International Journal of Innovative Technologies in Social Science

e-ISSN: 2544-9435

Scholarly Publisher
RS Global Sp. z O.O.
ISNI: 0000 0004 8495 2390

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ARTICLE TITLE	NON-SURGICAL APPROACH IN LATERAL EPICONDYLITIS, INJECTIONS VERSUS PHYSICAL THERAPY LITERATURE OVERVIEW
DOI	https://doi.org/10.31435/ijitss.4(48).2025.4340
RECEIVED	15 October 2025
ACCEPTED	23 December 2025
PUBLISHED	30 December 2025
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NON-SURGICAL APPROACH IN LATERAL EPICONDYLITIS, INJECTIONS VERSUS PHYSICAL THERAPY LITERATURE OVERVIEW

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ABSTRACT

Introduction: Lateral Epicondylitis, also known as tennis elbow, is a common tendinopathy characterized by pain and tenderness over the lateral epicondyle of the humerus. It leads to functional limitations and decreased quality of life. There are numerous available treatment options, including physical therapy, oral pharmacotherapy, injections and surgical interventions.
Aim of the study: The aim of this article was to analyze recent research on non-surgical methods of lateral epicondylitis treatment.
Methods and Materials: Extensive research was conducted using Scopus, PubMed and ProQuest databases, focusing on publications from the past five years, primarily on randomised control trials and meta-analyses. The databases were searched using the following keywords: “lateral epicondylitis”, “Platelet-rich plasma”, “Physical therapy” and “tennis elbow”.
Conclusion: Current evidence remains insufficient to establish clear therapeutic recommendations. However, extracorporeal shockwave shows promising results in pain reduction, while PRP may offer longer-lasting benefits compared to corticosteroids. Available data shows that corticosteroid injections provide only temporary benefits and are commonly associated with symptom recurrence. Further studies are required to assess the efficacy of the injection-based therapies.

KEYWORDS
Lateral Epicondylitis, Platelet-Rich Plasma, Tennis Elbow, Tendinopathy

CITATION

Maja Elertowicz, Mikołaj Moskwa, Gabriela Młyńska, Magdalena Zięba, Szymon Rudawski, Patrycja Herod, Magdalena Morytko, Kateryna Shtohryn, Aleksandra Wójciak. (2025). Non-Surgical Approach in Lateral Epicondylitis, Injections Versus Physical Therapy Literature Overview. *International Journal of Innovative Technologies in Social Science*. 4(48). doi: 10.31435/ijitss.4(48).2025.4340

1.Introduction

According to a population study, lateral epicondylitis - also reffered as lateral elbow tendinopathy - was observed in 1.3% of 4,783 participants from the Finnish population (Shiri et al., 2006). Its etiology has been debated for years. Initially considered an inflammatory condition, it is now recognized as a tendinosis affecting the common origin of extensor muscles at the lateral epicondyle of the humerus. (Seiça et al., 2023). It arises from the overuse of the wrist extensor muscles in daily tasks, leading to an overuse syndrome. The short radial wrist extensor tendon is commonly affected with this condition; however, it does not always exclude the involvement of other tendons. Lateral epicondylitis is a degenerative condition that typically affects individuals who frequently perform the actions of rotating the forearm outward (supination) and inward (pronation) against resistance when the elbow is nearly fully extended. (Alharbi et al., 2025). Symptoms are usually localized on the lateral part of the forearm and are aggravated by physical activity. The diagnosis is primarily clinical, with imaging serving as a complementary tool. However, a recent study showed an 11% rate of misdiagnosis in this condition, with the majority of cases (90%) attributed to atypical clinical presentation. (Blonna et al., 2025) Numerous surgical approaches have been proposed as the treatment, in spite of the conservative therapy remaining at its core. The most commonly used scales to assess effectiveness of each intervention is visual analogue scale (VAS) which scales from 0 - no pain to 10 (highest imaginable pain) and Patient-Rated Tennis Elbow Evaluation (PRTEE; 0 = best, 100 = worst), which assess both pain and functional impairment.

