BASDAI), and Metrology Index (BASMI), as well as the Oswestry (ODI) and Neck Disability Indices (NDI). Inflammatory biomarkers included C-reactive protein (CRP) and erythrocyte sedimentation rate (ESR). Baseline and post-intervention (6 months) evaluations were conducted. Statistical analyses included intra- and intergroup comparisons (α=0.05).

Results

At baseline, no significant differences were found among groups. After 6 months, the group-based exercise group showed significant improvements in BASFI (p=0.048) and BASMI (p=0.001), while the control group exhibited significant declines in both indices (p=0.003 and p=0.025, respectively). The home-based group presented a significant reduction in CRP (p=0.037), although no functional index showed statistical improvement. BASMI intergroup comparison showed significant differences (p=0.028), with post-hoc tests indicating improvement in both exercise groups compared to control. No significant changes in ESR were detected in any group. The control group showed a significant deterioration in BASDAI (p=0.017) and NDI (p=0.020).

Conclusion

A supervised, group-based exercise programe led to significant improvements in functional mobility and status in individuals with AS, whereas the home-based intervention was associated with a reduction in systemic inflammation (CRP). These findings highlight the differential benefits of exercise modalities in managing AS and support the integration of supervised programes into routine care.

Keywords: Disease activity, functionality, biomarkers, physiotherapy

IMPROVEMENTS IN GAIT BIOMECHANICS AFTER AN AQUATIC EXERCISE PROGRAM IN A HEALTH RESORT SETTING: A CASE STUDY OF KNEE OSTEOARTHRITIS

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Background

Knee osteoarthritis (OA) is one of the most common degenerative joint diseases causing progressive loss of cartilage that leads to joint stiffness, pain, and difficulty walking and performing activities of daily living. Among non-pharmacological interventions, aquatic exercise programs conducted in health resort settings, combining the benefits of therapeutic exercise with the physical and chemical properties of mineral-rich thermal water, have emerged as a promising approach.

Case report

This case study reports results on the improvements in gait biomechanics in a patient with knee OA (female, age 74 y.o., weight 85 kg, height 163 cm, OA grade II-III on the Kellgren and Lawrence scale) after 2-weeks of rehabilitation treatment, delivered in a health resort setting. Treatment included: 12 sessions of mud therapy and thermal baths and 6 sessions of hydrokinesis. Before and after treatment gait biomechanics was measured using a stereophotogrammetric system (Vicon Motion System Ldt, UK) synchronized with force plates (Bertec Corporation, USA). Results showed that mobility and walking pattern improved, as indicated and increase in walking speed (+6% on average), a decrease in double support time (-44% on average), an increase in knee joint angle range of motion during the gait cycle (+3% on average), and an increase in ankle joint power at toe off (+24% on average). These changes were associated with improvements in the patient's condition, measured with the Western Ontario and McMaster Universities Arthritis Index improved (decrease from 39 to 19).

Conclusion

Instrumental assessments indicated improvements in mobility and gait, which were associated with clinically measured improvements in function. These preliminary findings suggest that the health resort setting can offer promising therapeutic benefits for knee OA patients, enhancing functional outcomes.

Keywords: Knee, osteoarthritis, balneotherapy, thermal, rehabilitation.

SHOULDER TENDINOPATHY INDUCED BY STATINS: SYSTEMATIC REVIEW AND CASE REPORT

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Background and Aims

Statins are widely used to manage cholesterol levels, but their use can lead to musculoskeletal side effects, including tendinopathy of the shoulder. Among these, Rotator Cuff Disease (RCD) is one of the most prevalent forms of shoulder tendinopathy. Here we present a clinical case of statin-induced RCD and a systematic review on the association between statins and shoulder tendinopathy.

Methods

A systematic review was conducted following PRISMA guidelines, utilizing databases such as PubMed, Web of Science, and SCOPUS. Additionally, the case of a 49-year-old male patient with statin-induced RCD is reported. The patient was treated with a individual rehabilitation project (IRP) that included steroid and hyaluronic acid (HA) injections, mesotherapy, and therapeutic exercises.

Results

From an initial pool of 217 articles, three cohort studies met the inclusion criteria for the systematic review. The findings revealed conflicting evidence regarding the relationship between statins and shoulder tendinopathy. In the case report, symptoms improved after reducing the statin dose and implementing a multimodal personalized IRP.

Conclusion

Statins may contribute to tendon injuries by disrupting extracellular matrix composition and cell membrane integrity. Although the association between statins and tendinopathy remains debated, clinicians should monitor patients for signs of tendinopathy and consider alternative treatments if symptoms develop. This case report demonstrated that a multimodal personalized IRP can effectively manage statin-induced RCD. Further research is required to elucidate the relationship between statins and shoulder tendinopathy. Early diagnosis and individualized treatment strategies are critical for optimizing patient outcomes.

Keywords: Statins, Tendinopathy, intra-articular-injections, mesotherapy, therapeutic-exercise

THE EFFECT OF CONVENTIONAL PHYSICAL THERAPY IN REDUCING PAIN IN PATIENTS WITH CALCIFIC ROTATOR CUFF TENDINITIS OF THE SHOULDER

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Background and Aims

Calcific tendinitis of the shoulder rotator cuff is a common disorder of commonly treated with physical treatment modalities. The objective of the clinical study is to evaluate the effect of conventional physical therapy in reducing the pain in patients with calcific tendinitis of the shoulder rotator cuff.

Methods

The research was a prospective, monocentric clinical study that included 40 patients who received conventional physical treatment, ultrasound therapy with an intensity of 0.5 W on an area of 1 cm², for 5 min, and diadynamic currents, for a duration of 3 weeks, every working day, namely 15 treatments of therapeutic ultrasound and 10 treatments of diadynamic currents and shoulder exercises. The efficacy of the treatment was evaluated using the Visual Analogue Scale (VAS) and Constant Murley Score. The patients were evaluated at the same time in four time points: before starting physical therapy, immediately after the end of the therapy, after the third and the sixth month after starting physical therapy.

Results

All patients after the treatment had statistically significantly better results in the pain score and Constant Murley score, which were maintained even 6 months after the end of conventional physical therapy.

Conclusion

Conventional physical therapy is a safe and noninvasive treatment in patients with calcific tendinitis of the shoulder rotator cuff that reduces the pain and improves quality of life.

Keywords: Calcific tendinitis, shoulder, physical therapy

ACUTE CALCIFIC TENDINITIS OF THE SHOULDER: WHEN CALCIUM DECIDES TO MIMIC SEPTIC ARTHRITIS

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Background

Calcific tendinitis of the shoulder is a self-limiting disorder, it is the calcification and tendon degeneration caused by deposition of calcium hydroxyapatite crystals. Typically affects patients between 30 and 60 years, with a predilection for women. The supraspinatus tendon is most often involved. The supraspinatus tendon is most often involved. In some patients, acute and severe shoulder pain is the first symptom. This acute presentation is traditionally associated with the resorptive phase of the disorder. Symptoms generally resolve in a few weeks of onset. We present a case of acute calcific tendinitis of the shoulder associated with a systemic inflammatory response that mimicked septic arthritis. To our knowledge, only four similar cases have been reported in scientific literature.

Case report

A 75-year old woman with known history of rotator cuff syndrome was admitted to the emergency department with acute and disabling left shoulder pain persisting for over a week along with fever that began the day before. Laboratory tests showed leukocytosis, elevated C-reactive protein (138.33 mg/L; normal <5.00). An ultrasound-guided needle drainage revealed purulent material. A CT-Scan was performed and revealed a 22 mm calcification localized in Subscapularis tendon along with inflammatory changes of the surrounding tissues. Given the concern for septic arthritis the patient was started on Vancomycin and Ceftriaxone. However, cultures of the aspirated material revealed no bacterial growth. After five days the inflammatory markers normalized, and the patient was discharged.

Conclusion

The resorptive phase of calcific tendinitis is the most symptomatic and may resemble septic arthritis. Usually, the absence of systemic signs and mild elevation of inflammatory markers help differentiate them. However, in a subset of patients, resorption of calcific deposits produces systemic response which may confound the diagnostic process, mislead the treating physician. Awareness may help clinicians to correctly diagnose the patient and avoid unnecessary treatments and procedures.

Keywords: Calcific Tendinitis, Suprastinatus, Septic Arthritis

A CASE OF MISDIAGNOSED ACUTE GLUTEUS MEDIUS AND MINIMUS TEARS WITH SUBSEQUENT COMPLICATIONS

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Background

Background: Greater trochanteric pain syndrome (GTPS), including gluteal tendon tears, in the elderly is frequently misattributed to spinal pathology due to overlapping symptoms and age-related changes. Unrecognized gluteal tendon tears can lead to serious functional impairment and secondary issues.

Case report

A 76-year-old woman presented with chronic left lateral hip pain, tenderness over the greater trochanter, and limited hip abduction. Following a fall on a flat surface, symptoms worsened, including progressive limp and thigh/lumbar pain. Initial diagnostics - lumbar spine MRI (polydiscarthrosis, mainly L5-S1) and hip ultrasound (normal finding) led to a misdiagnosis of lumbar radiculopathy. Conservative treatment with physical therapy yielded no improvement. Over time, the patient developed progressive gait disturbance, gluteal muscle hypotrophy, and a positive Trendelenburg sign. Eight months later, pelvic MRI revealed chronic full-thickness tears of the gluteus medius and minimus with severe atrophy and fatty degeneration, alongside L4-L5 disc extrusion. Delayed recognition led to irreversible gait impairment requiring permanent cane use. This in turn caused worsening lumbar pain and compressive ulnar neuropathy due to cane overuse, manifesting as hand weakness. The patient also suffered emotional distress due to reduced mobility and chronic pain.

Conclusion

This case illustrates the clinical importance of considering gluteal tendon injuries in elderly patients with GTPS, particularly following trauma. These injuries are frequently underdiagnosed, and early MRI evaluation is critical for accurate diagnosis. Early diagnosis and timely management (physical or surgical) can significantly reduce the risk of long-term disability and secondary complications

Keywords: Greater trochanteric pain syndrome

NON-OPERATIVE TREATMENT AS AN OPTION IN CASE OF COMPLETE RUPTURE OF THE RADIAL COLLATERAL LIGAMENT OF THE THUMB

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Background

We are presenting a case of a twenty-eight-year-old patient, a surgeon by profession, with trauma of the thumb and rupture of the radial collateral ligament of the I MCP joint.

Case report

While performing physical activity (football), our patient received a moderately strong blow to the thumb of the right hand but couldn't recall the exact mechanism of injury. Shortly after, pain, haematoma and mild joint swelling had started to develop. He was examined by a surgeon, and standard imaging was done - RTG, which showed no abnormality, and the diagnostic ultrasound, which was inconclusive. Rest, ice, NSAIDs and an immobilisation splint were prescribed. At this point the working diagnosis was an injury of the ulnar collateral ligament (skier's thumb). Since the pain persisted, MR imaging was ordered which showed a complete rupture of the proximal attachment of the radial collateral ligament with retraction, as well as a minor partial rupture of the abductor pollicis brevis muscle. A hand surgeon specialist examined our patient and, taking into consideration the MR finding, concluded that since there were clinically no signs of instability of the MCP joint, conservative treatment is preferred. The patient was enrolled in a physical therapy program focusing on the mobility and strength exercises, but also passive procedures were included (such as HILT).

Conclusion

We would like to emphasise two important notes with this case. Firstly, although the pathology of the radial collateral ligament is rare and much less common than the UCL, we need to take it into consideration with injuries of the thumb. Also, for the correct diagnosis we often need targeted MR images. Secondly, while the available literature states that a complete rupture requires surgical treatment, in some cases conservative treatment is possible.

Keywords: Thumb, injury, RCL, UCL, ligament

EFFECTS OF INTRA-ARTICULAR BOTULINUM TOXIN INJECTION FOR THE MANAGEMENT OF OSTEOARTHRITIC KNEE PAIN – A LITERATURE REVIEW AND STATE OF THE ART

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Background and Aims

Knee osteoarthritis (KOA) is a progressive degenerative joint disease affecting over 30% of individuals above 65 years. It commonly presents with increasing pain, reduced knee mobility, and impaired quality of life. Although the mechanisms behind KOA pain are not fully understood, both peripheral and central sensitization are thought to play significant roles5. Persistent peripheral nociceptive input may maintain central sensitization, supporting the use of intra-articular (IA) injections to modulate this input. Since long-term non-steroidal anti-inflammatory drugs (NSAID) use is not advised8, alternative therapies are needed. This literature review aims to evaluate the efficacy and safety of intra-articular botulinum toxin injections in managing knee osteoarthritis pain.

Methods

A search of PubMed and Cochrane databases was performed using keywords and corresponding MeSH terms including "botulinum toxin", "injections", "intra-articular", "osteoarthritis", "knee", and "pain." The search focused on systematic reviews, meta-analyses, and randomized clinical trials from the past 20 years specifically addressing botulinum toxin for KOA-related pain.

