A Review of Therapeutic Management for Lateral Epicondylitis

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ABSTRACT

This paper examines studies that assess different therapeutic interventions for treating lateral epicondylitis. Various medical treatments, including drug therapies, surgical interventions and physical therapies are examined and evaluated based on the available evidence supporting their effectiveness. Various treatments have been studied for the management of lateral epicondylitis, but no specific therapy has been identified as the definitive best option with clearly superior long-term effectiveness. The existing research has some methodological flaws despite its commendable studies. Some limitations observed in the study are the absence of non-treatment and placebo controls, lack of objective outcome measures, inadequate follow-up and insufficient subject numbers. The paper addresses the constraints of existing research and proposes suggestions for future investigations. The paper discusses the need for further research on various therapies and encourages researchers to evaluate its effectiveness to determine the best treatment method for lateral epicondylitis.

Keywords: Lateral epicondylitis, Therapy, Exercise, Management, Drug, Physical.

INTRODUCTION

In 1873, German physician F. Runge was the first to define lateral epicondylitis (LE). Henry Morris, who was writing in the Lancet at the time, referred to the condition Arm" as "Lawn Tennis in 1882. Subsequently, this pathological condition characterised by pain in the lateral aspect of the elbow has been given a variety of names, including lateral epicondylitis, tennis elbow, lateral epicondylosis, tendinosis, enthesiopathy of the lateral epicondyle of the humerus, lateral epicondylalgia, and angiofibroblastic hyperplasia. (Cutts et al. 2020; Day et al. 2015; Fatyga et al. 2020) Previously, it was believed that lateral epicondylitis (LE) was caused by a transient inflammatory response at the origin of the wrist extensor muscles. The subsequent histological examination of the wrist extensor tendons revealed the absence of inflammatory cells and the presence of degeneration. It is hypothesised that lateral

epicondylitis is caused by an inadequate healing response to repetitive micro trauma and diminished blood supply at the tendon's origin. The lateral radial nerve and collateral ligament may be the underlying cause of lateral epicondylar discomfort, which is commonly attributed to the activation of typical wrist extensors. Due to an ambiguous path anatomical cause, the term lateral epicondylitis is used in the current investigation (Day et al. 2015; Lai et al. 2018). LE is a common condition characterised by arm discomfort that is frequently related to work or athletic activities (Bisset and Vicenzino, 2015). The incidence of lateral epicondylitis is seven higher than that of times medial epicondylitis, also known as golfer's elbow. It is typically described as a condition characterised by discomfort in the region of the lateral epicondyle (Bisset and Vicenzino, 2015). LE can manifest either as a degenerative condition or an inadequate tendon healing response (Coombes, Bisset, and Vicenzino, 2015). Lateral epicondylitis (LE) is a distressing medical condition characterised by injury to the tendinous tissue at the lateral epicondyle of the humerus, resulting in a loss of limb function. Consequently, this condition has a significant impact on the patient's social and intimate life (Waseem et al., 2012). The dominant arm is the upper extremity that is affected. most frequently The peak incidence of LE occurs between 30 and 60 years of age (Bisset and Vicenzino, 2015). The duration and severity of this musculoskeletal disorder are greater in females (Coombes, Bisset, and Vicenzino 2015; Waugh et al. 2004). It has a high rate of recurrence, highlighting the importance of rehabilitation for patients diagnosed with this condition (Day et al., 2015). The most prevalent form of LE is the bending back motion in which the wrist is extended against resistance due to overuse or repetitive strain. Frequently, the extensor carpi radialis brevis, one of the extensor tendons originating near the lateral epicondyle, has been identified as the primary structure implicated in lateral epicondylitis. It is susceptible to shearing forces during almost all arm movements due to its atypical anatomical structure. There is evidence, according to Briggs' biomechanical research, that tennis elbow is primarily caused by mechanical factors. (Cutts et al. 2020) Tennis, badminton, and squash are frequently linked to an increased incidence of lateral epicondylitis (LE). Nonetheless, extensive wrist use during daily activities is a common factor in the development of LE. In the realm of sports, the use of an improper backhand technique in tennis, an insufficiently sized racket grip, excessively taut strings, and participation in the sport with damp and heavy balls are all potential risk factors for the development of lateral epicondylitis (LE). In the context of repetitive activities, such as using a screwdriver, painting, or typing, these actions also increase the risk of developing LE (Waseem et al., 2012). The primary

concerns of patients diagnosed with LE are pain and a decline in functional abilities (L. M. Bisset and Vicenzino 2015; Coombes, Bisset, and Vicenzino 2015).