The researchers searched PubMed, Scopus and ProQuest databases to find appropriate literature. The aim of this overview is assessment of the literature with focus on comparing various forms of physical therapy and injections techniques in improving patient's outcomes.

2.Physical therapy

Extracorporeal shockwave therapy is a non-invasive procedure in which acoustic waves are focused on targeted sites within the body to facilitate pain relief and healing. In general, ESWT is considered as safe, easy to apply and well tolerated by most patients. It has been widely used for many musculoskeletal conditions over the last 25–30 years (Yao et al., 2020). A 2025 meta-analysis that included a total amount of 654 patients compared ESWT to ultrasound therapy, another common procedure in Physical therapy offices. The results revealed higher decrease in VAS scores (MD = − 0.90, 95% CI [− 1.28, − 0.52]) caused by usage of ESWT compared to ultrasound group and borderline significance of PRTEE scores favoring ESWT. However the heterogeneity was substantial in both groups I2 > 70% (Alharbi et al. 2025). Another 2025 meta-analysis found evidence to support this claim, the ESWT superiority to placebo (VAS reduction) (MD = −0.68; 95% CI −1.06, −0.3; P = 0.0004; I2 = 75%), ultrasound at 3 month follow-up (MD = −1.65; 95% CI −1.81, −1.49; P < 0.00001; I2 = 98%) (Zhu et al., 2025). It also highlights The study by Xiong et al. which showed that ESWT is better than corticosteroid injection when calculating the pooled effect size of VAS (SMD=1.13; 95% CI 0.72, 1.55; P<0.00001; I 2=0). (Xiong et al., 2019) There was no evidence supporting the improvement of grip strength. In The study from 2024 compared with Local corticosteroid injections, ESWT showed inferior short-term (1-month) but superior long-term effects (3-monthΔ VAS (WMD, −1.15; 95% CI, −1.51 to −0.80; I2 = 6%; p < 0.001)Δ grip strength (WMD, 2.04; 95% CI, 0.90 to 3.18; I2 = 3%; p = 0.0005) and 6-month Δ VAS (WMD, −1.81; 95% CI, −2.52 to −1.10; I2 = 33%; p < 0.001), Δ grip strength (WMD, 3.06; 95% CI, 0.90 to 5.21; I2 = 0%; p = 0.005)) outcomes regarding pain relief and function recovery. (Zhang et al., 2024). Which adds to 2023 meta-analysis that found no statistically significant long-term improvement in PRP or Corticosteroid injections, with ESWT showing such improvement however only in pain relief (SMD: −0.19, 95% CI [−0.36,

−0.02]) (Chen et al., 2023). As to proper usage of this technique a small retrospective study aimed to assess the best amount of energy to be used. The low energy (0.10 mJ/mm2) was more effective than high (0.20 mJ/mm2) at six months VAS scores reduction (3.2 ± 1.2 vs. 2.1 ± 1.1, p = 0.004) and PRTEE scores (25.3 ± 6 vs. 17.6 ± 9, p = 0.005) with statistical significance (Santilli et al., 2024).

Manual therapy and exercise seems to be the easiest procedures to implement and often use in physiotherapeutic offices, however it's harder to investigate as the methods differ from one practitioner to another. The 2024 meta-analysis attempted to investigate this matter, its adequate aim was lateral elbow pain that might encompass also other ailments but is essential in lateral epicondylitis. However the evidence supporting its effectiveness was low. Manual therapy decreased VAS scores MD -2.1 points (95% CI -4.2 to -0.1) and mean disability (0 to 100 scale) MD -25 points (95% CI -43 to -7) after 3 weeks treatment versus placebo manual therapy but the CI interval included almost no improvement possibility, and it was based on single low graded study which did not follow up for retention of effects. It also analyzed 12 studies to combine effects of manual therapy exercise or both which showed reduction in VAS MD of -0.53 points (95% CI -0.92 to -0.14, I2 = 43%;, 1023 participants) and reduced mean disability by MD of -5.00 points (95% CI -9.22 to -0.77, I2 = 63%; 10 trials, 732 participants) which CI 95% signals the lack of proper data that could help in narrowing it. (Wallis et al., 2024).