Results

Seven studies were included: 3 randomized controlled trials and 4 systematic reviews with meta-analyses. Intra-articular botulinum toxin type A (single dose of 100–200 UI) appears to reduce pain in KOA, particularly in patients with central sensitization. Its mechanism may involve inhibition of the release of inflammatory mediators and neuropeptides from nociceptors, thus reducing neurogenic inflammation associated with osteoarthritis. However, current evidence does not show a clear advantage over other intra-articular treatments. While its high cost is a limitation, it is safe, causing no cartilage degeneration, metabolic disturbance, or bone ischemia, and can be used in joints with metallic implants.

Conclusion

Intra-articular botulinum toxin appears to be an effective and safe treatment option for nociceptive pain management in knee osteoarthritis. However further and stronger studies should be undertaken to determine the optimal dose and frequency of botulinum toxin administration.

Keywords: Botulinum Toxin, Intra-articular, Knee, Osteoarthritis

EFFICACY OF TRANSCUTANEOUS ELECTRICAL NERVE STIMULATION (TENS) IN KNEE OSTEOARTHRITIS: A META-ANALYSIS OF RANDOMIZED CONTROLLED TRIALS

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Background and Aims

Knee osteoarthritis (OA) is a progressive, degenerative condition marked by joint pain, stiffness, and limited function, heavily impacting quality of life. Its prevalence is increasing due to aging populations, obesity, and sedentary habits, with projections indicating it may become the leading global cause of disability by 2030. TENS (Transcutaneous Electrical Nerve Stimulation) has been proposed as a non-invasive method for pain management in OA, though current guidelines (e.g., ACR 2019) no longer recommend its use due to inconclusive efficacy data.

Methods

This meta-analysis included six randomized controlled trials (2008–2021) assessing TENS efficacy in knee OA, with diverse patient populations and variable methodological quality. Studies analyzed pain relief and joint function outcomes using tools such as WOMAC, VAS, and functional performance tests. Statistical heterogeneity was measured ($I^2 = 81\%$), and analyses included funnel and forest plots to assess study bias and effect size consistency

Results

Results were mixed. TENS showed modest short-term benefits in early-stage OA (Kellgren-Lawrence grade 0–1), particularly in functional performance tasks like the 6-minute walk test and stair climb test. However, in patients with radiographic OA (grade ≥2), TENS was not superior to placebo for pain relief or functional improvement. Some studies noted placebo effects, and others highlighted benefits only when TENS was combined with acupuncture. No significant adverse effects were reported.

Conclusion

TENS may provide limited benefit in early-stage OA but lacks therapeutic advantage in moderate-to-severe cases. Findings support current guidelines advising against routine TENS use in knee OA. Further high-quality, double-blind trials are needed to clarify TENS's role, particularly in early intervention contexts

Keywords: osteoarthritis, knee, pain, metaanalysis, TENS

ULTRASOUND-GUIDED MULTIMODAL TREATMENT FOR PATELLAR TENDINOPATHY: A PERSONALIZED THREE-STEP INTERVENTIONAL APPROACH

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Background

Patellar tendinopathy, commonly known as "Jumper's Knee", is a chronic overuse condition frequently observed in athletes engaged in repetitive knee-loading activities. In some cases, it may be associated with partial tendon rupture and Hoffa fat pad impingement, contributing to persistent anterior knee pain and functional limitations. Recent studies have emphasized the importance of targeting not only the tendinous tissue but also the peritendinous structures, including the interface with Hoffa fat pad, to optimize clinical rehabilitation outcomes.

Case report

A 49-year-old non-competitive kickboxing athlete presented with chronic bilateral knee pain localized at the lower pole of the patella, significantly limiting sports participation and daily activities. He was referred to a PRM specialist after undergoing an MRI scan, which revealed bilateral patellar tendinopathy with partial tendon ruptures (6mm on the left, 10mm on the right), reactive bone edema, and Hoffa fat pad inflammation. Following clinical examination and ultrasound evaluation, the patient underwent a three-session ultrasound-guided interventional protocol, with one-week intervals. Each session included: (1) hydrodissection of the Hoffa–patellar tendon interface using saline and lidocaine, to disrupt adhesions and debride bridging neovessels and neonerves; (2) micro-fenestration of the damaged tendon tissue (dry needling) to stimulate blood flow and growth factors release; (3) injection of tendon-specific hyaluronic acid (e.g., Hyalotend MD) to improve tendon gliding and promote intra-tendinous structural remodeling. A tailored physiotherapy program followed, focusing on isometric and eccentric strengthening. Pain and function were assessed using the VISA-P and NRS scales, which improved from 31/100 and 9/10 pre-treatment to 84/100 and 1/10 at follow-up, respectively.

Conclusion

This case highlights how a personalized, ultrasound-guided approach targeting both intra- and peritendinous structures can lead to substantial clinical improvement in complex patellar tendinopathy. The combination of hydrodissection, dry needling, and hyaluronic acid injections under ultrasound guidance may provide synergistic benefits in pain relief and functional recovery.

Keywords: Patellar-Tendinopathy, Hoffa-Pad-Syndrome, HyaluronicAcid, Ultrasound

FUNCTIONAL INSTABILITY IN PATIENTS AFFECTED BY COLLAGENOPATHIES WITH ARTICULAR HYPERLAXITY

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Background and Aims

Joint Hypermobility Syndrome (JHS) is an inherited multisystem connective tissue disorder, primarily characterized by excessive joint mobility and widespread musculoskeletal pain, which is the most frequently reported symptom. Neurophysiological impairments are also commonly observed. The combination of joint hypermobility, hypotonia, and reduced proprioceptive acuity renders individuals with JHS more vulnerable to traumatic injuries resulting from joint overuse or mechanical overload. This study aimed to evaluate both static and dynamic postural balance in individuals with JHS by administering postural stability tests.

Methods

Twenty patients from the Rare Diseases Orthopaedic Outpatient Clinic at the Rizzoli Orthopaedic Institute were enrolled in the study. Postural assessments were conducted using the Delos proprioceptive system, analyzing the following parameters: postural instability, Stability Index (SI), and Autonomy Index (AI), under both static and dynamic conditions, with eyes open and closed. The results were compared to those obtained from a control cohort of healthy individuals.

Results

Balance deficits were observed in subjects with Joint Hypermobility Syndrome (JHS), as evidenced by increased postural instability and reduced Stability Index (SI) and Autonomy Index (AI) values when compared to the control group. Subgroup analysis of JHS patients with (i) a history of lower limb pathologies, (ii) a Numerical Rating Scale (NRS) pain score greater than 3, or (iii) localized lower limb pain revealed a statistically significant decrease in SI and AI values under eyes-closed conditions relative to controls. Furthermore, the majority of patients was unable to complete the assessment under dynamic conditions.

Conclusion

Our findings highlight significant balance and proprioceptive deficits in patients with Joint Hypermobility Syndrome (JHS). Specific clinical features were identified as potential indicators of more severe balance impairment, which may serve as discriminative factors to guide targeted rehabilitation strategies to reduce injury risk, improve gait function, and enhance overall quality of life.

Keywords: collagenopathies, hyperlaxity, instability, musculoskeletal disorders

EFFICIENCY OF REHABILITATIVE INTERVENTIONS BASED ON TREATMENT OUTCOME MEASURES

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Background and Aims

A retrospective research study was conducted by reviewing the medical documentation of 1024 patients treated at Department of Physical Medicine and Rehabilitation with Rheumatology at University Hospital of Split (Department). Factors such as age, gender and individual diagnoses were considered from the patients' medical history. Treatment outcome measures provided upon hospitalization and hospital discharge were recorded. The presence of a descriptive assessment of the patient's condition upon discharge was also investigated. The collected data was analyzed using the McNemar test to compare measures taken at admission and discharge within the same group. The objective of this study was to estimate the efficiency of rehabilitative interventions among patients treated at Department, based on treatment outcome measures.

Results

The results indicate a lack of pursuit of treatment outcome measures at Department. Among the 1024 cases, the most common treatment outcome measure, the Barthel Index of Functional Independence (BI), was determined upon admission and discharge in 614 cases (60%) while, it was not determined in 243 cases (24%) of patients. Furthermore, in the discharge summaries of 563 patients (55%), a descriptive assessment of the change in condition is mentioned. Out of the 563 patients for whom such a change was described, only 340 (60.4%) had the BI calculated both at admission and discharge. In as many as 148 (26.3%), the BI was not determined at either admission or discharge.

Conclusion

The study concludes that treatment outcome measures are insufficiently used and inadequately implemented at the Department. The implementation of these measures is limited to a few basic tests and measurements, and even these are not consistently implemented or are implemented incorrectly in a significant number of patients. Improvements are needed to ensure the proper utilization of treatment outcome measures, adherence to protocols, and accurate implementation in order to effectively evaluate patient progress and treatment effectiveness.

Keywords: Rehabilitation Medicine, Outcome Measures, Barthel

SUICIDAL FRACTURE: A CLINICAL CASE OF NEUROLOGICAL INJURY TO THE SACRAL PLEXUS

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Background

Sacral fractures represent 1% of axial skeleton fractures and are often associated with pelvic ring injuries. They usually result from high-energy trauma, such as traffic accidents and falls. The incidence of sacral plexus injury is significantly higher in sacral fractures compared to pelvic and acetabular fractures.

Case report

A 31-year-old woman was admitted to the emergency room following a suicide attempt, after falling 5 meters onto a hard surface while in an upright position. CT scans revealed fractures of the first to seventh right costal arches, a comminuted sacral fracture with bilateral multiple foraminal disruption ("H" fracture), and a right calcaneus fracture. The patient underwent L4-L5 percutaneous fixation, while other fractures were treated conservatively. During the Physical Medicine and Rehabilitation (PM&R) assessment, she exhibited a full and painless passive range of joint motion, muscle strength of 5/5 (MRC scale) bilaterally in C5-D1 and L2-S1 myotomes, preserved tactile and prick sensitivity in C5-S2 dermatomes, and symmetrical reflexes with no muscle tone changes. Neurourological examination showed abolished clitoral-anal and anal reflexes, 0/5 voluntary anal contraction, absent S3-S5 prick sensitivity and endoanal sensitivity bilaterally, and decreased muscle tone. She was catheterized due to urinary incontinence and a lack of bladder sensitivity. Rehabilitation included respiratory kinesitherapy, active polysegmental joint mobilization, pelvic floor reeducation with neuromuscular electrostimulation, electromyographic biofeedback, progressive perineal and abdominal muscle strengthening, sensory stimulation of hypoaesthetic regions, bowel and bladder training with tibial nerve stimulation, bladder sensitization, and intermittent urination. After discharge, she was referred for outpatient follow-up in PM&R to continue monitoring and rehabilitation.

Conclusion

Sacral plexus injury may go undiagnosed acutely due to trauma severity and pain affecting neurological examination. However, it must be ruled out in sacral spine trauma. Injury to the parasympathetic fibers of S2-S4 leads to an areflexic bladder with urinary incontinence, constipation, external anal sphincter dysfunction, and anal incontinence.

Keywords: Sacral plexus injury; Rehabilitation

EVALUATION OF POSTURAL BALANCE IN PATIENTS UNDERGOING TOTAL HIP ARTHROPLASTY USING THE TIMED UP AND GO TEST (TUG)

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Background and Aims

Total hip arthroplasty (THA) is a surgical intervention aimed at alleviating pain and restoring functional mobility. Assessing postural balance is a key aspect of patient management following THA, as it influences stability and mobility outcomes. This study aims to assess changes in postural stability in patients before and after undergoing THA.

Methods

A prospective and descriptive study of 52 patients who underwent unilateral THA were recruited to evaluate postural balance before surgery, as well as at 3 and 6 months postoperatively. Assessments were conducted using the Timed Up and Go (TUG) test and the single-leg stance duration. Patients with bilateral THA, neurological conditions, or any disorder likely to interfere with balance control were excluded. Postoperatively, all patients followed a standardized rehabilitation program that included muscle strengthening and proprioception exercises

Results

The mean age was 59.6 years, with a predominance of male participants. Significant improvements were noted in both the TUG test and single-leg stance duration across the different assessment periods. Pre-surgery: The average TUG test duration was 45 seconds, with 81.3% of patients relying on assistive devices. Single-leg stance was impossible for 37.2% of patients, while 62.8% could not exceed 5 seconds. Three months post-surgery: The average TUG test time improved to 21 seconds, with 48.3% still requiring assistive devices. Single-leg stance lasted on average 9 seconds. Six months post-surgery: The TUG test further improved to 17 seconds, and only 12.7% of patients still needed assistive devices. The single-leg stance duration increased to 12 seconds on average.

Conclusion

Our findings indicate that THA has an impact on postural stability, emphasizing the need for structured rehabilitation programs. Balance assessment plays a crucial role in monitoring patients' recovery and progression toward functional independence. The TUG test is a practical clinical tool for evaluating mobility, balance, and functional capacity.

Keywords: Postural, balance, hip, arthroplasty

ISOKINETIC EVALUATION OF SHOULDER MUSCLE DEFICITS IN REPETITIVE STRAIN INJURY AND ITS IMPACT ON QUALITY OF LIFE AND FUNCTIONAL PERFORMANCE

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Background and Aims

Isokinetic testing is a gold standard method for assessing muscle strength. It allows for a functional diagnosis by quantifying objectively the level of impairment in shoulders affected by repetitive strain injury (RSI). This study aims to determine the isokinetic profile of shoulders with RSI compared to a healthy population and to evaluate its impact on functional performance and quality of life(QoL).