Numerous treatment modalities for the management of lateral epicondylitis have been documented. Since the body of data supporting therapeutic treatment is always expanding, it is crucial to perform a comprehensive review of the current literature. This review aims to synthesise and appraise the current evidence on treatment therapies for lateral epicondylitis, with a focus on Mobilisation using movement and exercise-based strategies.

Therapeutic Management 1. Drug Therapy

Drug therapies are a prominent form of therapeutic interventions utilised in the conservative management of LE conditions. The treatments that are currently accessible encompass corticosteroid and local anaesthetic injections, oral non-steroidal anti-inflammatory drugs (NSAIDs), and transdermal NSAIDs.

In their study, Smidt et al. (2002) examined the effectiveness of physiotherapy, a waitapproach and corticosteroid and-see injections in managing lateral epicondylitis. In a recent study involving 185 participants, researchers investigated the efficacy of different treatment options for individuals diagnosed with lateral epicondylitis. The findings of this study suggest that corticosteroid injections emerge as the most effective short-term treatment option for managing this condition. The existing literature demonstrates significant and consistent disparities between the use of physiotherapy and a wait and sees approach. These disparities are clinically significant evident various and across outcome measures.

In their study, Tonks et al. (2007) conducted a comprehensive investigation using highdefinition ultrasound (HHD) to evaluate the effectiveness of steroid injection therapy as a conservative treatment option for lateral epicondylitis (LE). In his prospective randomised controlled trial (RCT), the author's findings revealed that steroid injection therapy exhibited a higher level of effectiveness when employed as the primary tennis treatment for elbow. The implemented intervention yielded a notable enhancement in grip strength and effectively expedited the resumption of daily activities. (2020)conducted Fatyga et al. a comprehensive review that examined the comparative efficacy of different pharmacological interventions. The interventions under investigation included a combination of steroid injections with lidocaine, non-steroidal anti-inflammatory drugs, hyaluronic acid, platelet-rich plasma, collagen, and botulinum toxin. Furthermore, the authors examined the various indications for surgical interventions in managing lateral epicondylitis. The authors' analysis highlights the lack of consensus in the medical community regarding the optimal treatment approach for lateral epicondylitis (LE). They emphasise the existence of numerous treatment options available for this condition, but also note the prevailing uncertainty surrounding their efficacy. This finding underscores the absence of a universally accepted treatment strategy for LE.

Lai et al. (2018) conducted a comprehensive review article on chronic lateral epicondylitis (LE). The study explored different conservative treatment options, including NSAIDs, physiotherapy, shockwave therapy, corticosteroid injections, and biologics. Additionally, the review examined surgical various interventions arthroscopic, such as percutaneous and open techniques for managing LE. The article presented a comprehensive review of the existing literature, examining the available evidence that supports the use of these treatment approaches in patients who have not responded to conventional therapies. The literature review reveals that the use of NSAIDs, physiotherapy, shockwave therapy, and bracing in the treatment of lateral epicondylitis only provides limited

benefits. Previous studies have proposed that autologous whole-blood injections and platelet rich plasma (PRP) may demonstrate superior effectiveness compared to steroid injections, particularly over a longer period of time. The current literature suggests that stem cell injections hold potential based on preliminary findings. However, to comprehensively assess their effectiveness, it is crucial to undertake larger comparative studies. Numerous studies have been conducted to evaluate the effectiveness of various techniques, yet none have exhibited a clear advantage over the others in terms of outcomes. Several studies have reported that arthroscopic and percutaneous techniques may offer advantages in terms of earlier return and faster recovery to work compared to open surgery.

2. Surgical Management

The percentage of patients referred for surgical intervention has shown a significant increase over the years. Starting at 1.1% in 2000 and 2002, the percentage has steadily grown to reach 24% in 2016. The escalation in the number of patients undergoing surgery has resulted in a significant increase in the financial burden associated with the management of LE. The selection of surgical intervention for lateral epicondylitis remains a topic of debate among surgeons, with differing opinions on the most appropriate approach. However, it is worth noting that there has been a consistent increase in the number of patients opting for surgical treatment. The increase in hospital visits has been observed in parallel with the growing prevalence of chronic lateral epicondylitis. Surgery has emerged as a prevalent alternative, with a substantial rate of 16%, suggesting its efficacy as a viable long-term treatment option. Regrettably, the existing literature lacks sufficient evidence to substantiate the long-term prognosis following surgery, thereby hindering our ability to ascertain the success of surgical intervention.

