Review Article Journal of Regenerative Science | 2023 Jan-Jun; 3(1): 32-34

Lateral Epicondylitis: General Concepts and Shock Wave Treatment Evidence

Ricardo Kobayashi[1]

Abstract

Introduction: Lateral epicondylitis (LE) is one of the most common tendinopathies of the upper extremity characterized by lateral elbow pain, seriously affecting patients' daily life and work.

Pathophysiology: Anatomically, the common extensor insertion on the lateral epicondyle of the humerus, mostly the extensor carpi radial is brevis tendon insertion, undergoes microtearing associated with a chronic repair process, but hardly any inflammation. The pathoanatomy of overuse tendinopathy is non-inflammatory angiofibroblastic tendinosis. For this reason, the term "tendinitis" is avoided, and "tendinosis" is preferred.

Diagnosis: LE is primarily a clinical diagnosis. The natural history is a gradual onset of pain in the absence of defined trauma. The most common findings on physical examination are tenderness at the lateral epicondyle of the distal humerus and weakness or pain with resisted wrist extension (the Thomsen test).

Treatment: Non-surgical options are the mainstream treatment for LE, a small proportion of patients eventually undergoes surgery, although surgery for LE is no more effective than non-surgical treatment, based on evidence. Non-operative treatments including rest, application of ice, administration of analgesic medications, orthopedic devices, ultrasound, transcutaneous electrical nerve stimulation, eccentric training, and extracorporeal shock wave therapy (ESWT).

Shockwave Treatment of LE: There are many therapeutic options for treating LE. The existing evidence does not clearly support the efficacy of any of the available treatment methods for this clinical condition. ESWT is not the exception, although it was approved by the U.S. Food and Drug Administration for treating this disease in 2002 and much of the current evidence supports its indication for LE.

Keywords: Lateral epicondylitis, Tennis elbow, Tendinopathy, Shock waves

Introduction

Lateral epicondylitis (LE) or "tennis elbow" is a common cause of elbow pain in the general population. LE is characterized by chronic degeneration at the origin of the extensor carpi radialis brevis muscle on the lateral epicondyle of the humerus. It is usually caused by injury or overuse. Symptoms include pain, weakness, and stiffness of the elbow. There is no strong evidence to support substantive benefit from any intervention. Conservative treatments include rest, application of ice, orthopedic devices, physiotherapy, analgesic medications, corticosteroid (CS) injections, and extracorporeal shock wave therapy (ESWT) [1, 2, 3].

Etiology and Pathophysiology

It is usually caused by injury or overuse, especially who participate in repetitive forceful movements involving the wrist and forearm [2, 3].

The term "tendinosis" is used rather than tendinitis because it more accurately defines the histopathological presentation of the degenerative process. The term "tendinitis" has been used to describe the theoretical chronic inflammatory changes in the overused tendon. Histologic examination of excised pathological tendons has consistently failed to reveal the presence of inflammatory cells; however, if chronic inflammatory cells are evident in the tendon, they are those of traumatic repair and include granulation tissue and scar [4].

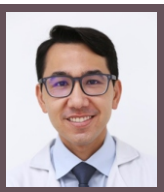
The characteristic appearance of this tissue consists of invasion of immature fibroblasts and disorganized, non-functional vascular elements. Electron microscopy has demonstrated that these vascular buds do not possess a lumen. This granulation-like tissue has been termed angiofibroblastic hyperplasia by Nirschl. As "tendinitis" is now known to be a misnomer, it should be replaced by the term "tendinosis" [4].

Epidemiology

LE is a common orthopedic disease, and it is observed with particularly high frequency (5%–10%) in tennis players. The prevalence

[1]Pain Center, University of S£o Paulo, S£o Paulo, Brazil.

Address of Correspondence
Dr. Ricardo Kobayashi, MD, Phd,
Pain Center, University of S£o Paulo, S£o Paulo, Brazil.
E-mail: institutokobayashi@gmail.com



Dr. Ricardo Kobayashi

Submitted Date: 27 Jan 2023, Review Date: 06 Feb 2023, Accepted Date: 15 April 2023 & Published: 30 June 2023

of LE is as high as 1–3% and is most prevalent in people aged 35–50 years. There is no significant gender difference. Patients usually present with unilateral and, less commonly, bilateral LE, with the dominant arm being the most affected [5,6].