Methods

A prospective, descriptive, and analytical study was conducted on 55 patients diagnosed with rotator cuff tendinopathy due to RSI, alongside a control group of 30 healthy individuals. Participants were recruited from the Department of Physical Medicine and Rehabilitation at CHU Ibn Rochd in Casablanca. All subjects underwent clinical, paraclinical, and isokinetic assessments. Qol was evaluated using the SF-36 as for the functional performance the DASH score was used

Results

The average age of participants was 36 ± 3.7 years, with a female predominance (68%). Isokinetic testing revealed a significant ($p<0,05$) reduction in muscle strength of the medial and lateral rotators in the RSI group compared to the healthy controls. Additionally, muscle strength asymmetry between the left and right shoulders was observed in patients with RSI. 65,45% of the patients had a high DASH score as well as 70,90% who had a low SF-36 score indicating a negative impact on their functional performance and quality of life.

Conclusion

A deficit in shoulder muscle strength is a key factor in the development of rotator cuff tendinopathy, leading to a significant decline in quality of life. Targeted strengthening and stretching exercises are essential components of rehabilitation programs for RSI-related shoulder dysfunction with a special focus on excentric strengthening.

Keywords: isokinetic, shoulder, quality of life

EVALUATION OF THE SATISFACTION OF OLDER ADULTS WITH A KNEE ARTHROPLASTY AFTER A GROUP EXERCISE PROGRAMME

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Background and Aims

Knee arthroplasty is the most frequently performed lower limb surgery in older adults. Adherence to physical exercise programme has been shown to contribute significantly to improved functionality, quality of life and perception of safety, factors that are closely associated with high levels of satisfaction among individuals undergoing this type of surgery. Aims: To analyse the satisfaction of older adults with knee arthroplasty with a group exercise programme.

Methods

A descriptive observational study involving 36 older adults who took part in a group exercise programme supervised by a physiotherapist. The programme lasted a total of 15 sessions, held three times a week, with sessions lasting 30 minutes each. Individuals who took part in the programme in an aquatic environment were excluded from the study. For data collection, a characterisation questionnaire was applied, including specific questions about the participants' satisfaction with the programme.

Results

The sample showed a homogeneous gender distribution, with an average age of 70.3 years (SD = 5.3). Most of the participants were retired (94%; n=34) and 33% (n=12) perceived their state of health as good. The participants attributed benefits to the exercise programme in terms of functionality and safety in activities of daily living. The majority (97.2%) perceived an improvement in quality of life. However, only 25% considered the duration of the sessions to be adequate. It is important to note that all respondents reported being satisfied with the programme.

Conclusion

The programme shows satisfaction among older adults in terms of functionality, safety and quality of life. However, its duration doesn't seem to show satisfaction. These data reinforce the importance of the user experience as an indicator of quality in healthcare.

Keywords: Exercise, Physiotherapy, Functionality, Safety

FEMORAL FRACTURE DURING DENOSUMAB THERAPY IN A PATIENT WITH POSTMENOPAUSAL OSTEOPOROSIS AND RHEUMATOID ARTHRITIS: A CASE REPORT

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Background

Postmenopausal osteoporosis is a common cause of fractures in the elderly population. Denosumab is a highly effective antiresorptive agent that significantly reduces the risk of osteoporotic fractures. However, spontaneous fractures may still occur during therapy, particularly in complex patients with multiple comorbidities. This report presents a patient with longstanding postmenopausal osteoporosis, who despite being on denosumab therapy, sustained an atypical femoral fracture.

Case report

A 71-year-old female patient diagnosed with postmenopausal osteoporosis has been treated with risedronate (2011-2021) and teriparatide (2021-2023). In February 2024, she began denosumab therapy (60 mg subcutaneously every 6 months), with optimal calcium and vitamin D supplementation. Regular follow-up with a physiatrist was conducted due to stable vertebral fractures at Th11, Th12 and L3. Since 2022, the patient has been receiving methotrexate treatment (15 mg once weekly) for rheumatoid arthritis. In March 2025, due to a fall, the patient sustained fractures of the third to fifth metatarsal bones in her right foot. One month later, while walking on flat ground and without any trauma, she experienced pain in her left thigh. A femoral diaphyseal fracture was diagnosed and internal fixation was performed using a long gamma nail. After acute care at the Traumatology Department, the patient was transferred to the Physical and Rehabilitation Medicine Department for inpatient rehabilitation and further evaluation of the fracture's etiology.

Conclusion

This case highlights the importance of vigilant monitoring in patients on long-term antiresorptive therapy, especially those with rheumatologic comorbidities. Despite appropriate supplementation and treatment, atypical fractures may still occur in complex patients, requiring comprehensive physiatric and multidisciplinary evaluation.

Keywords: Osteoporosis, Atypical bone fracture, Denosumab

INTRAOSSEOUS AND INTRA-ARTICULAR INFILTRATION OF PLATELET-RICH PLASMA FOR SEVERE KNEE OSTEOARTHRITIS: CASE REPORT

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Background

The prevalence of osteoarthritis (OA) continues to rise alongside increasing life expectancy. In advanced stages, subchondral bone marrow lesions (BMLs) are commonly observed and are closely associated with pain severity and disease progression. Intraosseous (IO) platelet-rich plasma (PRP) infiltration, as described by Mikel Sánchez, has shown promising outcomes. This case illustrates a targeted regenerative approach involving IO PRP administration to BMLs identified via magnetic resonance imaging (MRI).

Case report

A 68-year-old retired woman presented with longstanding bilateral mechanical knee pain, predominantly affecting the right knee. Symptoms were exacerbated by stair use, inclined walking surfaces, and prolonged sitting ("movie theater" sign). Baseline scores were 9/10 on the Numeric Pain Rating Scale (NPRS) and 49/100 on the Western Ontario and McMaster Universities Arthritis Index (WOMAC), indicating significant functional limitation. Physical examination revealed a positive Clarke's test. MRI of the right knee demonstrated Grade IV chondromalacia (Outerbridge classification) of the lateral patellar facet and lateral femoral condyle, with BMLs appearing as poorly marginated hyperintensities on fat-suppressed T2-weighted images. PRP was prepared by processing 52 mL of peripheral blood using the Magellan PRP system, yielding 10 mL of leukocyte-rich PRP with a platelet concentration of 745,000/μL, an absolute platelet count of 7,450,000, a 3.5-fold increase over baseline, and a platelet retention rate of 67.5%. Under fluoroscopic guidance with contrast, which confirmed the absence of vascular extravasation, 2 cc of PRP were infiltrated into the patella and 1.5 cc into the lateral femoral condyle. An additional 6 cc were administered intra-articularly under ultrasound guidance. Two weeks post-procedure, the patient reported complete resolution of symptoms, with sustained improvement lasting 10 months. At the 11-month follow-up, mild symptom recurrence was noted (NPRS 2/10; WOMAC 11/100).

Conclusion

This case highlights the concept of precision regenerative therapy in OA management and underscores the critical role of subchondral bone in the disease's pathophysiology.

Keywords: Severe-Osteoarthritis; Bone-marrow-lesions; Intraosseous-PRP

KIN DEPIGMENTATION AND SOFT TISSUE ATROPHY AFTER TRIAMCINOLONE ACETONIDE INJECTION

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Background

Steroids are commonly used in physical therapy/orthopedics practice for various indications with excellent results and a seemingly known safety profile. There are literature reports of triamcinolone acetonide localized skin and fat tissue atrophy in some patients.

Case report

We represent a 29-year-old female patient with skin depigmentation and soft tissue atrophy after triamcinolone acetonide (Kenalog) injection into a ganglion cyst over the radiocarpal joint. The patient came to physical therapy two weeks after a whiplash injury and complained of neck and right arm pain with paresthesia. MR of cervical spine revealed C3-C4 disk protrusion without nerve affection and EMNG revealed right C5 mild radiculopathy. Four months after injury, the patient underwent a Kenalog injection in the ganglion cyst over the left radiocarpal joint. Two months after the injection she noticed skin depigmentation and subcutaneous tissue atrophy on the injection site with paresthesia. Six months after injection all symptoms persisted including neck and right arm pain so repeated MRI revealed C5-C6 disk protrusion without nerve compression and EMG revealed C5 bilateral chronic radiculopathy. Algodystrophy was suspected and the patient underwent intensive physical therapy. Brain MRI did not reveal pathology and MR of both forearms did not reveal muscle atrophy. 16 months after injection, she had only mild forearm atrophy with no skin discoloration or pain.

Conclusion

Soft tissue atrophy and local skin depigmentation are known adverse effects of local corticosteroid injections with reported incidences from 1.5-40% and 1.3-4%, respectively. The average latency period for development of both lesions is 4-8 weeks for some authors and 1- 4 months for skin depigmentation according to others. In most cases, these events are self-limited and resolve in 6-24months. Based on some authors the administration of extra-articular corticosteroid injections seems to be a 'relatively safe' intervention, but patients should be informed about local adverse events before drug administration.

Keywords: depigmentation, skin, atrophy, corticosteroid, injection

POSTURAL BALANCE ASSESSMENT BEFORE AND AFTER UNILATERAL TOTAL HIP ARTHROPLASTY

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Background and Aims

Total hip arthroplasty (THA) is a surgical procedure with the aim of relieving pain and restoring functionality in patients with hip joint degeneration. Postural balance assessment plays an important role in the management of patients with THA since it impacts patient's stability. The aim of this study is to evaluate postural stability in patients before and after THA.

Methods

Prospective and descriptive study conducted in the department of Physical Medicine and Rehabilitation of university hospital « CHU Ibn Rochd » in Casablanca, Morocco. 38 Patients who underwent unilateral THA were recruited to assess postural balance before surgery, 3 and 6 months after THA using timed up and go test (TUG test) and time duration of single leg stance.

Results

The mean age was 58.3 years old with a male predominance. All patients had THA after hip osteoarthritis. Significant differences were observed concerning TUG test and time duration of single leg stance before and after surgery. The average TUG test before surgery was 45 seconds with 78.9% using assistive devices. Single leg stance was impossible for 31.5% and lasted only <5sec for 68.4%. 3 months after surgery, the average TUG test was 23 seconds with 42.8 % still using assistive devices. Single leg stance lasted in average 8 sec. 6 months after surgery, the average TUG test was 16 seconds with only 10.5 % still using assistive devices. Single leg stance lasted in average 10 sec.

Conclusion

In our study, TUG test combined with time duration of single leg stance showed that THA can initially affect patient's ability to maintain postural stability. Thus, patient must undergo a structured rehabilitation program where balance assessment is an important component in order to monitor patient's progress in restoring stability, and to provide valuable information about patient's risk of falling and to walk without any assistive devices

Keywords: Hip arthroplasty, balance, TUG test

BLOOD FLOW RESTRICTION (BFR) EXERCISE FOR SARCOPENIA: A CASE SERIES

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Background and Aims

Sarcopenia, characterized by progressive loss of muscle mass and strength, is a significant health concern in older adults. Blood flow restriction (BFR) exercise has emerged as a promising intervention, enabling muscle adaptation at lower loads, which may be safer and more feasible for frail individuals.

Methods

We present a case series of three older adults (ages 58–81 years) diagnosed with sarcopenia based on reduced muscle mass and strength. The participants included two females and one male with body mass index (BMI) ranging from 19.5 to 23.9 kg/m². All patients participated in a supervised BFR exercise program, consisting of three sessions per week for four weeks. The BFR pressure was set at 40% of arterial occlusion pressure (AOP), and exercise intensity was maintained at 30% of one-repetition maximum (1RM). Each session included a combination of lower limb resistance exercises performed under BFR conditions.

Results

All patients completed the intervention without adverse events. Hand grip strength (HGS) showed varying degrees of improvement across cases, ranging from 0.8% to 46.5% (from 14.2 kg to 23.0 kg post-intervention). Thigh muscle thickness increased by 37.9% to 44.7%, with final measurements up to 28.8 mm. In terms of physical performance, short physical performance battery (SPPB) scores improved from 8–9 at baseline to 11 at follow-up, and 6-minute walk test (6MWT) distances increased by 37 to 74 meters. However, no consistent changes were observed in appendicular muscle mass index (AMI).

Conclusion

This case series suggests that low-load blood flow restriction (BFR) exercise may be a feasible and well-tolerated approach for enhancing muscle strength, muscle mass, and physical function in older adults with sarcopenia. While these observations are encouraging, further research with larger samples is needed to confirm the potential benefits of BFR training in this population.

Keywords: Sarcopenia, BFR

EPIDEMIOLOGICAL SURVEY ON THE MAIN MUSCULOSKELETAL DISORDERS RELATED TO THE USE OF CHORD INSTRUMENTS IN PROFESSIONAL MUSICIANS

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Background and Aims

Performing music require considerable physical effort and, being a prolonged activity, exposes musicians to the possible development of musculoskeletal disorders (MSKDs) that can influence their health and career. The aim of the study is to collect concrete data on the prevalence of MSKDs related to the use of chord instruments in professional musicians in order to outline a complete epidemiological picture. This could lead to targeted intervention and optimized preventive strategies.

