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Management of Physiotherapy in Tennis Elbow

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ABSTRACT

Background: Tennis elbow or lateral epicondylitis is one of the most common types of inflammation of the tendons and can cause a decrease in the function of the affected limb, an overuse injury to the wrist extensor that undergoes degenerative changes such as tendinosis and micro-tearing (small tears), on fibrous tissue. The prevalence of tennis elbow is about 1-3% in the general population and can increase to 23% among workers. The highest prevalence rate is estimated to increase by about 1.3% at 45-54 years old. This study aims to summarize secondary data related to interventions that can be applied to tennis elbow cases.

Methods: The research method is a literature study using secondary data in journals related to physiotherapy management in tennis elbow cases obtained through Google Scholar, Science Direct, and PubMed.

Results: Several studies have proven that various interventions can be applied to overcome the problems experienced by tennis elbow patients and provide good results in overcoming pain and gripping muscle weakness.

Conclusion: Patients diagnosed with tennis elbow may experience pain and muscle weakness in gripping. Several interventions include Cyriax, progressive resistance exercise, eccentric and concentric exercise, ultrasound, and Kinesio tape. The interventions can have a good effect in overcoming the complaints experienced by tennis elbow patients.

Keywords: lateral epicondylitis, tennis elbow, intervention.

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Introduction

Tennis elbow or lateral epicondylitis is one of the most common types of inflammation of the tendons and can cause the decreased function of the affected limb. It is an overuse injury to the wrist extensors that undergo degenerative changes such as tendinosis and micro-tearing (small tears) in fibrous tissue. The prevalence of tennis elbow is around 1-3% in the general population and can increase to 23% among workers. The highest prevalence value is estimated to increase by about 1.3% at 45-54 years old.[1,2]

Tennis elbow that occurs in women usually has a higher degree of weakness, and the healing process takes longer than in men. The problem that often arises in cases of tennis elbow is the occurrence of functional impairment or limitations in a job, sport, and daily activities. This is caused by the presence of pain resulting from the inflammatory process that occurs in the lateral epicondyle.[3] Clinically, tennis elbow may present acutely in the form of tendonitis but more frequently presents in a chronic fashion where degenerative tendon changes, disorganized collagen bundles, scarring, and hypervascularity have been identified. One of the risk factors that will occur is the presence of load-related (biomechanical) and systemic tendinopathy. Systemic risk factors include hypercholesterolemia, diabetes, hormonal imbalance, age, and genetics. In general, systemic risk factors are thought to reduce the tendon's capacity to manage loads, so routine activities of daily living may be sufficient to trigger a pathological cycle.[2]

In study specimens collected during surgery, a transient inflammatory response in patients with new-onset lateral epicondylitis occurred (stage 1) in contrast to the chronic symptomatic stage with angiofibroblastic hyperplasia characterized by high cell counts, vascular hyperplasia, and destruction of collagen fibers. (stage 2). Thus, tendinosis is a more appropriate term than tendinitis. The lesion may progress to a partial or complete tear of the tendon (stage 3) and then to fibrosis and calcification (stage 4).[4]

Pain around the lateral elbow is known by various names, periostitis, extensor carpi radialis brevis (ECRB) tendinosis, epicondylalgia, tennis elbow, and lateral epicondylitis. The main goals in treating lateral epicondylitis

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are relief of pain, inflammation, microbleeds, rehabilitation, and prevention of recurrence.[5]

Methods

The research method used was a literature study using secondary data from journals related to physiotherapy management in tennis elbow cases obtained through Google Scholar, Science Direct, and PubMed. The literature was searched with the keywords 'tennis elbow and lateral epicondylitis', 'exercise for tennis elbow', 'tennis elbow and laser therapy', 'tennis elbow and ultrasound', and 'tennis elbow and Kinesio tape'. The inclusion criteria: 1) published in English between 2017-2020, 2) reported about tennis elbow and lateral epicondylitis, 3) reported about exercise or home-based exercise for tennis elbow. The exclusion criteria: 1) the result of the study is not reported, and 2) exercises for tennis elbow are not reported.