Sanders et al. (2015) conducted a study on the average cost of therapy for lateral epicondylitis in the United States. The average cost was found to be \$4263. Multiple studies have shown an increase in average yearly total reimbursement and perpatient reimbursement for treating LE, indicating a significant rise in future expenses for this condition. Surgical procedure costs can vary based on the type of procedure and surgeon's objectives. Debridement, the removal of dead or damaged tissue, is generally a more costeffective option than tenotomy, a surgical procedure that involves cutting a tendon. The high cost of surgical treatments can discourage some people, but the desire for a speedy recovery and a prompt return to work often drives them to choose surgery. Patients who choose conservative treatment for lateral epicondylitis for 5 years may experience higher costs compared to those who have surgery, according to existing literature. Solheim et al. (2016) emphasise the importance of creating an appropriate conservative treatment plan before exploring surgical alternatives.

Lai et al. (2018) conducted a literature review on surgical techniques used for refractory lateral epicondylitis (LE) cases. The study highlights the effectiveness of various approaches, such as open, arthroscopic, and percutaneous methods, in treating this condition.

In their review article, Tarpada et al. (2018) explored different therapeutic approaches used to promote tendon regeneration and improve functional recovery in individuals with epicondylitis. The study examined various innovative techniques such as PRP injections, Bone Marrow Aspirate Concentrate (BMAC), stem cell injections, and collagen-producing cell injections. The review aimed to assess the effectiveness of different approaches for treating epicondylitis. This study summarises the current research on innovative therapies, including PRP 24 variables, collagenproducing cell treatments, and stem cell treatments. Preliminary studies indicate promising results for these therapies, suggesting they are still in the early stages of investigation. Efforts are currently underway to improve and investigate the potential benefits of these treatments. The lack of evidence in existing literature is a current limitation in determining the safety effectiveness of PRP protocols. and Preliminary clinical trials are exploring the collagen-producing potential of cell treatments and stem cell treatments for managing LE conditions, including both conservative and surgical approaches. The literature widely acknowledges the potential of these treatments in improving tendon healing, pain management, and functional outcomes.

3. Physical therapy *Ultrasound Therapy*

Murtezani Ardiana 2015 conducted a study in which the impact of exercise and therapeutic ultrasound was examined in relation to corticosteroidal injection as a treatment for lateral epicondylitis. Based on her research findings, she reached the conclusion that the utilization of exercises and ultrasound therapy in the rehabilitation of LE yields notable advantages when compared to the administration of corticosteroidal injections.

Sayegh and Strauch 2015 conducted a metaanalysis and reached the conclusion that, based on an extensive analysis of randomized controlled trials (RCTs), the primary approach for managing lateral epicondylitis (LE) without surgery was predominantly through the utilization of ultrasound therapy (UST) and exercise therapy. These interventions were found to yield intermediate to long-term benefits

Electrophysical Therapy

Dingemanse et al. (2013) conducted a systematic review on the effectiveness of various electrophysiological modalities for treating Lateral and Medial Epicondylitis. The researcher found evidence suggesting that ultrasound and laser therapies may be effective in treating Lateral Epicondylitis (LE) conditions. In a study conducted by Kubot et al. in 2017, the researchers compared the effects of radial extracorporeal shockwave therapy and ultrasound therapy in treating Lateral Epicondylitis. UST was found to be less effective than radial shockwave therapy. The findings mentioned are similar to those of Lizis P (2015), who also found that extracorporeal shock wave therapy had a significant impact immediately after treatment and during the three-month analysis.

In a systematic review by Testa et al. (2020), the effectiveness of extracorporeal shockwave therapy (ESWT) for upper limb diseases was investigated. The review found conflicting results regarding its efficacy.

Manual Therapy

Vicenzjno 2003 conducted a study on the topic of lateral epicondylagia from a musculoskeletal physiotherapy standpoint. The researcher discovered that the utilization of manipulative therapy and taping treatments yields the most favorable outcomes in the clinical management of lateral epicondylalgia.