Methods

A questionnaire composed of 14 multiple choice questions was delivered to chord instrument professional musicians being, part of international orchestras. The questionnaire was divided into 4 sections: demographic information, type of chord instrument used, individual musical experience and possible presence of MSKDs suffered during musical activity.

Results

51 professional musicians were enrolled. Among them 41.2% suffered from one or more impairments related to the use of the musical instrument. The most common found were: tendinitis (36.4%), localized inflammatory states (bursitis and joint inflammation, 22.7%), muscle tension and widespread pain (18.2%), nerve impairment (De Quervain's syndrome and ulnar nerve entrapment, 13.6%) and vertebral protrusions (9.1%). Over 47% of participants reported persistent or recurrent symptoms, which significantly affected their musical practice.

Conclusion

MSKDs are a significant problem among professional musicians. Despite preventive measures such as regular breaks and stretching, a portion of the population examined continues to suffer from chronic symptoms. Just a few musicians regularly consult a physiatrist to prevent MSKDs, thus clearly highlighting the need for proper prevention through regular medical consultations and management of their MSKDs. It would be appropriate therefore to introduce specific education and prevention programs for musicians, focused on ergonomic techniques for musical practice and on the management of MSKDs.

Keywords: Musicians, injuries, physical therapy

POSTER PRESENTATION

CANCER REHABILITATION

PREHABILITATION IN CANCER PATIENTS: CURRENT EVIDENCE ON FUNCTIONAL AND PSYCHOLOGICAL OUTCOMES

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Background and Aims

Prehabilitation, defined as the implementation of physical, nutritional, and psychological interventions prior to cancer treatment, has gained growing interest for its potential to optimize functional reserve and improve outcomes. This review aims to summarize the most recent evidence regarding the effectiveness of prehabilitation in enhancing physical performance, reducing psychological distress, and improving postoperative recovery in cancer patients.

Methods

A narrative synthesis was conducted using findings from recent systematic reviews and meta-analyses published between 2023 and 2024. The studies included evaluated the impact of multimodal and exercise-based prehabilitation programs on outcomes such as anxiety, depression, endurance (6-minute walk test and VO_2 peak), and postoperative complications in patients undergoing oncological treatment, primarily surgical resections.

Results

Recent meta-analyses confirm that prehabilitation significantly improves physical endurance, with one study showing a mean increase of 38.5 meters in the 6-minute walk test and moderate improvements in VO_2 peak. Mental health also benefits: prehabilitation was associated with significant reductions in anxiety and depression (HADS scores improved by -0.49 and -0.71, respectively). In surgical patients, prehabilitation led to reduced postoperative complications, including pulmonary events, and shorter hospital stays. Despite promising results, evidence quality was rated as low to moderate in several reviews due to methodological heterogeneity and variability in program designs.

Conclusion

Prehabilitation is a promising approach to improve functional capacity and mental well-being in cancer patients prior to treatment. It may reduce postoperative complications and enhance recovery, particularly in surgical candidates. However, variability in protocols and limited high-certainty evidence highlight the need for standardized, large-scale trials to confirm these benefits and inform clinical guidelines.

Keywords: Cancer; Prehabilitation

A TANGLED WEB: AXILLARY WEB SYNDROME AND EXTENSOR POLLICIS LONGUS TENDON INJURY –A RARE DUAL COMPLICATION CHALLENGING RECOVERY

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Background

Extensor pollicis longus (EPL) tendon rupture, a rare complication of distal radius fractures, often occurs at Lister's tubercle due to poor vascularization. It results from mechanical attrition, ischemia, or compartment pressure. Conservatively managed fractures can lead to EPL rupture, presenting as thumb extension loss and wrist tenderness. Treatment typically involves extensor indicis proprius (EIP) tendon transfer. Axillary Web Syndrome (AWS), a post-surgical breast cancer complication, causes painful axillary cords that restrict shoulder mobility. It usually resolves within three months, with physiotherapy as the main treatment. Lymphatic dissection, and chemotherapy are risk factors.

Case report

A 70-year-old woman with left breast cancer underwent neoadjuvant chemotherapy. On the day of her axillary lymph node dissection, she sustained a fall, resulting in left radius and ulna fractures, managed conservatively with a plaster splint. She later developed a complete active extension deficit of the left thumb interphalangeal joint, leading to a diagnosis of extensor pollicis longus (EPL) tendon rupture, requiring tendon transfer using the extensor indicis proprius (EIP). The patient continued oncological treatment with radiotherapy and hormone therapy. Post-surgery, she regained thumb extension and index finger flexion but had difficulty with thumb opposition, tip-to-tip pinch, and developed allodynia in the index finger scar. Left axillary web syndrome (AWS) was also noted, limiting shoulder mobility (active ROM: 80°, passive ROM: 110°). Rehabilitation included passive mobilization, strengthening exercises, thumb motor training, scar release massage, and sensory re-education. She also received Neurobion, Pregabalin, and Lidocaine plasters. Passive shoulder ROM improved to 140° and active ROM to 120°. She regained the ability to perform a tip-to-tip pinch with the 5th finger, showing functional improvement despite residual limitations.

Conclusion

This case highlights the rare coexistence of EPL rupture and AWS, complicating recovery. Early tendon transfer and physiotherapy were crucial, emphasizing the need for a multidisciplinary approach in complex post-fracture and post-surgical rehabilitation.

Keywords: DistalRadiusFracture, ExtensorPollicisRupture, AxillaryWebSyndrome

USEFULNESS OF THE SINS SCORE IN THE PHYSICAL THERAPY MANAGEMENT OF AN ONCOLOGY PATIENT: A CLINICAL CASE REPORT.

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Background

The rehabilitation of an oncologic patient is a difficult task from which the physiatrist does not shy away. The spine is afflicted from neoplastic diseases which can lead to instability, that it can cause deformity, pain, and spinal cord compression and is an indication for surgery/radiotherapy. The spinal instability neoplastic score (SINS) helps to assess tumor-related instability of the vertebral column. It has been shown to be useful in guiding the mobilization or operative management of patients with neoplastic spinal disease and correlates with patient-reported outcomes.

Case report

An elderly oncologic patient is hospitalized and at the level of the vertebral bodies of L2, L3, L4 and L5, we found areas of subtle osteolysis, in the presence of degenerative phenomena and one area of sub-centimetric osteolysis, , respectively at the level of the distal third of the sternal body, of D7 and D8, of the left hemi-sacrum. We used the Spine Instability Neoplastic Scale (SINS) and obtained a score of 8, which characterized a potential vertebral instability with a significant risk of vertebral fracture caused by lytic lesions of a neoplastic nature. So we e prescribed a trunk orthosis; we started the therapy for the primary neoplasm first in hospital and subsequently establishing new outpatient checks after having activated a home physiotherapy service and managing to discharge the patient to her home.

Conclusion

The concept of spinal instability remains important in the clinical decision-making process for patients with spine neoplasms. SINS is a score that it has the potential to be a valuable guide to the management of patients with spinal metastases. In this case report the skills of the geriatrician and those of the physiatrist and the oncologist are called upon to collaborate closely to take charge of a complex patient using this score in clinical practice.

Keywords: elderly patient

RISK FACTOR IDENTIFICATION AS A KEY STRATEGY IN LYMPHEDEMA PREVENTION AND TREATMENT IN PATIENTS AFTER CANCER TREATMENT

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Background

Lymphedema is characterized by the accumulation of lymphatic fluid in soft tissues, most commonly affecting the limbs. This condition can lead to serious complications such as infections, skin changes, and joint stiffness, while also contributing to psychological distress and increased healthcare costs due to the need for prolonged management. Although the exact incidence of treatment-related lymphedema among cancer survivors remains unclear, it is widely recognized as a potentially lifelong, chronic condition that significantly diminishes quality of life. Lymphedema can develop following treatment for any malignancy that involves lymph node dissection or radiation targeting lymphatic regions. Early identification of patients at increased risk is critical for effective prevention and timely intervention. Key contributing factors include the site and extent of radiation therapy, the extent of lymph node removal, and the presence of underlying comorbidities. Recognizing these risk factors can play a pivotal role in reducing the burden of lymphedema in cancer survivors.

Case report

We report the case of a 30-year-old woman admitted in October 2024 for evaluation of progressive bilateral leg swelling. The lymphedema likely resulted from thoracic duct damage caused by mediastinal radiotherapy for Hodgkin's lymphoma, which she underwent in 2017. Edema appeared about one-year post-treatment and was preceded by significant weight gain. The patient's comorbidities—including spondyloarthritis, vitamin D deficiency, and anemia—likely contributed to the development and progression of her lymphedema.

Conclusion

This case highlights the importance of comprehensive risk factor identification, including metabolic and autoimmune conditions, which may predispose patients to lymphedema. Early recognition and proactive management of these factors are essential for prevention and for improving long-term outcomes in cancer survivors.

Keywords: Lymphedema, Cancer, Survivors, Radiotherapy, Rickactorshoracicuct

HAND MYXOFIBROSSARCOMA AND THE IMPORTANCE OF THUMB OPPOSITION

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Background

Myxofibrosarcoma (MFS) is a rare malignant soft tissue sarcoma, originates in the body's connective tissue, most commonly affecting elderly individuals.Usually occurs in extremities (75%), mostly the hand.Given the complexity of the hand's anatomy and function, treatment planning must be carefully managed, including surgical intervention and rehabilitation program.Preserving hand function, particularly thumb opposition, is crucial for grasp, manual dexterity and object manipulation.Losing this ability impacts hand functionality and quality of life.

Case report

A 68-year-old male patient, right-handed, presented with a painless swelling in the 3rd interdigital space of his right hand with no history of trauma.Over 6 months, the swelling grew progressively and reduced movement and grip strength.Suspecting malignancy, an excisional biopsy was performed.Histopathological analysis confirmed MFS.The subsequent MRI demonstrated persistence of disease.The patient underwent amputation of the 3rd-5th fingers.Post-surgery, the patient was discharged to rehabilitation.During a 6-month rehabilitation program, the focus was on wound care, joint mobility of the remaining limb and adaptation to the new condition.At follow-up, the patient showed effective pinch capacity with 1st-2nd fingers, with similar strength comparable to the unaffected hand.Progressively started his activities of daily life in an adapted way, referring be autonomous in his self-care, eating and meal preparation, having restarted his gardening hobby.After discussion with the medical team, a passive silicone cosmetic prosthesis was prescribed.One year after the amputation, the patient remained free disease but maintained some residual functional limitations.

Conclusion

MFS is often asymptomatic, leading to delayed diagnosis and significant functional loss.Timely diagnosis and clear surgical margins are essential for prognosis, but radical excision with amputation can severely affect functional outcomes.The challenge is preserving thumb function, especially opposition.This case highlights the critical role of thumb opposition in hand function and show the need for a multidisciplinary approach to ensure both oncological safety and functional preservation.

Keywords: Myxofibrossarcoma, tumb-opposition, rehabilitation, amputation, functional.

MEDITERRANEAN BY LOCATION, NOT BY DIET: POOR ADHERENCE TO THE MEDITERRANEAN DIET AMONG BREAST CANCER SURVIVORS IN A MEDITERRANEAN REGION

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Background and Aims

The Mediterranean diet is recognized for its positive impact on overall health and is considered beneficial in cancer risk reduction and survivorship. Although it originated in the Mediterranean region, where it was historically the dominant dietary pattern, it's unclear how much the local population still adheres to it today. This study aimed to assess adherence to the Mediterranean diet among breast cancer survivors in a Mediterranean region, a population for whom nutrition plays a important role.

Methods

This cross-sectional observational study was conducted over a 6-month period, from December 2023 to April 2024, at the Lymphedema Clinic of the University Hospital Split. The study included female breast cancer survivors aged 18 years and older who had completed treatment for unilateral breast cancer at least six months prior to enrolment and had consented to participate. Exclusion criteria were applied, and 74 participants were enrolled. Adherence to the Mediterranean dietary pattern was assessed using the Mediterranean Diet Serving Score (MDSS), a validated and reliable questionnaire based on the updated Mediterranean Diet Pyramid model.

Results

A total of 74 breast cancer survivors were included in the analysis. Based on the Mediterranean Diet Serving Score (MDSS), only one participant demonstrated adherence to the Mediterranean dietary pattern. The remaining participants showed low or insufficient adherence across most food categories. These findings are particularly concerning given the study's Mediterranean setting, where such dietary habits would traditionally be expected.

Conclusion

Despite being conducted in a Mediterranean region, this study revealed alarmingly low adherence to the Mediterranean diet among breast cancer survivors. These results raise important questions about the persistence of traditional dietary habits in the Mediterranean population. Given the well-documented benefits of the Mediterranean diet, particularly for cancer survivors, these findings highlight the urgent need for nutritional education and public health strategies aimed at promoting dietary awareness and adherence.