Results

Based on the literature study, we found five journals describing physiotherapy management in tennis elbow. Hamza Shaheen et al. (2019) evaluated whether Kinesio tape and therapeutic ultrasound affect tennis elbow-related discomfort and hand grip strength. The patients suffering from lateral epicondylitis were arranged into two groups, Group A (ultrasound and exercises group) and Group B (Kinesio tape and exercises group), and the dynamometer was used to measure wrist joint strength, and visual analog scale (VAS) was used to evaluate the pain. Both groups demonstrated a reduction in pain and increased strength between the pre-and post-test evaluations. Additionally, the Kinesio tape exceeded ultrasound in strength and pain alleviation.[6]

Fatih Bagcier et al. (2020) studied the effectiveness of dry needling (DN) and extracorporeal shock wave treatment (ESWT) in treating plantar fasciitis pain and function, involving 40 patients assigned to 2 groups. Pre-and post-assessments were performed by measuring the VAS for pain, pressure algometer for pressure pain threshold, Foot Function Index (FFI) for functionality, maximum painless standing time, and maximum painless walking distance. The results showed significant improvements in VAS, pressure pain threshold, maximum painless standing time, maximum painless walking distance, and FFI's pain, disability, and activity limitation subscales scores ($p \leq 0.001$) in both groups. The ESWT and DN combination therapy were superior in intergroup comparison, as shown in VAS scores, maximum painless standing time ($p = 0.002$), maximum painless walking distance ($p \leq 0.001$), and FFI pain subscale scores ($p = 0.034$).[7]

A study by Sweta Upadhyay et al. (2017) assessed the effects of a progressive strengthening exercise program in comparison to the effects of standard treatment (such as stretching exercises, deep transverse friction massage, and local pulsed ultrasound) on pain relief, functional disability, and maximum isometric grip strength in lateral epicondylitis patients. In both groups, there was a significant improvement in VAS, maximal isometric grip strength, and the patient-rated tennis elbow evaluation (PRTEE) questionnaire. The combination of strengthening exercises and conventional therapy showed significant improvement in VAS ($p = 0.0003$), maximal isometric grip strength ($p = 0.0131$), and PRTEE questionnaire ($p = 0.0025$), suggesting that progressive strengthening exercises combined with conventional physiotherapy are more effective than conventional physical therapy alone in relieving pain, improving functional disability, and increasing pain-free maximal isometric grip strength.[8]

Joseph M. Day (2019) discussed a comprehensive rehabilitation strategy for people suffering from lateral elbow tendinopathy using the dual rehabilitation program (DRP) based on the combination of a three-phase scapula and forearm (elbow or wrist) rehabilitation programs. The DRP program employs therapeutic exercise, focusing on a phased approach to scapular and forearm strengthening and local manual therapy techniques. In a multi-center randomized controlled trial (RCT), this comprehensive rehabilitation program is currently being compared to a standard localized treatment approach. The program is a flexible model that can provide effective and comprehensive treatment for patients with LET based on individual presentations and responses to treatment.[9]

Rena Fillias Afinii (2018) investigated the efficacy of the Graston technique and eccentric strengthening exercises in cases of right-side tennis elbow. The Graston technique improves blood circulation in the injured area, reducing waste products of the body's metabolism that can cause muscle spasms and increasing the range of motion (ROM) of the joints of the affected limb. Muscle strength is increased by performing eccentric strengthening exercises. The study revealed that the Graston technique and eccentric strengthening exercises could reduce pain, increase ROM, and strengthen arm and wrist muscles.[10]

Discussion

Pathological changes in the tendons are referred to as fibroangiomatous hyperplasia, a term that defines poor quality, slow healing, and painful tissue. Relapse may occur if the patient returns to the activity that caused the injury before the inflammatory response has fully resolved. The patient has not acquired adequate muscle strength and endurance. Physiotherapy is the first line of treatment for tennis elbow. Stretching exercises are one of the most commonly used. Mobilization involving joint motion, Mill manipulation, or regional mobilization may be beneficial. Eccentric epicondylar muscle strengthening exercises. DTF massage is a component of most physiotherapy programs for lateral epicondylitis.[1,2]