Acupuncture is widely used for analgesia in China and western countries. Lateral epicondylitis (LE) is a common disease, which influences the quality of life for many patients. The clinical practice suggests that acupuncture has a therapeutic effect on the tennis elbow; however, whether it is superior to sham acupuncture or conventional therapies remains controversial. (Zhou et al., 2020; Zhou et al., 2021). There are trials with statistically relevant results that show that non-segmental verum acupuncture has an intrinsic analgesic effect in the clinical treatment of tennis elbow pain which exceeds that of placebo acupuncture (Molsberger et al., 1994). By comparing it to the corticosteroid injections the 2022 RCT proved that acupotomy is just as effective as corticosteroid injections in the short term (< 6 weeks). In the long term, acupotomy has greater efficacy and is associated with a lower rate of recurrence. The acupotomy group scored significantly better in visual analogue scale score (VAS) of pain, tenderness during palpation, pain-free grip strength (PFGS) and Nirschl staging. (Ge et al., 2022). Similar results were achieved in 2020 cohort study that found that both methods were effective for external humeral epicondylitis. However, after 6 months of treatment, patients with chronic LE with acupuncture achieved pain relief and function improve significantly, exceeding the effect of corticosteroid injection. (Peng et al., 2020) Different type of acupuncture- vibroacupuncture (VA) that combines the traditional one with vibration to stimulate acupressure points was tested though it did not result in statistical significance compared to the traditional method but showed significantly lower pain intensity p = 0.005) during VA than during PA. This study indicated that VA may be beneficial in individuals with clinical chronic musculoskeletal pain. (Wang et al., 2021).

3.Injection-based therapies

In recent years, injection-based therapies have been increasingly utilized due to their ability to reduce pain severity, shorten recovery time and limit systemic adverse effect (Tavassoli et al., 2022). Currently, the substances used for injections include corticosteroids, lidocaine, botulinum toxin, platelet-rich plasma, autologous blood and dextrose solution.

Corticosteroid injections are the second most popular treatment method recommended by hand surgeons, following oral NSAID's.(Amar et al., 2014). Nevertheless, numerous studies have demonstrate short-term benefits in pain reduction and improved elbow function. (Houck et al., 2019; Cakar et al., 2024). A randomised controlled trial by Bisset et al., evaluated the effectivenes of manual therapy, a "wait and see" strategy and corticosteroid injections over 52 weeks observation in the group of 198 patients diagnosed with lateral epicondylitis. The findings revealed that the corticosteroid injections were associated with significantly greater improvement in pain-free grip ratio at the 6-week assessment. However, at long term follow-up, approximately 72% of participants experienced a recurrence of symptoms (Bisset et al., 2006).

PRP is biologically derived plasma fraction prepared from peripheral blood, containing a platelet concentration exceeding physiological values. The first attempts to use platelet-rich plasma in sports medicine were made approximately 25 years ago (Mishra et al., 2006). The platelet-rich plasma (PRP) in the management of tendinopathies has become progressively more common, as it contains variety of cytokines and growth factors that facilitate enhanced tissue healing and regeneration (Cole et al., 2010). Kizilkurt et al. investigated the effects of PRP, corticosteroid and saline injections in patients with tennis elbow. PRP demonstrated superior functional outcomes according to Patient-Rated Tennis Elbow Evaluation (PRTEE) and