Keywords: Breast, Cancer, Survivor, Diet, Nutrition

ANALYZING UROFLOWMETRY OUTCOMES FOR PATIENT AFTER RADIATION THERAPY FOR PROSTATE CANCER

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Background and Aims

Prostate cancer's (PC) local treatment includes radical prostatectomy and radiotherapy (RT) that has some impact on genito-urinary system despite of the important advances that had been made in techniques of RT. Some patients may have long-term urinary side effects such as increased urinary frequency, urgency, urinary incontinence and dysuria…These symptoms may impact significantly patient's quality of life

Methods

retrospective study including 33 patients who underwent radiotherapy for prostate cancer. All patients had completed radiotherapy at least 12 months before uroflowmetry evaluation to analyse the effect of late complications related to RT on voiding. We evaluated lower urinary tract symptoms (LUTS) using Urinary Symptom Profile (USP), 3-day frequency-volume charts (FVC), uroflowmetry (UFM) and post-void residual urine volume (PVR) measurement.

Results

The average age was 69.45 years. The evaluation of LUTS was done after an average of 22 months after finishing radiotherapy. 72.7% had radical prostatectomy prior to the radiotherapy. 45.4% had hormonotherapy and 36.3% had chemotherapy. About lower urinary tract symptoms, 63.6% had urgency urinary incontinence, 54.5% stress urinary incontinence and 81.8% dysuria. Using USP, stress urinary incontinence subscore was 7/9, overactive bladder subscore 14/21 and dysuria subscore was 5/9. FVC showed increased urinary frequency (average number of daytime voids >10 and nocturnal voids > 2) and an average voided volume of 139.2 ml

Conclusion

Despite the effectiveness of radiotherapy, it can cause damages associated with urinary complications that have impact on patient's quality of life and be sometimes life threatening to the patient. Regular follow-up allow to early detect radiation complications. Uroflowmetry is an indispensable test for patients with LUTS. It can provide objective and quantitative information to understand symptoms

Keywords: Prostate cancer, uroflowmetry LUTS

POSTER PRESENTATION

OTHER TOPIC

CHALLENGES IN THE REHABILITATION OF SPINAL SERONEGATIVE RHEUMATOID ARTHRITIS IN NON SPINAL SPECIALIST UNIT: A MULTIDISCIPLINARY APPROACH

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Background

Seronegative arthritis describes a group of conditions that present with inflammatory arthritis but without a positive rheumatoid factor.Seronegative Rheumatoid arthritis(RA) represents a significant disease burden,for which prompt therapeutic intervention continues to be hampered by diagnostic challenges.

Case report

We report a 68 year old lady with a diagnosis of seronegative Rheumatoid Arthritis (RA). She had multilevel disc prolapse with severe spinal stenosis at L4/5 due to disc prolapse in combination with facet joint hypertrophy.Had lumbar spinal decompression. She developed severe cauda equina secondary to spondylolisthesis at L4/5 and has had two decompressions.She then had CT guided aspiration of left facet joint.Scans confirmed a right psoas abscess L4/L5 that has increased in size.She was managed conservatively. She received extended doses of intravenous antibiotics and followed by 3 months of oral antibiotics.During the course of illness she developed weakness in her left foot (3/5) and severe pain in her legs more so in the left limb. She developed a grade 2 pressure sore on her sacrum.She was managed on complete bed rest with frequent turns.She started to develop contractures in both lower limbs.Once the skin had healed she started a protocol of gradual sitting up.Her severe pain improved and was weaned off opiates. Soft tissue contractures were prevented and reversed by passive stretching daily.Her bladder function has been maintained by using a flip/flow regime. Her bowel sensation started to recover but not fully.Her care was provided in one unit (non-spinal) with a wide range of expertise to cover aspects of her rehabilitation.ASIA score has improved from C to D.

Conclusion

There is insufficient evidence to support a bespoke treatment strategy for seronegative RA subset.Complications can be devastating.A multidisciplinary Team approach is essential due to the complexity in such cases.Sound knowledge and proactive approach in preventing complications is crucial.Patient education of spinal injuries is vital to their rehabilitation.

Keywords: Seronegative arthritis, Spinal injury, complications

OSTEONECROSIS OF THE KNEE AFTER PARENTERAL CORTICOSTEROID APPLICATION AND INTRA-ARTICULAR HYALURONIC ACID INJECTION

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Background

Osteonecrosis is the death of bone tissue due to interruption of blood supply. The development is associated with systemic and intra-articular use of corticosteroids. The earliest symptom is pain. We present the case of an 65-year-old female that developed osteonecrosis of the right knee after parenteral corticosteroid application and intra-articular hyaluronic acid injection.

Case report

Patient was presented in our practice in October 2024 with the pain in the right knee. Degenerative changes of the knee were visible on MRI in July 2024 and were treated with intra-articular corticosteroid injection with good effect on pain. Because of spinal stenosis symptomatology, she received an epidural corticosteroid injection (ESI). Two days prior the ESI, intra-articular hyaluronic acid injection (HAI) was applied because of the degenerative changes of the knee. Two weeks after the HAI, at the beginning of August 2024, the knee pain got worse which led to further corticosteroid intra-articular applications. Two months after the pain intensified, at the beginning of 10/24, the diagnosis of osteonecrosis of medial femoral condyle was confirmed with a MR scan. The patient started walking with two crutches and 50 days of continuous physical therapy were performed. On MR scan control edema was reducing. The load on the right leg was gradually increased. During the last check-up in March 2025., due to clinical deterioration and deterioration of edema on MR findings, knee arthroplasty was recommended.

Conclusion

If left untreated, osteonecrosis can lead to the destruction of joint. Except one study, we haven`t found any cases in literature connecting the onset of osteonecrosis with hyaluronic acid intra-articular application. The goal of our case report is to draw attention to the cumulative dose of corticosteroids that can lead to the development of osteonecrosis as well as after the combination of corticosteroids and intra-articular hyaluronic acid injection.

Keywords: osteonecrosis, intra-articular, corticosteroid, hyaluronic acid

BOTULINUM TOXIN INJECTION IN CROCODILE TEARS SYNDROME: WHAT DO WE DO AND WHAT WE KNOW?

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Background and Aims

Crocodile tears syndrome (CTS) is a rare sequela of peripheral facial palsy (PFP) causing excessive lacrimation during mastication, deglutition or salivation. CTS occurs from the misdirection of regenerating salivary nerve fibers and innervation of the lacrimal gland post-PFP, affecting the patient's quality of life. Transconjunctival injection of botulinum toxin (TIBT) type A has been growing as an option, although still rarely implemented and with no standardized protocols available. We aim to review the current literature on TIBT on CTS in adults, using 2 clinical cases, reviewing clinical evaluation, therapeutical goals establishment, injection protocols and possible complications.

Methods

Case 1: right PFP sequelae following temporal bone trauma. Case 2: left PFP sequelae post-Ramsay-Hunt syndrome. Both with facial asymmetry and CTS worsened by mastication. Goals for TIBT: facial symmetry; reduce lacrimation. We conducted a literature review on Pubmed using the keywords "crocodile tears syndrome"; "toxin injection"; "facial palsy"; articles released in the last 10 years and including studies describing CTS, TIBT protocols in adults, its effect and possible complications.

Results

We identified 4 articles. All recommended anamnesis and systematic clinical evaluation, including pre- and post-procedure Schirmer test and establishing therapeutical goals. The authors used onabutulinumtoxinA or incobotulinumtoxinA, with doses ranging from 1 to 10U (maximum of 20U), most commonly 4 or 5U, with epiphora resolution within a week. Some authors recommended starting with a lower dose and if necessary, reinjecting in 2 to 3 weeks to avoid overdosing. Reinjection intervals ranged between 3 to 6 months. Despite relatively painless and safe, potential but temporary side effects included palpebral ptosis, hematoma, xerostomia, diplopy, among others.

Conclusion

TIBT has been shown to be effective and safe, however with possible complications, therefore careful clinical assessment, establishing clear treatment goals and using an adequate protocol (based on the best clinical practice) is essential for therapeutical success and patients' well-being.

Keywords: Crocodile, tears, syndrome;, Botulinum, toxin

GENDER DIFFERENCES IN PHYSICAL ACTIVITY HABITS AMONG PHYSIOTHERAPY STUDENTS

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Background and Aims

Kinesiotherapy is the most important form of physical therapy[1], and it is essential for physiotherapists to understand the significance of physical activity (PA) in both the prevention and treatment of musculoskeletal disorders. The aim of this study was to investigate the physical activity habits of physiotherapy students and compare them based on gender.

Methods

This longitudinal, prospective study included 38 physiotherapy students with an average age of 22.4 years, representing both genders (57.9% women). All participants completed a validated questionnaire that asked about general demographics (gender, age) as well as frequency (a) less than once a week; b) 1-2 times a week; c) 3-4 times a week; d) 5 or more times a week), and type of physical activity (a) aerobic activity; b) strength exercises; c) group exercises; d) other). The number of participants was sufficient for valid statistical analysis. Significance in terms of exercise type and frequency was tested using the chi-square test, with a significance level set at $p<0.05$.

Results

Men were represented in all categories of physical activity intensity, whereas no women participated in the "5 or more times a week" category. Although more women (18.4%) than men (5.3%) exercised 1-2 times a week, the chi-square test suggested that gender was not a significant factor influencing PA frequency ($p=0.24$). Women more frequently engaged in various types of exercises (they were represented in all categories), while men significantly preferred strength exercises (31.6%). There was a statistically significant relationship between the gender of physiotherapy students and the type of PA they preferred ($p<0.01$).

Conclusion

Previous research indicates that the proportion of regular exercisers within the physiotherapy population is low[2], though the difference in our study was statistically insignificant. Ultimately, there is no gender difference in the frequency of exercise among physiotherapy students, although male students tend to prefer strength exercises.

Keywords: physiotherapy students, physical activity

CAREGIVER BURDEN AND PSYCHOLOGICAL IMPACT OF NOCTURNAL ENURESIS

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Background and Aims

Nocturnal enuresis (NE), commonly known as bedwetting, is characterized by involuntary urination during sleep at least twice a week in children over five years of age, persisting for a minimum of 3 months. This study aimed to assess the burden experienced by caregivers of children with NE and its effect on their psychological well-being.

Methods

It's a prospective study including 85 patients over five years old undergoing treatment for primary NE. The impact on caregivers was assessed using the french version of Zarit Burden Interview (ZBI) and the Hamilton Depression Scale (HAM-D), while children's enuresis patterns were evaluated through a voiding diary. Caregivers of children with additional lower urinary tract symptoms or other comorbidities, and caregivers with pre-existing psychological health conditions, were excluded.

Results

The average age of children was 8.7 years [6 -15 years], with 80% coming from low-income families and 35.3% having a family history of enuresis. The mean duration of enuresis was 4.3 years, and all children were receiving simple behavioral interventions, such as reward-based strategies and scheduled nighttime awakenings for urination. According to voiding diary records, 69.4% of children experienced nocturnal enuresis daily. The mean age of caregivers was 34.6 years, with 94.1% of mothers. The average score on the ZBI was 63.2, with 68.2% of caregivers reporting a lack of personal time due to their caregiving responsibilities. Additionally, 96.2% of mothers felt that their social life was negatively impacted. According to the HAM-D, 35.3% of caregivers experienced mild depression, yet only 7% sought professional help.

Conclusion

Healthcare professionals often focus primarily on the patient's quality of life, while overlooking caregiver burden. Further research on anxiety and depression management in caregivers of children with NE is needed. Implementing support strategies for caregivers could improve their well-being and contribute to better adherence to treatment plans for affected children.

Keywords: nocturnal enuresis, children, caregiver burden

BALANCING REHABILITATION AND AUTOIMMUNITY: ULCERATIVE COLITIS EXACERBATION LINKED TO NSAID USE IN PHYSIOTHERAPY

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Background

Ulcerative colitis (UC) is an inflammatory bowel disease often triggered by environmental or pharmacologic factors. Although (NSAID) are commonly used in physiotherapy for musculoskeletal pain, their safety in UC remains debated. We present a case of a patient in long-term UC remission who experienced a severe flare following NSAID use during physiotherapy. This case raises important considerations about the potential role of NSAID in triggering autoimmune responses and the need for caution when prescribing them to patients with underlying inflammatory conditions.

Case report

23-year-old man, engineer, with personal history of UC and ankylosing spondylitis in remission for 4 years, medicated with 2g mesalazine/day. He performed frequent muscular resistance training. He had terrible fracture of the left elbow whilst skateboarding (elbow dislocation, radial head and coronoid fracture). After 1 month of conservative treatment (which included iontophoresis with NSAID-Ketoprofen), his past symptoms of ankylosing spondylitis and UC retuned. Colonoscopy revealed pan-ulcerative-colitis. NSAID were stopped and he started treatment with messalazine enema, 40mg prednisolone/day (followed by slow weaning) and azathioprine, which was initially effective. However, symptoms relapsed when prednisolone dose was lowered bellow 20mg/day, and the patient had to start anti-TNF (infliximab), becoming completely asymptomatic. One year after the fracture, with physiotherapy and gradual return to resistance training, there was complete recovery of arm pain, ROM and muscle atrophy/strength.

Conclusion

This case highlights the potential risk of UC exacerbation associated with NSAID use, even in patients in stable remission, and despite NSAID being used in iontophoresis, not orally/systemically. Clinicians should weight the benefits of symptom relief with NSAIDs against the risk of triggering disease flares in individuals with autoimmune diseases. This case also highlights the possibility of achieving excellent results in Terrible Triad of the Elbow with conservative treatment, especially in young physically patients, motivated to comply with a rehabilitation and muscle strengthening plan.

