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Corresponding author:

Monika Benduch

48241@awfkatowice.edu.pl

Author Affiliation:

Academy of Physical Education in Katowice.

Comparison of the Therapeutic Efficacy of Extracorporeal Shockwave Therapy and High-Intensity Laser Therapy in Patients with Lateral Epicondylitis: A Systematic Review and Meta-Analysis

Benduch, M; Dudoń, A; Stania, M.

ADMINISTRATIVE INFORMATION

Support - This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

Review Stage at time of this submission - Formal screening of search results against eligibility criteria.

Conflicts of interest - None declared.

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Amendments - This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 7 November 2025 and was last updated on 7 November 2025.

INTRODUCTION

Review question / Objective The research question was developed using the PICOS framework: In patients diagnosed with lateral epicondylitis (tennis elbow) (Population), how effective is shockwave therapy (Intervention) compared to high-intensity laser therapy (Comparison) in reducing pain (assessed using pain scales), subjective evaluation using questionnaires, and grip strength measured with a dynamometer (Outcomes)? The analysis was based on selected randomized controlled trials (RCTs) (Study design).

Rationale Despite the growing popularity of both extracorporeal shockwave therapy and high-intensity laser therapy, the literature still lacks conclusive scientific evidence indicating which modality demonstrates superior efficacy in the treatment of lateral epicondylitis. Therefore, conducting a systematic review comparing the effectiveness of these two therapies is justified.

Such an analysis will enable the evaluation of their impact on pain reduction, functional improvement, and restoration of physical capacity, as well as provide practical insights into their optimal application in physiotherapy.

Condition being studied Lateral epicondylitis of the humerus, commonly known as tennis elbow, is an overuse syndrome affecting the extensor muscles, leading to degeneration of the tendon insertion of the extensor carpi radialis brevis muscle onto the bone (Regan et al., 1992). The most commonly reported symptom is pain and tenderness in the area of the lateral epicondyle of the humerus, which intensifies during wrist and middle finger extension movements. (Cutts et al., 2020).

The annual incidence of tennis elbow is estimated at 1–3% of the adult patient population (Allander, 1974), most commonly affecting individuals aged 40–50 years (Bot et al., 2005). Predisposing factors include female sex, dominant arm involvement,

physical labor, and unilateral rotator cuff injury (Park et al., 2021). Tennis elbow affects both athletes—often due to improper technique—and individuals engaged in manual occupations, such as factory workers, office employees, and nurses (Herquelot et al., 2013; Sanders et al., 2015).

METHODS

Participant or population

- Adult patients (aged 18 years or older, or as defined by the study authors)
- Patients diagnosed with lateral epicondylitis
- Studies involving patients with tendinopathies or other soft tissue disorders, only if data for patients with lateral epicondylitis were reported separately
- Patients with either chronic (> 3 months) or acute (< 3 months) lateral epicondylitis
- Non-active individuals, as well as recreational and/or elite athletes.

Intervention

- Radial shock wave therapy or focused shock wave therapy (as a monotherapy)
- Shock wave therapy combined with another conservative treatment modality
- Shock wave therapy combined with pharmacological treatment.

Comparator

- High-intensity laser therapy (as a monotherapy)
- High-intensity laser therapy combined with another conservative treatment modality
- High-intensity laser therapy combined with pharmacological treatment.

Study designs to be included

- Randomized controlled trials
- Full-text, peer-reviewed original research articles
- Articles published in English or Polish
- Articles providing a comprehensive description of application parameters, such as: type of ESWT, number of shocks, frequency, energy flux density, number of sessions, and treatment frequency.

Eligibility criteria

- Adult patients (aged 18 years or older, or as defined by the study authors)
- Patients diagnosed with lateral epicondylitis
- Studies involving patients with tendinopathies or other soft tissue disorders, only if data for patients with lateral epicondylitis were reported separately
- Patients with either chronic (> 3 months) or acute (< 3 months) lateral epicondylitis
- Non-active individuals, as well as recreational and/or elite athletes.

Information sources The search was conducted in the scientific databases PubMed and EBSCOhost (06 November 2025), as well as on relevant websites. Additionally, the reference lists of all included articles were screened to identify further studies eligible for inclusion in the review.

Main outcome(s)

- Intensity of pain measured using a quantifiable scale (e.g., Numeric Rating Scale or Visual Analog Scale)
- Patient-reported outcomes related to physical function and disability, evaluated using standardized questionnaires (e.g., Patient-Rated Tennis Elbow Evaluation)
- Grip strength using hand dynamometr.

Quality assessment / Risk of bias analysis The risk of bias was assessed using the Cochrane Collaboration's Risk of Bias 2 tool for randomized controlled trials (McGuinness & Higgins, 2020). The analysis was conducted with reference to five main categories: bias related to the randomization procedure, bias resulting from deviations from the intended interventions, bias due to incomplete outcome data, bias in the measurement of outcomes, and bias associated with selective reporting of results (Sterne et al., 2019). Each study was classified within these five domains as having a 'low,' 'high,' or 'unclear' risk of bias.

Strategy of data synthesis A quantitative synthesis of results from primary studies was conducted if identical variables—expressed as mean and standard deviation—were reported in at least two randomized controlled trials. To assess the effect size of continuous data, the following measures were used: mean difference or standardized mean difference. The overall meta-analytic effect was calculated using a random-effects model. A 95% confidence interval was applied to all calculations. Heterogeneity of effect sizes was assessed using the I^2 statistic, with thresholds of 25% indicating low heterogeneity, 50% moderate, and 75% high. A significance level of $p < 0.05$ was adopted for all statistical analyses. The meta-analysis procedure was performed using STATISTICA (Data Analysis Software System), version 13.3, Plus package. Subgroup and sensitivity analyses were not conducted.

Subgroup analysis Subgroup analysis was not performed.

Sensitivity analysis Sensitivity analysis was not performed.

Country(ies) involved Poland.

Keywords lateral epicondylitis; shock wave; radial shock wave; focused shock wave; hilt; high intensity laser; therapy; treatment.

Contributions of each author

Author 1 - Monika Benduch.

Author 2 - Artur Dudoń.

Author 3 - Magdalena Stania.