Clinical and Imaging Evaluation

Clinical evaluation

Persons with LE usually present with gradual onset of pain in the absence of defined trauma. The most common findings on physical examination are tenderness at the lateral epicondyle of the distal humerus and weakness or pain with resisted wrist extension (the Thomsen test). The differential diagnosis includes elbow osteoarthritis, which typically manifests as generalized tenderness located at the joint line and limited range of motion; radial tunnel syndrome, which is best characterized as dynamic compression of the posterior interosseous nerve branch of the radial nerve and manifests as pain and tenderness over the proximal forearm. Patients with a history of elbow trauma can present with lateral elbow pain due to fracture of the radial head, disruption of the lateral collateral ligament, or dislocation. Radial tunnel syndrome can coexist with LE, and thus, examination of the forearm should also be performed [1].

Imaging evaluation

LE is primarily a clinical diagnosis. Elbow radiographs are generally limited to rare cases in which there is high suspicion of fracture or osteoarthritis as an alternative diagnosis. Although imaging findings typical of LE have been described (including a focal hypoechoic area of the extensor tendon origin seen on ultrasonography and signal changes at the lateral epicondyle seen on magnetic resonance imaging), imaging is not recommended for evaluation since it is generally unnecessary, and findings are non-specific and can be seen in asymptomatic persons [1,7,8].

Treatment

Non-surgical options are the mainstream treatment for LE, with only 2% of patients requiring surgical treatment in refractory cases [9], although surgery for LE is no more effective than non-surgical treatment, based on evidence [10].

Physical therapy, splinting, and oral or topical non-steroid anti-inflammatory drugs are often employed as first-line treatment to manage acute LE. In chronic cases, ESWT, as well as local injection therapies using CSs, botulinum toxin A, autologous whole blood, platelet-rich plasma, or dextrose prolotherapy, are considered [9].

Non-operative treatments, including rest, application of ice, administration of analgesic medications, orthopedic devices, ultrasound, transcutaneous electrical nerve stimulation, eccentric training, and ESWT, might have value in treating LE [10].

Although there are many therapeutic options for treating LE, the existing evidence does not clearly support the efficacy of any of the available treatment methods for this clinical condition. ESWT is not the exception; nevertheless, it was approved by the U.S. Food and Drug Administration for treating this disease in 2002 [11].

Shockwave Treatment of LE

Shock waves

Focused ESWT (F-ESWT) and radial pressure wave treatment (RPW) are treatments in which the mechanical energy created by these different methods is transformed into a biological response through a mechanism called mechanotransduction. This mechanical stimulus generates biological responses with tissue regeneration and analgesia. One of the most supported indications in the literature is tendinopathy, including LE [12].

Evidence

There is mixed evidence on the efficacy of ESWT for LE. This is partly attributed not only to the study design and study populations but also to the increasing array of shock wave systems and treatment protocols, as well as basic differences in the forms of shock waves used. The effectiveness of ESWT to treat LE has been systematically reviewed before [10].

Haake et al. (2002) concluded that ESWT for LE is ineffective through a multicenter randomized clinical trial with good scientific methodology in a high impact journal (Journal of Bone and Joint Surgery). This negative study is cited in all reviews due to its methodological quality; however, there was a technical error as all patients in this study received local anesthesia and it is now known that the outcome of ESWT is negatively affected by local anesthesia [13].

Pettrone and McCall (2005) reported a significant improvement with respect to pain and function in the active treatment group at 6 and 12 months compared with the placebo group in a study with Level-I evidence [14].

In 2005, a Cochrane systematic review including 10 RCTs showed that there is platinum-level evidence that ESWT provides minimal or no benefit in terms of pain and function in patients with LE [15].

In a review study by Thiele et al. (2015), the authors stated that several clinical trials have achieved very good results with the use of ESWT for LE of the elbow. That review only included Level-I studies using focused ESWT and RPW, and the authors concluded that LE is a primary indication for ESWT [3].

Moya et al. (2018) published a review of the use of ESWT in the treatment of musculoskeletal pathologies. Although the strength of the supporting evidence is not strong, no method to treat LE is backed by studies with a high level of evidence. As the benefits largely exceed any potential harm, they recommend the use of RPW or F-ESWT technologies when conventional rehabilitation treatment has failed [11].

Although there is not much literature on treating myofascial trigger points (TPs) associated with LE, most experts in ESWT recommend the associated treatment of LE with the main TPs in the region, such as TPs of the wrist and finger extensor muscles. A clinical trial that evaluated the difference in the outcome of the treatment associated with TPs and tendinopathy was that of Moghtaderi et al. (2014) which demonstrated that the combination of ESWT for both plantar fasciitis and gastrocsoleus TPs in treating patients with plantar fasciitis is more effective than utilizing it solely for plantar fasciitis [16].