Keywords: Ulcerative Colitis NSAID Terrible Triad

INFLUENCE OF OCCUPATIONAL GYMNASTICS ON MUSCULOSKELETAL SYMPTOMS AND QUALITY OF LIFE IN WORKERS AT A FOAM COMPANY

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Background and Aims

Workers are subject to high demands that can cause musculoskeletal symptoms and reduce their quality of life. Workplace Gymnastics (WG) emerges as a health promotion tool with benefits for physical, mental, economic, and social well-being. Aim: Evaluate the influence of workplace gymnastics on musculoskeletal symptoms and the quality of life of blue-collar and white-collar workers in a foam company, as well as quantify the pressure pain threshold.

Methods

Pre-experimental study with a sample of 92 workers, including blue-collar (n=68) and white-collar (n=24). A WG program was implemented, (strengthening, stretching, and coordination for 10 minutes exercises). Initially (M0) and after 13 months (M1), the NMQ, the SF-36, and the Algometry test were applied. Was used descriptive and inferential statistics, with a significance level of 0.05. For data analyze used the SPSS version 29.0.

Results

After 13 months of intervention, blue-collar (M0:33.8%; M1:20.6%) and white-collar (M0:37.5%; M1:12.5%) workers showed significant improvements in neck symptoms over the last 7 days (p=0.050 and p=0.034). Blue-collar workers showed significant improvements in wrist/hands (reduced pain, p=0.049), hips/thighs (less activity limitation, p=0.021 and pain, p=0.041), knees (fewer symptoms in 7 days, p=0.033), and ankles/feet (fewer symptoms in 12 months, p=0.029 and 7 days, p=0.018; less activity limitation, p=0.034 and pain, p=0.017). After the intervention, the pain pressure threshold showed positive and significant results (p<0.05) for almost all muscles evaluated in both worker groups. Regarding quality of life, the both groups showed good levels in all dimensions with slight improvements, in blue-collars (M0: 64.0-87.2; M1: 63.9-90.4) in white-collars workers (M0: 54.2-88.5; M1: 59.1-90.4) only in the "emotional dimension" in white-collar workers showed to be significant (p=0.030).

Conclusion

After 13 months of the WG program, musculoskeletal symptoms decreased, pressure pain threshold increased, and perceived quality of life improved among both blue- and white-collar workers.

Keywords: Exercise, Nordic, Musculoskeletal, Questionnaire, algometry

SPA-BASED REHABILITATION FOR LONG COVID SYNDROME: A PROSPECTIVE STUDY ON FUNCTIONAL AND PSYCHOSOCIAL OUTCOMES IN PREVIOUSLY HOSPITALIZED AND NON-HOSPITALIZED PATIENTS

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Background and Aims

Long Covid is associated with persistent symptoms such as fatigue, dyspnea, cognitive impairment, and psychological distress, often resulting in a marked decline in patients' quality of life and autonomy. Conventional rehabilitation may not sufficiently address the multisystemic nature of the condition. Spa settings, integrating traditional treatments with land-based and aquatic rehabilitation, may represent an innovative therapeutic option. This study aimed to evaluate the effects of a 5-week spa-based rehabilitation program on physical, psychological, and cognitive outcomes in Long Covid patients, and to compare recovery patterns based on prior hospitalization status during the acute phase.

Methods

A prospective study was conducted involving Long Covid patients participating in a structured 5-week program at a certified spa center. The intervention included thermal aerosol therapy, individualized physiotherapy (land and aquatic), and cognitive training. Patients were divided into two subgroups based on whether they had been hospitalized during the acute infection. Assessments were performed at baseline (T0), post-treatment (T1), and at 3-month (T2) and 6-month (T3) follow-up. Outcome measures included fatigue (Fatigue Assessment Scale - FAS), dyspnea (Modified Medical Research Council scale - mMRC), pain (Visual Analog Scale - VAS), motor function (6-Minute Walking Test - 6MWT), psychological well-being (Beck's Anxiety Index - BAI and Beck Depression Index - BDI), and quality of life (12-item Short Form Survey - SF12).

Results

Significant improvements were observed in FAS, mMRC, VAS, 6MWT, BAI and BDI at T1, with sustained benefits at T2 and T3 ($p < 0.05$). Previously hospitalized patients had initially lower scores in SF12 but showed progressive improvement, reaching similar outcomes to non-hospitalized patients by T3.

Conclusion

Spa-based rehabilitation appears to be a promising approach for Long Covid recovery, offering tailored interventions that address the complex needs of both hospitalized and non-hospitalized patients. These findings support the inclusion of spa facilities in future rehabilitation models for chronic conditions.

Keywords: Long Covid; balneology; aquatic therapy.

ASSOCIATION BETWEEN BECK DEPRESSION INVENTORY-II SCORE AND CONFIRMATORY ANSWERS OF THE ROLAND MORRIS DISABILITY QUESTIONNAIRE IN THE SAMPLE OF CHRONIC NON-SPECIFIC LOW BACK PAIN PATIENTS

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Background and Aims

Chronic non-specific low back pain (LBP) is a major public health problem that adversely affects the functional ability of working men and women. It is conceptualized according to the biopsychosocial model, and it is generally accepted that psychological and psychosocial factors significantly contribute to the burden and experience of chronic non-specific LBP.

Methods

In our study, we investigated the association between the severity of functional disability and depressive symptoms in the sample of the Croatian working active population with the age distribution from 35 to 65 years with chronic non-specific LBP. The study protocol was approved by the Ethics Committee Sestre milosrdnice University Hospital Center (protocol number 003-06/23-03/003). We performed a cross-sectional study at the University Department of Rheumatology, Physical Medicine, and Rehabilitation from February 2023 to April 2024. Functional disability was measured by the Roland Morris Disability Questionnaire (RMDQ), and depressive symptoms by the Beck Depression Inventory-II (BDI-II). During the routine outpatient visit, included participants completed RMDQ and BDI-II. The analysis of the relationship between the RMDQ answers and the BDI-II total score was performed using the Pearson correlation test and multivariate regression analysis (using the stepwise method).

Results

The data from the total of 203 recruited patients, divided into categories concerning disability score were analyzed. The mean age of 48.59 ± 6.48 was in the lower and the mean of 50.65 ± 7.68 in the higher disability category. Higher BDI-II total scores were associated with confirmatory answers on the 2nd (r=0.277), 3rd (r=0.270), 6th (r=0.303), 18th (r=0.310) and 22nd (r=0.455) question of the RMDQ.

Conclusion

In our sample, the confirmatory answers of RMDQ such as frequent necessity to change position, slow walk pace, need to lie down more often, less sleep and more irritability due to LBP were found to be associated with the higher total BDI-II score.

Keywords: low back pain, disability, depression

OSTEOANABOLIC TREATMENT AFTER MULTIPLE PROXIMAL HUMERAL FRACTURES AND VERTEBRAL FRACTURES IN POSTMENOPAUSAL WOMAN

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Background

Osteoporosis is a silent condition until a fracture occurs. Once vertebral and non-vertebral fracture are sustained, the risk of subsequent fracture increases. Our 69-year-old female presented with a frailty fractures cascade after several low-energy falls. She was diagnosed with diabetes mellitus and sarcopenia. Serious height decline and lumbar pain represented red flags which referred her to DEXA. Osteoanabolic treatment should be taken into consideration for high-risk patients.

Case report

Her total lumbar T-score of -1.5 SD was misrepresentative because of degenerative changes and vertebral compressive fracture. Genant II anteriorly wedge-shaped L1 was revealed. Shortly a right proximal humeral fracture (PHF) occured. Due to incompliance, she refused to be treated with antiresorptive therapy prescribed by a physiatrist. Three years later due to a low-impact fall, she sustained an acute L4 fracture and X-ray findings revealed a prior Genant III L3 fracture too. She was treated with calcium and 25(OH)D daily supplementation whom was faithfully compliant with. At this point, the opportunity to be treated by osteoanabolic was missed, because of irregular physiatrist visits due to her concern of fracture restoration. Again the same year a refracture of the left PH occurred. Three months later she fell again and sustained left multi-fragmentary PHF with screw dislocation, instability, and a gap between the plate and diaphysis. Recent DEXA showed false negative readings in the lumbar region due to vertebral compressive fractures (total T score -0.8 SD), and total hip T score -3.2 SD. Range of motion and load exercises were introduced for six months to the point when suboptimal range of motion was obtained.

Conclusion

The patient met criteria for teriparatide treatment 20μg/80μL daily subcutaneously for 2 years after prior 25(OH)D and calcium levels optimization. This instructive case report highlights the importance of earlier osteoanabolic treatment to prevent fracture cascade.

Keywords: osteoporosis, frailty fracture cascade, teriparatide

DIFFERENCE IN OPINIONS ON THE NEED FOR THE MEDITERRANEAN DIET AMONG PHYSIOTHERAPY STUDENTS BASED ON THEIR PLACE OF RESIDENCE

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Background and Aims

The Mediterranean diet (MD) is a dietary pattern characterized by the consumption of large amounts of whole grains, fruits, vegetables, legumes, seeds, nuts, and fish. It is associated with reduced disability in multiple sclerosis, reduction of symptoms in cognitive impairments, and neurovegetative diseases (3), which can indirectly lead to stronger muscles and improved mobility. The aim of this study is to examine the knowledge of physiotherapy students (PS) regarding their awareness of the MD concept, based on their place of residence, and their opinions on the usefulness of the MD in the prevention of poor posture and its impact on learning.

Methods

In this prospective longitudinal study, 79 physiotherapy students participated, of whom 48 were from the city and 31 from rural areas. All participants completed a validated questionnaire about their awareness of the MD concept, the frequency of MD consumption, and their opinions on whether MD could influence posture improvement and, consequently, facilitate learning. Depending on the normality of the distribution of the results, statistical analysis was performed using the chi-square test and the Shapiro-Wilk test. All results were set at a significance level of $p<0.05$.

Results

A total of 79% of the physiotherapy students were familiar with the MD concept, with no differences based on their place of residence ($p=0.11$). 85% consume MD at least once a week, with significantly higher consumption ($p=0.04$) and frequency ($p<0.01$) in the city. 66% of the participants believe that MD can influence body posture, and consequently, improve learning (89%), with no significant differences based on place of residence (posture $p=0.48$; learning $p=0.58$).

Conclusion

Although a relatively large number of physiotherapy students are familiar with the MD concept and believe that it can positively affect posture and thus facilitate learning, 15% still consume it less than once a week, with significantly lower consumption in rural areas.

Keywords: mediterranean diet, physiotherapy students, posture

CLINICAL MANIFESTATIONS OF RHEUMATIC POLYMIALGIA

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Background

Polymyalgia rheumatica (PMR) is a chronic inflammatory disease that affects people older than 50 years. It causes joint and muscle pain and stiffness, mainly in the shoulder and hips. The diagnosis of PMR relies mainly on symptoms and signs combined with laboratory markers of inflammation.

Case report

The aim of this study was to present the clinical manifestations of patients who were treated for PMR at the Department of Clinical Immunology, Rheumatology and Pulmology of the Sveti Duh university Hospital in the period from 2021 to 2025. Patients diagnosed with PMR according to the EULAR/ACR classification criteria from 2012 were included in the study. A retrospective study was conducted based on the data collected by reviewing the available medical documentation. Descriptive statistics methods were used in the analysis of the results. A total of 7 patients with PMR were analyzed. The average age is 76 years, where the female gender predominates (71.43%). The most common manifestation of PMR was joint pain 87.71%, stiffness 57.14%, myalgia 28.57% and fever 28.57%. Three patients (42, 28%) were diagnosed with temporal arteritis (TA), everyone manifested with headache and visual disturbances. No malignant diseases were found in these patients. All patients were treated with glucocorticoids, followed by a rapid clinical response. Relapse occurred in 2 patients (28.57%).

Conclusion

PMR is a disease that appears in older age and is characterized by a good and rapid therapeutic response to glucocorticoid treatment. Polymyalgia rheumatica (PMR) and temporal arteritis (TA) are closely related rheumatic diseases and often occur in the same patient. The most common manifestations of PMR in our patients were joint pain, stiffness, myalgia and fever. By timely recognition of the most common clinical manifestations of PMR and considering the characteristic of a quick response to the use of glucocorticoids, we prevent complications of these disease.

Keywords: rheumatic polymialgia, temporal arteritis

LOWER LIMB AMPUTATION AND LOW BACK PAIN: A 2024 RETROSPECTIVE ANALYSIS AT CENTRO DE MEDICINA DE REABILITAÇÃO DE ALCOITÃO

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Background and Aims

Despite advances in the treatment of peripheral arterial disease, lower limb amputation remains necessary for a significant number of patients. Low back pain (LBP) is one of the most common pain complaints following amputation, occurring in over half of unilateral lower limb amputees. Several mechanical factors contribute to LBP in amputees, including movement asymmetry, altered joint forces, limb length discrepancy, prosthesis type, muscle atrophy, and weakness.

Methods

A retrospective observational study was conducted, including all patients assessed in the amputee rehabilitation consultation from January to December 2024. Data collected included demographics, amputation type and level, prosthetic use, functional classification (K levels), presence of LBP, stump and phantom limb pain, and prescription of assistive devices.

