

Physiotherapy Interventions in Lateral Epicondylitis

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ABSTRACT

Background: Lateral epicondylitis, commonly called “tennis elbow”, is an overuse injury to the wrist extensor that causes inflammation resulting in degenerative changes such as tendinosis and micro-teared (small tears) in the fibrous tissue. The risk of lateral epicondylitis is highest in workers who lift heavy weights and workers whose work requires repetitive movements of the wrist extensors. Degenerative factors are also one of the factors that can affect the development of lateral epicondylitis. From Magnetic Resonance Imaging (MRI) scans of 369 patients without clinical complaints of lateral epicondylitis, MRI signs consistent with lateral epicondylitis were seen in 5.7% of individuals in the 18-30 years age group and 16% in individuals over 70 years of age.

Objective: The purpose of this study is to summarize secondary data related to interventions that can be applied to cases of lateral epicondylitis.

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

Results: Several studies have shown various interventions can be applied to overcome the problems experienced by patients with lateral epicondylitis and provide good results in overcoming pain and gripping muscle weakness.

Conclusion: Several interventions can be given to overcome the problems experienced by lateral epicondylitis patients, such as Cyriax, low-level laser therapy, mulligan mobilization with movement, ultrasound, eccentric exercise, concentric exercise, and kinesiотaping. Based on the literature review results, it can be concluded that these interventions can have a good effect in overcoming complaints experienced by patients with lateral epicondylitis.

Key words: lateral epicondylitis, tennis elbow, cyriax, low level laser therapy, mulligan mobilisation with movement, ultrasound, eccentric exercise, concentric exercise, kinesiотaping.

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Background

Lateral epicondylitis, commonly called “tennis elbow”, is an overuse injury to the wrist extensor that causes inflammation resulting in degenerative changes such as tendinosis and micro-tearing (small tears) in fibrous tissue.¹ Lateral epicondylitis is determined to have a relatively constant annual incidence of around 15.1 cases per 10.000 patients in the United States. The general population prevalence of lateral epicondylitis is reported to be 1% to 3%.²

The risk of lateral epicondylitis is highest in workers who lift heavy weights and workers whose work requires repetitive movements of the wrist extensors.^{2,3} Degenerative factors are also one of the factors that can influence the development of lateral epicondylitis.³ In the study by Van Leeuwen et al. of Magnetic Resonance Imaging (MRI) scans of 369 patients without clinical complaints of lateral

epicondylitis, MRI signs consistent with lateral epicondylitis were seen in 5.7% of individuals in the 18-30 year age group and 16% in individuals over 70 years of age.^{3,4} In specimens collected during surgery, transient inflammatory response in a patient with new-onset lateral epicondylitis occurs (stage 1), which contrasts the chronic symptomatic stage with angiofibroblastic hyperplasia characterized by an increased cell count, vascular hyperplasia, and collagen fibre damage (stage 2). Thus, tendinosis may be a more appropriate term than tendinitis. The lesion may progress to a partial or complete tendon tear (stage 3) and then to fibrosis and calcification (stage 4).³

Pain around the lateral elbow is known by various names, periostitis, extensor carpi radialis brevis (ECRB) tendinosis, epicondylgia, tennis elbow and lateral epicondylitis.¹ The main goals in the management of lateral

epicondylitis are pain relief, inflammation and microbleeds, rehabilitation, and prevention of recurrence.^{1,3}

Methods

The research method used is a literature study using secondary data in journals related to the topic of physiotherapy management in cases of lateral epicondylitis obtained through Google Scholar, Science Direct, and PubMed.

Results

The search results show five studies regarding intervention in lateral epicondylitis. Sharma et al. examined the effects of Cyriax physiotherapy versus Cyriax and low-level Laser Therapy on pain and grip strength in lateral epicondylitis.¹ Cyriax is a technique that combines deep transverse friction (DTF) with manipulation. Low-level laser therapy (LLLT) was applied using The Mid 1500 IRRADIA laser machine, with wavelength: 904 nm, mean power output: 12 mW, peak value: 8.3 W; frequency: 70 Hz (pulse train). The intervention was carried out 3 sessions/week for 3 weeks.

Ahmed et al. compared the effectiveness of Mulligan mobilization versus the Cyriax approach in the management of patients with subacute lateral epicondylitis.⁶ In the Cyriax approach, a combination of DTF was performed on lateral elbow tendon insertions, and Mill's manipulation was performed on the elbow joint with the wrist flexed and the forearm in pronation. Each session lasted 20-30 minutes. The Mulligan Mobilization With Movement 4 (MMWM) intervention was initiated in a sitting position. Firstly, a lateral glide at the elbow joint was performed, and the therapist instructed the patient to make a fist and open the fist. The therapist repeated the procedure 36 times in one session. After 12 repetitions, a short rest period was given. Each session lasted 35-45 minutes. Both interventions were performed 3 times/week for 4 weeks.

Ünver et al. compared the efficacy of continuous and pulsed ultrasound therapies in patients with lateral epicondylitis.⁷ Continuous Ultrasound (CUS) used a frequency of 1.5 MHz and an intensity of 1 W/cm² applied with a 5 cm diameter applicator. Pulsed Ultrasound (PUS) used a frequency of 1.5 MHz and an intensity of 1 W/cm² with a pulsed mode duty cycle of 1:4. Ultrasound therapies were performed for 5 minutes per session, 1 session/day, 5 days/week for 2 weeks.