Slater 2006 conducted study to investigate the impact of manual therapy technique on experimental lateral epicondylalgia. A study was conducted on a sample of 24 participants, wherein it was determined that the lateral glide Mulligan mobilisation with movement (MWM) technique does not elicit the activation of mechanisms associated with analgesia or force augmentation in individuals exhibiting experimentally induced characteristics resembling lateral epicondylalgia.

Vicenzino et al. 2001 examined the effects of specific manipulative therapy treatment on chronic lateral epicondylegia, resulting in distinct hypoalgesia. The study was conducted on a sample size of 24 participants, and the findings revealed a statistically significant and substantial improvement in pain-free grip strength by 58% during the treatment phase, as compared to the placebo and control phases. On the other hand, the observed increase of 10% in pressure threshold following treatment, while significantly higher than that of the placebo and control groups, was considerably smaller compared to the change exhibited in pain-free grip strength. The observed effect was limited to the affected limb.

Exercises

Trivedi et al. (2019) conducted a study focusing on the efficacy of combining plyometric exercises with pulsed ultrasound therapy in individuals suffering from chronic lateral epicondylitis. The findings of this study revealed promising outcomes in terms of treatment effectiveness. The study examined the effects of a four-week treatment protocol on pain reduction and rehabilitation of lateral epicondylitis. The results indicated significant improvements in these areas following the treatment. The available literature indicates that the combination of plyometric exercises and pulsed ultrasound therapy may have potential as an effective strategy for the management of chronic lateral epicondylitis. In recent studies, Srinivas et al. (2022) and independently Raia et al. (2022)investigated the effectiveness of combining therapy with strengthening ultrasound exercises for the treatment of lateral epicondylitis in individuals. The two studies examined in this review both utilised a sample size of 50 participants. The findings from both studies indicated that when comparing the effectiveness of strengthening exercises alone to а combination of ultrasound therapy and strengthening exercises, the former was more successful in reducing pain and enhancing muscle strength. Nevertheless, it is important to acknowledge that the amalgamation of interventions demonstrated a statistically significant decrease in pain. Furthermore, Stasinopoulos et al. (2005) conducted a study that provides further evidence for the efficacy of exercise therapy in the management of lateral elbow tendinopathy. The effectiveness of exercise routines in managing lateral epicondylitis

has been concluded by researchers, emphasising the significance of including exercise in the treatment plan for this condition.

The inclusion of plyometric exercises in rehabilitation protocols has been suggested to offer potential advantages that extend treatment beyond the of lateral epicondylitis. Several studies have been conducted to investigate the effects of plyometric exercises on muscle power and different performance in sports and activities. Notably, Vissing et al. (2008), Loturco et al. (2015), and McCormick et al. (2016) have contributed to this body of Their findings consistently literature. demonstrate that plyometric exercises have the potential to enhance muscle power and improve overall performance. The literature suggests that incorporating plyometrics into training regimens can have positive effects on overall athletic performance. This is particularly relevant for individuals who are enhance looking to their physical capabilities beyond just injury rehabilitation.

Laser

Stergioulas 2007 conducted a study to assess the effectiveness of Low-Level Laser therapy in comparison to Plyometric Exercises for the treatment of Lateral Epicondylitis. The findings of the study patients indicated with that lateral epicondylitis (LE) who underwent treatment with low-level laser therapy in conjunction plyometric exercises experienced with notable enhancements in wrist range of motion (ROM) and a reduction in pain.

Mobilisation with movement (MWM) therapy

It is a conservative treatment strategy for musculoskeletal diseases such lateral epicondylitis (tennis elbow). Managing lateral epicondylitis with MWM has been the subject of several scientific investigations.

In their study, Abbott et al. (2001) examined the preliminary effects of an elbow mobilisation with movement technique on grip strength among individuals suffering from lateral epicondylalgia. In a recent study, a sample of 25 participants was examined to investigate the effects of an intervention on pain-free grip strength and maximum grip strength in the affected limb. The findings of this study revealed a noteworthy increase in both maximum grip strength and pain-free grip strength following the intervention. The observed augmentation in pain-free grip strength surpassed that of maximum grip strength, as reported in the literature.

Aatit Paungmali et al. 2003 conducted research to investigate the Hpoalgesic and svmpathoexcitatory effects of mobilisation with movement for lateral epicondylgia. A study was conducted on a sample of 24 participants, and the findings indicated that the mobilisation with movement treatment technique yielded physiological effects comparable to those reported for certain spinal manipulations.