Results

A total of 261 amputees were included, predominantly male (73.56%), with a mean age of 57.47 years. Lower limb amputations accounted for 90.01%, mainly unilateral transtibial amputations (39.46%). Vascular causes were responsible for 45% of cases. At evaluation, 73.56% used prostheses, with most classified as K1 (35.63 %). LBP was reported by 25% of patients, although 18% of records lacked this information. Most patients with LBP were transfemoral amputees (75.58%). Stump pain was reported by 13% and phantom limb pain by 32% of patients.

Conclusion

Although LBP is prevalent among amputees, the observed prevalence may have been underestimated due to sample size limitations and incomplete data. Even though it was not analyzed in our study, it would be important to investigate the most common causes of low back pain in our amputee patients and to determine which patient groups are more frequently affected. This is important to prevent or treat this condition, which adds further disability to the amputee and worsens their quality of life. Larger studies are needed to clarify LBP aethiology and prevalence in this population.

Keywords: Low back pain; amputation

CRICOPHARYNGEAL DYSFUNCTION AND UPPER ESOPHAGEAL SPHINCTER HYPERTONIA: CHALLENGES IN REHABILITATION AFTER TRAUMATIC BRAIN INJURY

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Background

The cricopharyngeal muscle, part of the upper esophageal sphincter (UES), relaxes during swallowing and contracts to prevent reflux. Cricopharyngeal dysfunction (CPD) disrupts this, causing food entering the laryngeal vestibule. Symptoms include dysphagia, globus sensation, and vocal changes. CPD can result from traumatic brain injury (TBI). Treatment options include speech therapy (ST), UES surgery, botulinum toxin injections, or alternative feeding if needed.

Case report

62-year-old man with history of TBI and percutaneous endoscopic gastrostomy (PEG) due to severe dysphagia, was referred to a PMR/Dysphagia appointment. Still PEG-fed, he was trialing pureed solids and honey-thickened liquids, reporting coughing, vocal changes, and choking during meals. Examination showed midline tongue protrusion, preserved oromotor function, reduced tongue strength, and symmetrical soft palate elevation with normal gag and palatal reflexes. Hyolaryngeal elevation and sustainment were reduced. Videofluoroscopic Swallow Study (VFSS) showed significant oral residue (cavity, tongue base and valleculae), with poor clearance in the oral phase; incomplete epiglottic movement, severely reduced hyolaryngeal elevation and pharyngeal residue noted throughout. Clearance was ineffective despite compensatory maneuvers, with absent UES relaxation; only minimal residual food entered the esophagus. Full PEG feeding and continued ST were recommended. Six months later, he independently discontinued PEG and transitioned to oral feeding with moistened solids and thin liquids (TL). Tongue strength improved; hyolaryngeal elevation was preserved, although sustainment remained reduced. Second VFSS showed improved epiglottic movement, hyolaryngeal elevation, and UES relaxation. Textures below IDDSI Level 3 and clearance maneuvers were recommended. He continues ST and oral feeding, requiring volume/texture adjustments and maneuvers, without complications.

Conclusion

CPD from UES hypertonia can be life-threatening. Hyolaryngeal distraction and tongue base propulsion aid compensation, but when compromised, UES opening is impaired. PMR and ST improved UES relaxation, allowing safer oral feeding. The patient awaits otorhinolaryngology intervention with botulinum toxin, as ~50% of ingested volume remains above the UES.

Keywords: Cricopharyngeal dysfunction, Rehabilitation

APPLICATION RESEARCH OF MICROWAVE THERAPY FOR SUDDEN DEAFNESS PATIENTS BASED ON 5A NURSING MODE

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Background and Aims

To explore the application effect of ear microwave therapy based on the 5A nursing model (evaluation Assess, suggestion Advice, consensus Agree, assist Assist, follow-up Range) in patients with sudden deafness.

Methods

A randomized controlled design was used to select 120 SSNHL patients admitted from January 2024 to December 2024, who were randomly divided into an intervention group (n=60) and a control group (n=60). Both groups received ear microwave therapy, with the intervention group receiving personalized intervention based on the 5A nursing model, and the control group receiving routine care. Compare the hearing recovery effect (pure tone hearing threshold measurement), treatment compliance, anxiety and depression score (HADS score), and quality of life (SF-36) between two groups of patients.

Results

The improvement of pure tone hearing threshold in the intervention group was significantly better than that in the control group after treatment ($P<0.05$), and the total effective rate of treatment (88.3%) was higher than that in the control group (71.7%) ($P<0.05$). The treatment compliance score of the intervention group was significantly higher than that of the control group ($P<0.05$), and the HADS score and SF-36 score were significantly improved compared to the control group ($P<0.05$).

Conclusion

Ear microwave therapy based on 5A nursing mode can effectively promote hearing recovery, improve treatment compliance, alleviate negative emotions, and improve quality of life in patients with sudden deafness.

Keywords: Sudden deafness, 5A nursing mode.

SOFT CHANNEL MINIMALLY INVASIVE DRAINAGE VERSUS CRANIOTOMY FOR INTRACRANIAL HEMATOMA EVACUATION: A SINGLE-CENTER COMPARATIVE STUDY

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Background and Aims

Minimally invasive soft channel techniques and conventional craniotomy represent divergent approaches for intracranial hematoma evacuation, yet comparative data on efficacy and outcomes remain limited. This study aimed to explore the complication rates and functional recovery between these two surgical strategies.

Methods

A retrospective analysis was conducted on 197 consecutive patients with hypertensive basal ganglia hemorrhage treated at our hospital between October 2022 and March 2025. Patients were divided into the soft channel drainage group (n=103, mean age 67 years, 67 men and 36 women) and craniotomy group (n=94, mean age 65 years, 56 men and 38 women). The primary endpoints included operation duration, CT-measured hematoma clearance rate, and intraoperative blood loss. Secondary outcomes encompassed Glasgow Coma Scale (GCS) improvement at 72 hours postoperative complications of infection and modified Rankin Scale (mRS) at 90-day follow-up.

Results

There were no significant differences with regard to age and sex between the two groups. The soft channel group demonstrated significantly shorter operative duration (0.38 ± 0.13h vs 1.04 ± 0.32h, P<0.001) and reduced blood loss (205 ± 38 ml vs 398 ± 57 ml, P<0.001). Hematoma clearance rates (77/103 vs 71/94, P=0.90) and GCS improvement (P=0.87) were comparable. Craniotomy patients exhibited higher rates of surgical site infection (2/103 vs 9/94, P=0.02). At 90 days, favorable functional outcomes as defined as mRS < 3 were achieved in 57.28% of soft channel patients versus 42.55% of craniotomy patients (P=0.04).

Conclusion

Soft channel drainage offers distinct advantages in procedural efficiency, reduced blood loss, lower post-operative infection rate and better functiona outcomes than craniotomy.

Keywords: Craniotomy, Functional outcomes, Intracranial hemorrhage

CASE PRESENTATION: NEUROPHYSIOLOGICAL CONFIRMATION OF INJURY TO THE PALMAR BRANCHES OF THE ULNAR NERVE CAUSED BY PERIPHERAL VENOUS CATHETER PLACEMENT

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Background

A common site for peripheral venous cannulation is the dorsal surface of the hand. Although generally considered safe, a few cases of complications involving peripheral nerve injury have been reported in the literature.

Case report

A 70-year-old man was referred for electromyography due to reported numbness of the little finger on one side. The patient's history revealed that symptoms had started six months earlier, specifically after the removal of a peripheral venous catheter that had been placed for three days on the dorsal surface of the corresponding hand. Clinical examination showed mild atrophy of the first dorsal interosseous muscle and hypoesthesia of the little finger on the affected side. The SNAP of the ulnar nerve from the little finger on the affected side showed low amplitude and prolonged latency, with normal values on the contralateral side. The CMAP of the ulnar nerve recorded from the abductor digiti minimi muscle was normal bilaterally, without significant differences in conduction velocity between the wrist–below elbow and below elbow–above elbow segments. However, the CMAP recorded from the first dorsal interosseous muscle showed an amplitude of 6.2 mV on the affected side and 9.8 mV on the contralateral side, without significant differences in latency. Electromyographic examination of the first dorsal interosseous muscle revealed no spontaneous activity, but only mildly reduced recruitment of motor units on the affected side.

Conclusion

The combination of clinical and electrophysiological findings supports the diagnosis of axonal injury to the sensory branch of the ulnar nerve and, to a lesser extent, to the motor branch, sparing the branch to the abductor digiti minimi. The most likely causes are either direct injury during catheter removal or hematoma formation leading to compression of the affected branches.

Keywords: palmar branches, ulnar, catheter, electromyographic

VULPIAN-BERNHARDT SYNDROME IDENTIFICATION THROUGH ELECTROMYOGRAPHIC STUDY: CASE REPORT

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Background

Vulpian-Bernhardt syndrome is a rare variation of amyotrophic lateral sclerosis (ALS) with a more prominent attack of the lower motor neuron. It presents with bilateral weakness and atrophy mostly proximally in the upper limbs, resulting in bilateral flail arms. Compared to classic ALS it progresses slower and swallowing difficulty and diaphragmatic weakness present later in the progression of the disease.

Case report

A 71 year old male presented to the NCS department with reported upper limb weakness that started 5 months prior. He reported previous chemotherapy treatments due to prostate cancer. He presented with bilateral arm weakness more prominent proximally (mostly torso and shoulder region), and very mild weakness in the lower limbs (ambulatory). Fasciculations were seen in the triceps muscles billatery. The deep tendon reflexes were absent in the upper limbs and no sensory deficits were found. The electoneurographic testing regarding the nerves: median, ulnar, peroneal and tibial was normal bilaterally. The electromyographic testing was conducted with a needle electrode and resulted in positive sharp waves, fibrilations and fasciculations at rest and reduced reqruitment in the supraspinatus, deltoid, triceps, bracoradilis, extensor capri radialis longus, abductor pollicis brevis, abductor digiti minimi, quadriceps, tibialis anterior, extensor digitorum brevis and gastrocnemius muscles bilaterally. More impacted were the upper limbs, and proximal muscles compared to distal in all four limbs.

Conclusion

It is necessary for a Physical and Rehabilitation Medicine physician to be aware of this rare variation of ALS, as its symmetrical presentation prominently affecting the upper limbs can pose a significant difficulty in the differential diagnosis.

Keywords: Vulpian-Bernhardt syndrome, electromyographic, fasciculations

DIAGNOSTIC APPROACH AND MANAGEMENT OF A PATIENT WITH NILATERAL PERONEAL NERVE MONONEUROPATHY ON THE BACKGROUND OF GIANT CELL ARTERITIS

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Background

Giant cell arteritis is a chronic inflammatory vasculitis affecting medium and large sized blood vessels, mostly in the cranial arteries emerging from the aortic arch and affects mostly people around 50 years of age. It can be accompanied by rare peripheral nerve damage caused by damage to the vasa nervorum causing low blood supply to the nerves. Our aim is to present a case of bilateral mononeuropathy of the peroneal nerve attributed to giant cell arteritis.

Case report

A 78 year old male presented to the outpatient clinic of our PRM department describing a 3 month history of unilateral lower limb weakness, which started affecting both lower limbs in the last two months. Five months prior a diagnosis of giant cell arteritis had been made which was being treated with high dose prednisone. During clinical examination bilateral drop foot and impaired sensation in the area innervated by the peroneal nerve was observed. Recently performed nerve conduction studies demonstrated spontaneous activity in the tibialis anterior and extensor digitorum brevis muscles bilaterally while there were not signs of polyneuropathy. The patient was prescribed active assisted physical therapy of the lower limbs, range of motion exercises at the ankles and neuromuscular electrical stimulation. The use of plastic ankle-foot orthoses was suggested to be used during ambulation as well as the use of a cane for medium and long distances.

Conclusion

In the case of this patient the bilateral paralysis of the peroneal nerve should be attributed to the preexisting condition of giant cell arteritis, a rarely reported case. Therefore, a paralysis of the peroneal nerve as well as other signs and symptoms regarding the peripheral nerve system should be regarded as a manifestation of giant cell arteritis on older persons with increased erythrocyte sedimentation rate and c reactive protein.

Keywords: Giant cell arteritis, peroneal

SEVERE PROXIMAL AXONAL INJURY OF THE MEDIAN NERVE FOLLOWING TRAUMATIC SHOULDER DISLOCATION: ELECTROMYOGRAPHIC INVESTIGATION

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Background

Acute traumatic shoulder dislocation is correlated with damage to th proximal peripheral nerves. Most common is damage to the brachial plexus, the axillary and musculocutaneous nerve. Less common is the damage the proximal parts of the median, ulnar and radial nerves.

Case report

A 72 year old woman was referred to electrodiagnostic studies department 3 months after surgical treatment for right humeral fracture with shoulder dislocation. She reported three month long severe weakness and reduced sensation in the right upper limb. Upon clinical examination the characteristic Benediction hand was observed with reduced sensation confined to the median nerve distribution. The sensory nerve action potential(SNAP) and the compound muscle action potential(CMAP) of the right ulnar nerve were normal, but the SNAP and CMAP of the right median nerve could not be recoded. Fibrilations and positive sharp waves were recorded in the flexor capri radialis, extensor pollicis longus and abductor pollicis brevis muscles, while the electromyographic testing was normal in the right deltoid, biceps, triceps, brachioradialis, extensor capri radialis longus, extensor digitorum comminis and abductor digiti minimi muscles. Taking into consideration that the median nerve derives from the branches of the median and lateral cords of the brachial plexus and in this case only muscles innervated by this nerve were denervated, the diagnosis of an isolated median nerve damage is the most likely.