The Misquitta and Prabhakar study examined the effect of eccentric training versus concentric training along with therapeutic ultrasound therapy for pain and functioning in subjects with lateral epicondylitis.¹¹ In ultrasound intervention, the patient's position was sitting with a pillow placed under the arm. The ultrasound probe was placed in the lateral area of the epicondyle. Parameters used: mode = pulsed output, frequency = 1 MHz, intensity = 0.8-1.5 watt/cm², duration = 6 minutes.

The eccentric exercise was performed in bed with elbows supported on the base fully extended, arms in pronation, wrists in extended position (as high as possible),

and hands hanging off the edge of the bed. In this position, the subject bent their wrist slowly until full flexion was achieved and then returned to the starting position. The patient performed three sets of 10 repetitions per session, with at least a 1-minute rest interval between each set. As for the concentric exercise, the subject sat on a chair next to a table with an edge or overhang. The subjects bent their elbows to 90°, and palms should face the floor. Slowly lower the weight, then slowly lift it up. Subjects extended their wrists to full extension, and then returned to the starting position. The exercise was performed in three sets of 10 repetitions in each training session, with at least a 1-minute rest interval between each set.

Tezel et al. tested the effects of kinesiotaping on wrist extensor strength using an isokinetic device in patients with chronic lateral epicondylitis.¹³ Kinesiotaping applied in a long Y shape to the wrist extensor from insertion to origin after stretching the muscle with 15-25% tension. With the fascia correction technique, 25-35% tension is applied by short Y-shaped kinesiotaping to support the fascia.

Discussions

The pathological changes in the tendons are referred to as fibroangiomatous hyperplasia, a term that defines poor quality, slow healing, and painful tissue. Relapse is possible if the patient returns to the activity that caused the injury before the inflammatory response has fully improved and the patient has not gained adequate muscle strength and endurance.⁵ Physiotherapy is the first-line treatment for lateral epicondylitis. Stretching exercises are one of the most commonly used. Mobilization involving joint movement, Mill's 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

LLLT is administered at an optimal dose of 904 nm and a wavelength of 632 nm directly into lateral elbow tendon insertions, resulting in short-term pain relief and reduced disability in the lateral elbow tendon.¹ DTF combined with Mill's manipulation in Cyriax is effective for pain associated with lateral epicondylitis. The reduction in pain is actually due to massage, which results in vasodilation and increases blood flow to cells, which not only causes the elimination of chemical irritants but also increases the transport of endogenous opioids to the affected area.^{1,6} Meanwhile, the MMWM technique aims to provide mobilization during joint movement. MMWM differs from other types of mobilization techniques in that traditional mobilization techniques such as the Maitland mobilization are applied in a static position, while MMWM is performed while the joint is movable. It helps in correcting joint biomechanics in functional movement.

Ultrasound therapy is used in various musculoskeletal disorders. It converts electrical energy into the form of acoustic waves, which are then converted into heat and then pass through tissues of various resistances.⁷ It can reduce oedema, relieve pain, and accelerate tissue

repair.^{7,8} PUS produces a non-thermal effect, while CUS produces a thermal effect.⁸ Analgesia may result from increased capillary permeability and tissue metabolism, increased fibrous tissue extensibility, decreased muscle spasm and increased pain threshold by thermal mechanisms.⁹ PUS has been recommended for acute pain and inflammation. It alters cellular tissue, increases membrane permeability, activates degranulation of macrophages and mast cells, increases fibroblast proliferation, and affects wound contraction and protein synthesis by influencing acoustic and cavitation currents.¹⁰

Progressive eccentric and concentric resistance exercises result in the formation of dense collagen scars and thereby relieve the pain experienced by the patient. The increased muscle tension produced by eccentric contraction allows the formation of new fibrous tissue in the musculotendinous unit, which makes it more resistant.¹¹ Effects of eccentric contraction exercise on tendonitis include lengthening of the muscle-tendon unit, which can result in less tension during elbow joint movement, or loading the muscle-tendon unit, which may increase the tensile strength of the tendon and cause muscle belly hypertrophy.¹² Eccentric contraction exercises and concentric contraction exercises increase muscle strength. However, the eccentric contraction produces sufficient tension to form the fibrous tissue of the musculotendinous structure, allowing adaptation to increased tension. These strong 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.¹²

Kinesiotaping (KT) has been widely used in the conservative treatment of pain and disability associated with musculoskeletal injuries. KT elevates the skin and reduces mechanoreceptor pressure by producing skin tension.¹³ It can also improve blood or lymph circulation because it lifts the skin and reduces pain intensity.¹⁴ KT enhances proprioception through increased excitability of skin mechanoreceptors and causes pain relief.¹⁵ KT decreases pain intensity through proprioceptive theory, providing a mechanism for stimulating skin proprioceptors during upper extremity activity. Stimulated proprioception increases ergonomic patient awareness and compliance and therefore reduces pain.¹³ The use of KT provides pain relief by resting overactive muscles in tendinopathy, reducing excessive stress on tendons and joints, regulating joint biomechanics, and activation of mechanoreceptors.¹⁶

Conclusion

Patients with lateral epicondylitis may experience gripping muscle pain and weakness. Several interventions can be given to treat symptoms, such as Cyriax, low-level laser therapy, mulligan mobilization with movement, ultrasound, eccentric exercise, concentric exercise, kinesiotaping. Based on the literature review results, it can be concluded that

these interventions can have a good effect in overcoming complaints experienced by patients with lateral epicondylitis.

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