Disabilities of the Arm, Shoulder and Hand (DASH) questionnaire score compared to both other groups ($p < 0,001$), with the saline group showing the poorest results. The beneficial effect of PRP was sustained at the three- and six-month follow-up (Kizilkurt et al., 2025). In the subsequent RCT conducted on patients aged >20 years who had experienced symptoms for more than 3 months and demonstrated typical lateral epicondylitis features like calcifications, enthesophytes and partial tendon tear in ultrasound examination, Sharma et al. evaluated the impact of PRP injections and dry needling. The study included 40 patients who were divided into two groups: dry needling and platelet-rich plasma. The findings revealed that the PRP group demonstrated a significantly greater reduction in pain on the visual analogue scale compared to group which underwent dry needling (Sharma et al., 2024). Interestingly, mean improvement in common extensor tendon thickness did statistically differ between PRP group (5.1 mm at three months and 4.3 mm at six months) and dry needling group (4.4 mm and 4.0 mm, respectively). Combining ESWT with PRP improved QUICK DASH scores at 12 weeks compared to ESWT alone or sham procedure, although ESWT showed better VAS score reduction.. (Akçin et al., 2025).

The term autologous blood refers to blood collected from and subsequently reinfused into the same individual. It is used in regenerative medicine to stimulate tissue repair through the release of growth factors and cytokines from the patient's own plasma and platelets (Yogev et al., 2020). Cakar et al. investigated effects of autologous blood (AB) injection, corticosteroid (CS) injection and a combination of both (AB + CS) in patients with chronic tennis elbow. The results indicated that patients treated with AB and AB + CS demonstrated significant improvements in PRTEE score and handgrip strength at the 90 days follow-up. Interestingly, AB+CS group achieved the most pronounced positive outcomes (Cakar et al., 2024).

Dextrose is a naturally occurring monosaccharide that serves as a source of energy for cellular metabolism. Hypertonic dextrose solution is used in prolotherapy to induce mild inflammatory response, promoting collagen synthesis and strengthening connective tissue.[Hauser et al., 2016]. A randomised control trial by Ciftci et al. examining the impact of 5%, 15% dextrose solution and 0,9% saline prolotherapy on pain severity and functional outcomes in adults with chronic lateral epicondylitis. The results demonstrated a significant improvement in pain intensity, handgrip strength and functionality of the affected limb at the 12-week follow-up in both group treated with dextrose. However, patients receiving the higher dose exhibited superior outcomes (Ciftci et al., 2023).

Botulinum toxic therapeutic effect seems to be mediated by muscle paralysis, which decreases the tension in the enthesis and allows faster recovery time. Moreover, botulinum toxin inhibits the release of neurotransmitters involved in pain transmission, resulting in a rapid lactate removal, reduced inflammatory markers, and amelioration of pain in the affected area. 2025 metanalysis showed statistically significant pain reduction ($MD = -0.95$; 95% CI $[-1.63, -0.26]$, $p = 0.007$) comparing to any other injection therapy method, although it was not deemed as clinically relevant (Vilchez-Cavazos et al., 2025).

4.Conclusion

Currently available medical data limits the ability to make definitive recommendations regarding which intervention offers the greatest benefit for patients. According to recent knowledge, there is evidence that ESWT, at least in terms of pain alleviation shall be proven beneficial to patients and could be a good alternative for conservative treatments such as manual therapy or prescribing exercise. Those interventions have not yet to be proven useful beyond reasonable doubt. However, it is understood that obtaining heterogenic data may be problematic. If the clinician wishes to intensify his actions it is to be noted that corticosteroids may bring quick improvement but recurrence of symptoms is an often problem and maintaining control of the ailment may be achieved by PRP which seems to have longer lasting effects. Moreover, dextrose injections and botulin remain yet not undermined by research. Available literature suggests benefits of such treatments but they require further research. We also found evidence that the presented techniques may be combined to achieve additional effects. More Rcts are needed to establish the best course of those treatments, proper dosing and new emerging therapies will most likely need further investigation.

Financing Statement: This research received no external funding.
Conflict of Interest: Authors declare no conflict of interest.

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