Clinical research by Ahmed et al. (2021) compared the effectiveness of Mulligan mobilisation with the Cyriax technique in the treatment of subacute lateral epicondylitis. Both deep transverse friction and Mill's manipulation (both based on the Cyriax method) and Mulligan mobilisation movement techniques) (with were administered to one group, while the other group just moved. After 4 weeks of therapy, both groups saw substantial reductions in pain and functional impairment ratings. Pain subscale ratings increased significantly in Group A (Cyriax method) but functional disability subscale scores decreased significantly in Group В (Mulligan mobilisation). Patients with lateral epicondvlitis reported significant improvements in both pain and function after using either treatment approach.

In order to determine whether or not wrist joint manipulations are helpful for lateral epicondylitis, Eapen et al. (2023) performed a systematic review. The discomfort from lateral epicondylitis may be alleviated with regular wrist manipulations for at least three weeks, according to the review. Although studies found varying degrees of functional improvement after wrist joint manipulation, the evidence was strong that it was more effective than other therapies for relieving pain in the short term.

Researchers Singh et al. (2022) looked examined the effectiveness of Cyriax mobilisation physiotherapy vs with movement method for treating tennis elbow. Cyriax physiotherapy was shown to be more effective than mobilisation with movement in reducing pain, reducing functional impairment, and increasing pain-free grip strength in people with lateral epicondylitis. Manandhar (2021) compared the effects of eccentric exercise and Mulligan's MWM on grip strength and functional impairment in a group of recreational tennis players with lateral epicondylitis. When compared to eccentric exercise alone, the combination of Mulligan's MWM administration plus eccentric exercise improved grip strength and functional skills in this population of patient's more than eccentric exercise alone. The effectiveness of Mulligan mobilisation with movement as a therapy for lateral epicondylitis was investigated in a literature review by Zami et al. (2023). Based on the findings of this systematic review, Mulligan mobilisation with movement should be considered as a treatment option for the therapy of lateral epicondylitis since it has the ability to reduce discomfort and increase functional capacity in the elbow joint.

In addition, the integration of mobilisation with movement techniques in conjunction with various therapeutic interventions, including conventional treatments and exercise, has been found to yield optimal outcomes (Raja et al 2022; Eapen et al. 2022; Singh et al. 2022; Reyhan et al 2022; Zami et al. 2023 and Mandhaar 2021).

Studies show that MWM treatment, or Mulligan mobilisation with movement, may help those with lateral epicondylitis by lowering discomfort and increasing their functional level. Considered an alternative to intrusive treatments like corticosteroid injections, it shows promise as a method of controlling tennis elbow.

CONCLUSION

In conclusion, drug therapy, surgical management, and physical therapy are available therapeutic management options for lateral epicondylitis (tennis elbow). Patients with lateral epicondylitis have found temporary relief from drug therapy corticosteroid such injections and nonsteroidal anti-inflammatory drugs (NSAIDs). There is no agreement on the best course of action, and it is unclear whether or not these therapies will be beneficial in the long run. More and more patients are choosing surgical treatments as part of their treatment plans in recent years. While surgical options exist for treating lateral epicondylitis, the long-term prognosis and cost-effectiveness of these procedures are still up for dispute and need further research. Ultrasound, electrophysical therapy, and manual treatment are just a few of the physical therapy methods that have shown potential in treating lateral epicondylitis. Plyometric exercises in particular have been shown to help individuals with lateral epicondylitis have less discomfort and better functional benefits from their exercise treatment. Both laser treatment and mobilisation with movement (MWM) have shown promise in elbow pain and restoring alleviating function. The existing research has some methodological flaws despite its commendable studies. Some limitations observed in the study are the insufficient subject numbers, absence of non-treatment and placebo controls, inadequate follow-up, and lack of objective outcome measures. Clearly, further study and development are needed to determine the best treatment method for lateral epicondylitis. While there is evidence that certain therapies are beneficial, additional research is required to determine whether or not they are superior than alternatives in the long run. In addition, individuals with lateral epicondylitis may benefit most from a customised and comprehensive treatment strategy that makes use of a variety of treatments. Overall, pharmacological treatment, physical therapy, and surgical alternatives should be explored while treating lateral epicondylitis due to the complexity of the condition and the wide variety of patients who suffer from it.

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