Conclusion

Although the initial diagnostic approach focused on a diffuse brachial plexus injury due to the severity of weakness and the anatomical location of the injury, the detailed combination of clinical and electrophysiological findings supports the diagnosis of an acute traumatic injury to the median nerve above the elbow.

Keywords: median nerve, proximal, shoulder dislocation

ISOLATED COMPRESSION OF THE DEEP MOTOR BRANCH OF THE ULNAR NERVE IN A GUITAR PLAYER: ELECTRODIAGNOSTIC INSIGHTS

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Background

The ulnar nerve, after its insertion to Guyon's canal divides into the superficial and the deep branch. The latter is a primarily motor nerve that innervates most of the intrinsic muscles of the hand. Injury of the deep branch is rare and it can be caused by overuse of the hand, due to occupation (e.g. musicians). The aim of this case report is to highlight the electrophysiological characteristics associated with this uncommon neuropathy in a professional guitar player.

Case report

A 66-year-old right-handed female professional guitar player was referred to the KAT General Hospital Electromyography Unit (Kifissia, Greece) in July 2024. She had been playing the instrument since she was sixteen years old, three hours a day. She self-reported weakness of her left thumb and index finger during guitar playing, without tingling or numbness. Symptoms had started a year ago. Clinical examination revealed atrophy of her left 1st dorsal interosseous (DI) muscle, positive Froment sign and no sensory disorders. The sensory nerve action potential recorded from the left 5th digit was normal. The compound muscle action potential (CMAP) recorded from the left abductor digiti minimi was normal, without conduction velocity differences between the wrist-below elbow area and below elbow – above elbow area. However, the latency of the CMAP recorded from the 1st DI was 3.33 msec in the left side and 2.87 msec in the right side, while the amplitude was 5.2 mV in the left side and 8.9 mV in the right side. This amplitude difference of 40% was considered as significant. The needle electromyography examination in the left 1st DI revealed reduced recruitment with high amplitude motor units.

Conclusion

This case highlights the importance of thorough electrophysiological evaluation in patients with atypical motor symptoms of the hand. Further investigation is warranted to identify potential etiologies and guide appropriate management.

Keywords: neuropathy, electromyography, musician, ulnar

CASE PRESENTATION: IATROGENIC AXONAL INJURY OF THE SURAL NERVE

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Background

The sural nerve is a purely sensory nerve formed by branches of the common peroneal and tibial nerves. It provides cutaneous innervation to the lateral surface of the ankle and the foot extending to the base of the fifth toe. Isolated injuries to this nerve represent a rare clinical entity. Symptoms typically include paresthesia or pain along the lateral ankle and foot, which worsen with foot inversion and plantarflexion. Known causes include acute trauma (such as fractures of the base of the fifth metatarsal, talus, calcaneus, or the cuboid bone), traction injuries leading to secondary fibrosis of the nerve, tendinopathies of the Achilles or peroneal tendons, space-occupying lesions (e.g., ganglia), and gastrocnemius muscle injuries. This report presents a case of iatrogenic sural nerve injury with corresponding electromyographic findings.

Case report

A 22-year-old woman presented to the Electromyography Laboratory of the Department of Physical Medicine and Rehabilitation at GNA KAT, complaining of pain and paresthesia in the distribution of the sural nerve, ongoing for four months. According to her medical history, symptom onset followed a dermatological skin cleansing procedure near the lateral malleolus of the right ankle. Clinical examination revealed hypoesthesia in the sural nerve distribution below the right lateral malleolus, while muscle strength and tendon reflexes were normal. Sensory evoked potentials of the sural nerve were recorded bilaterally, with the recording electrode placed below and anterior to the usual recording site to examine the region distal to the injury. The results showed a significantly prolonged latency and reduced amplitude of the sensory nerve action potential on the right compared to the left. These findings are consistent with axonal damage to the right sural nerve.

Conclusion

This case highlights a rare cause of sural nerve injury and emphasizes the importance of clinical vigilance when performing medical procedures in the affected area.

Keywords: iatrogenic, sural nerve, axonal, injury

OPTIMISING ADMISSION CRITERIA FOR INPATIENT REHABILITATION: POPULATION-BASED INSIGHTS FROM MALTA

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Background and Aims

This population study aims to analyse referral patterns and admission decisions at Karin Grech Hospital, Malta's sole inpatient rehabilitation facility, while also comparing the findings to corresponding local data from 2018 to identify emerging trends. To identify key shifts in acceptance rates and patient profiles, and thereby provide evidence to enhance in-patient rehabilitation selection frameworks and guide international rehabilitation strategies.

Methods

A retrospective, population-based analysis was conducted on all in-patient rehabilitation referrals in Malta between July 1, 2022, and December 31, 2023. Referral outcomes, acceptance rates, and primary admission diagnoses were examined. Referrals from the acute care hospital, Mater Dei, to Karen Grech Rehabilitation Hospital for in-patient rehabilitation were analysed. Patients who were admitted to Mater Dei Hospital for acute care and referred to in-patient rehabilitation during July 1, 2022, and December 31, 2023, were included.

Results

407 referrals were placed. 64% (n=261) were accepted—a notable rise from 47% in 2018. Non-acceptance was recorded in 96 cases, while 50 patients were discharged or deceased before review. The average length of stay at Karen Grech Rehabilitation Hospital increased to 69.74 days from 59.1 days in 2018. Cerebrovascular accidents were the leading cause of referral (22.36%), while post-oncological rehabilitation referrals were the least common (1.22%).

Conclusion

As a population-based analysis of national in-patient rehabilitation data, this study provides insights into optimising admission criteria to enhance efficiency and outcomes. These findings may serve as a framework for rehabilitation policies worldwide. Future research should investigate barriers influencing discharge and long-term rehabilitation success.

Keywords: Rehabilitation, Length of Stay, Hospital

Interventional ultrasound in PRM

PERCUTANEOUS ULTRASOUND-GUIDED NEEDLE TENOTOMY OF THE LATERAL EPICONDYLITIS WITH HUMERORADIAL JOINT INFILTRATION OF PLATELET-RICH PLASMA

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Background

The concurrent diagnoses of humeroradial plica syndrome and chronic lateral epicondylitis present unique challenges for treatment. Both conditions can result in similar lateral elbow pain, making accurate diagnosis arduous. It is crucial to evaluate the possible presence of a synovial plica in individuals with chronic lateral epicondylitis, as this may complicate clinical presentations. In this complex clinical scenario, ultrasound emerges as a crucial and reliable tool in both diagnosis and management.

Case report

A case series of 5 patients with chronic lateral epicondylitis who did not experience symptom alleviation with conservative management for 3 months was referred to our department for ultrasound examination. The clinical presentation suggested the possible presence of simultaneous humeroradial plica syndrome and chronic lateral epicondylitis. Ultrasound confirmed both diagnoses, and patients agreed to undergo percutaneous ultrasound-guided tenotomy of the common extensor tendon with PRP application. PRP was applied to the sites of the tenotomy to promote healing. Simultaneous humeroradial joint infiltration with PRP was also performed. Individual kinesiotherapy was then initiated 2 weeks post-procedure, focusing mainly on the elbow range of motion with progressive mechanical loading of the common extensor tendon. The USG reevaluation was performed 2 and 6 weeks after the procedure. Significant improvement in pain, elbow range of motion, grip strength, and overall satisfaction with elbow and wrist function was recorded after 6 weeks post-procedurally without symptom recurrence.

Conclusion

The interplay between humeroradial plica syndrome and chronic lateral epicondylitis necessitates a comprehensive approach to diagnosis and management. This novel dual-target treatment, which involves the use of PUNT and humeroradial joint infiltration with PRP, is showing significant promise in the management of chronic lateral elbow pain. We propose considering this therapeutic modality as a bridge therapy before referring patients to elbow arthroscopy, offering a new ray of hope in the treatment of these conditions.

Keywords: Humeroradial plica, lateral elbow pain

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UPUTE AUTORIMA

CILJ I SVRHA

Fizikalna i rehabilitacijska medicina službeni je recenzirani časopis Hrvatskog društva za fizikalnu i rehabilitacijsku medicinu Hrvatskoga liječničkog zbora. Časopis objavljuje pregledne članke, originalne radove, preliminarna izvješća i prikaze slučajeva koji izvještavaju o važnim trendovima u fizikalnoj medicini i rehabilitaciji, interdisciplinarnim područjima rehabilitacije i njihovu razvoju te o novostima u kliničkom i nekliničkom djelokrugu rada. Čitatelju pruža bitne informacije u svezi s terapijskom primjenom fizikalnih i farmakoloških čimbenika u pružanju sveobuhvatne skrbi osobama s oštećenjima i kroničnim bolestima. Također, u časopisu se periodično objavljuju dodatci sa sažetcima ili cjelovitim tekstom izloženim na kongresu ili simpoziju, te informacije o Hrvatskom društvu za fizikalnu i rehabilitacijsku medicinu, njihovim članovima u Hrvatskoj i u inozemstvu, kao i aktivnostima Europskog društva za fizikalnu i rehabilitacijsku medicinu, te Sekcije i Odbora za Fizikalnu i rehabilitacijsku medicinu Europske unije medicinskih specijalista. Časopis je dio europske mreže časopisa iz fizikalne i rehabilitacijske medicine.

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Izložite rezultate logičnim slijedom u tekstu, tablicama i ilustracijama. Treba se služiti SI jedinicama. Treba iscrpno opisati statističke metode da bi se educiranom čitatelju koji ima pristup izvornim podatcima dala mogućnost da potvrdi navedene rezultate. Gdje god je to moguće, zaključke treba kvantificirati i prezentirati odgovarajućim indikatorima pogreške ili odstupanja od mjerenja.

Rezultati se izlažu logičnim slijedom u tekstu, tablicama i ilustracijama. U tekstu se ne ponavljaju svi podatci iz tablica ili ilustracija već se naglašavaju ili sažimaju samo bitna opažanja.

Rasprava

Naglasite nove i bitne aspekte studije, te zaključke koji proistječu iz nje. Ne ponavljajte detaljne podatke ni bilo koje druge materijale koji su navedeni u uvodnom ili u dijelu s rezultatima. U dio za raspravu uključite važnost dobivenih rezultata i njihova ograničenja, uključujući i implikacije vezane uz buduća istraživanja, ali izbjegavajte izjave i zaključke koji nisu potpuno potvrđeni dobivenim podatcima. Povežite zaključke iz svoje studije s ostalim relevantnim studijama. Kad je potrebno, navedite nove hipoteze i jasno naglasite da su nove.

Tablice

Naslovi tablica i tekstualni dio tablica moraju biti dvojezični, na hrvatskom i engleskom jeziku. Tablice se pišu na posebnoj stranici. Ne smiju se slati kao fotografije. Svaka tablica mora imati naslov i redni broj prema redoslijedu pojavljivanja u tekstu. Tablica mora biti pregledna i jednostavna. Legende tablica trebaju biti napisane ispod tablice, uz oznaku u tablici u superskriptu. Tablice ne bi trebale ponavljati rezultate koji su prezentirani bilo gdje drugdje u radu (npr. u slici). Tablice preuzete iz drugih izvora treba popratiti dopuštenjem za objavu njihovih izdavača/autora.

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Opisi slika i tekstualni dio slike moraju biti dvojezični, na hrvatskom i engleskom jeziku.

Slike trebaju biti profesionalno nacrtane ili snimljene. Pazite da slova, brojevi i simboli budu čitljivi i u smanjenom obliku u kojem će se objaviti. Svaka fotografija treba imati broj prema redoslijedu pojavljivanja u tekstu, ime autora i označenu gornju stranu. Fotografije osoba mogu se objavljivati samo uz pisano dopuštenje osobe na fotografiji ili moraju biti neprepoznatljive. Ako se dostavljaju u elektroničkom obliku, slike/ilustracije moraju biti u formatu TIFF ili JPEG visoke kvalitete, najmanje širine 1500 piksela. Slike/ilustracije u ostalim formatima mogu biti prihvaćene samo uz prethodni dogovor s uredništvom. Uredništvo pridržava pravo ne objaviti slike/ilustracije koje ne zadovoljavaju ove uvjete.

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Služite se samo standardnim kraticama. Puni pojam za koji se koristi kratica treba biti naveden pri prvom korištenju kratice u tekstu, osim ako se ne radi o standardnim kraticama mjernih jedinica. Izbjegavajte korištenje kratica u naslovu rada.

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References are listed by number, according to the order of appearance in the text. References in the text, tables, and legends should be listed in parentheses using the alphanumeric system. References should be listed using Index Medicus. Journal titles should be abbreviated in the manner customary for Index Medicus (http://www.nlm.nih.gov). When citing accepted but not yet published works, they should be listed as "in press." Authors should obtain written permission to cite such work, along with confirmation that the work has been accepted for publication.

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