Progressive Resistance Exercise (PRE) is a method of increasing the ability of muscles to produce strength. In many settings, PRE has been shown to increase the ability to generate strength, with moderate to large effect sizes that can translate into improving the ability to perform activities of daily living. The principles of progressive resistance training (PRE) to increase strength production are (1) performing a small number of repetitions until exhaustion, (2) providing

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adequate rest between exercises for recovery, and (3) increasing resistance as an ability to generate increased power. These principles are detailed in the American College of Sports Medicine (ACSM) guidelines. Suppose a lack of muscle strength generation contributes to the inability to perform daily activities. In that case, this provides a reason for physical therapists to apply the principles of PRE when designing treatment programs.[1,11]

Ultrasound therapy is used in a variety of musculoskeletal disorders. It converts electrical energy into acoustic waves, then converts to heat and passes through tissues of varying resistance. This can reduce edema, relieve pain, and accelerate tissue repair. Analgesia may result from increased capillary permeability and tissue metabolism, increased fibrous tissue extensibility, decreased muscle spasm, and increased pain threshold by thermal mechanisms. EFA has been recommended for acute pain and inflammation. It transforms cellular tissue, increases membrane permeability, activates macrophage and mast cell degranulation, promotes fibroblast proliferation, and influences wound contraction and protein synthesis by influencing acoustic currents and cavitation.[12–16]

Progressive eccentric and concentric resistance exercises result in the formation of a dense collagenous scar and thereby relieve the pain experienced by the patient. The increased muscle tension produced by eccentric contraction allows the construction of new fibrous tissue in the musculotendinous unit, making it more resilient. Effects of eccentric training contractions on tendonitis include lengthening the tendon-muscle unit, which can produce less strain during elbow joint movement, or loading the muscle-tendon unit, which may increase the tensile strength of the tendon and lead to muscle belly hypertrophy. Eccentric contraction exercises and concentric contraction exercises improve muscle strength. Only exercise of eccentric contractions generates enough tension necessary to form fibrous tissue in musculotendinous structures, allowing adaptation to increased tension. These powerful contractions often result in pain and potential damage to the muscle itself. The addition of concentric contraction exercises can reduce muscle tension during the training regimen, thereby minimizing muscle soreness and tissue damage experienced by patients.[17–19]

Kinesio taping (KT) has been widely used in the conservative treatment of pain and disability associated with musculoskeletal injuries. KT lifts the skin and relieves mechanoreceptor pressure by generating skin tension. It can also improve blood or lymph circulation by raising the skin and reducing pain intensity. KT improves proprioception through increased stimulation of skin mechanoreceptors and causes pain relief.[20] KT decreases pain intensity through proprioceptive theory, providing a mechanism for dermal proprioceptor stimulation during upper extremity activity. Stimulated proprioception increases patient ergonomic awareness and compliance and therefore reduces pain. KT offers pain relief by resting overactive muscles in tendinopathy, reducing excessive stress on tendons and joints, regulating joint biomechanics, and acting as a mechanoreceptor.[21,22]

Conclusion

Patients with a diagnosis of tennis elbow may experience pain and muscle weakness in gripping. Several interventions can be given to overcome the problems encountered, such as Cyriax, progressive resistance exercise, eccentric and concentric Exercise, ultrasound, eccentric exercise, concentric exercise, and Kinesio tape. Based on the literature review results, it can be concluded that these interventions can positively affect overcoming complaints experienced by tennis elbow patients.

Conflict of interest

No conflict of interest in this study.

Funding

No funding for this study.

Ethical consideration

This review of the literature used data from publicly accessible records and did not require institutional ethics approval.

Author contributions

While NLPMA developed the study concept, wrote the article, and did the literature review, NMR revised the paper and searched the literature.

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