Conclusion

LE or "tennis elbow" in the upper extremity causes pain and can cause considerable morbidity. It is considered self-limiting, usually resolving in 12–18 months without treatment; however, the long-term pain and functional impairment leads to great economic and social burden due to lost workdays. The choice of shock waves is justified according to scientific evidence and clinical experience, in those cases of LE that do not respond after 3 months of

conservative treatment.

Declaration of patient consent: The authors certify that they have obtained all appropriate patient consent forms. In the form, the patient has given his/her consent for his/her images and other clinical information to be reported in the Journal. The patient understands that his/her name and initials will not be published, and due efforts will be made to conceal his identity, but anonymity cannot be guaranteed.

Conflicts of Interest: Nil. **Source of Support:** None.

References

1. Wolf JM. Lateral epicondylitis. N Engl J Med 2023;388:2371-7.

2. Marigi EM, Dancy M, Alexander A, Marigi IM, Clark J, Krych AJ, et al. Lateral epicondylitis: Critical analysis review of current nonoperative treatments. JBJS Rev 2023;11(2): doi: 10.2106/JBJS.RVW.22.00170

3. Thiele S, Thiele R, Gerdesmeyer L. Lateral epicondylitis: This is still a main indication for extracorporeal shockwave therapy. Int J Surg 2015;24:165-70.

4. Nirschl RP, Ashman ES. Elbow tendinopathy: Tennis elbow. Clin Sports Med 2003;22:813-36.

5. Xu J, Chen M, Xue X, Zhou W, Luo X. Global research trends and hotspots in lateral epicondylitis during the past 30 Years: A bibliometric and visualization study. Med Sci Monit 2023;29:e939309.

6. Yao G, Chen J, Duan Y, Chen X. Efficacy of extracorporeal shock wave therapy for lateral epicondylitis: A systematic review and meta-analysis. Biomed Res Int 2020;2020:2064781.

7. van Leeuwen WF, Janssen SJ, Ring D, Chen N. Incidental magnetic resonance imaging signal changes in the extensor carpi radialis brevis origin are more common with age. J Shoulder Elbow Surg 2016;25:1175-81.

8. van Kollenburg JA, Brouwer KM, Jupiter JB, Ring D. Magnetic resonance imaging signal abnormalities in enthesopathy of the extensor carpi radialis longus origin. J Hand Surg Am 2009;34:1094-8.

9. Liu WC, Chen CT, Lu CC, Tsai YC, Liu YC, Hsu CW, et al. Extracorporeal shock wave therapy shows superiority over injections for pain relief and grip strength recovery in lateral epicondylitis: A systematic review and network meta-analysis. Arthroscopy 2022;38:2018-34.e12.

10. Yoon SY, Kim YW, Shin IS, Moon HI, Lee SC. Does the type of extracorporeal shock therapy influence treatment effectiveness in lateral epicondylitis? A systematic review and meta-analysis. Clin Orthop Relat Res 2020;478:2324-39.

11. Moya D, Ramón S, Schaden W, Wang CJ, Guiloff L, Cheng JH. The role of extracorporeal shockwave treatment in musculoskeletal disorders. J Bone Joint Surg Am 2018;100:251-63.

12. Camargo LS, Kobayashi R. Case Report: Extracorporeal shock wave treatment in plantar fasciitis with an associated neuropathic component. How to optimize the result? J Regen Sci 2022;2:21-3.

13. Haake M, Konig IR, Decker T, Riedel C, Buch M, Muller HH. Extracorporeal shock wave therapy in the treatment of lateral epicondylitis: A randomized multicenter trial. J Bone Joint Surg Am 2002;84:1982-91.

14. Pettrone FA, McCall BR. Extracorporeal shock wave therapy without local anesthesia for chronic lateral epicondylitis. J Bone Joint Surg Am 2005;87:1297-304.

15. Buchbinder R, Green SE, Youd JM, Assendelft WJ, Barnsley L, Smidt N. Shock wave therapy for lateral elbow pain. Cochrane Database Syst Rev 2005;4:CD003524.

16. Moghtaderi A, Khosrawi S, Dehghan F. Extracorporeal shock wave therapy of gastroc-soleus trigger points in patients with plantar fasciitis: A randomized, placebo-controlled trial. Adv Biomed Res 2014;3:99.

Conflict of Interest: NIL
Source of Support: NIL

How to Cite this Article

Kobayashi R. | Lateral Epicondylitis: General Concepts and Shock Wave Treatment Evidence. | Journal of Regenerative Science | Jan-Jun 2023; 3(1): 32-34.