

Global map of tennis elbow literature: A bibliometric analysis supported with statistical methods

 **Sezgin Korkmaz.** *Faculty of Sport Sciences. Burdur Mehmet Akif Ersoy University. Burdur, Turkey.*
 **Hüseyin Şahin Uysal.** *Faculty of Sport Sciences. Burdur Mehmet Akif Ersoy University. Burdur, Turkey.*
 **Bogdan Alexandru Antohe**  *Department of Physical Therapy and Occupational Therapy. "Vasile Alecsandri" University of Bacău. Bacău, Romania.*
Elena Adelina Panaet. *Department of Physical Therapy and Occupational Therapy. "Vasile Alecsandri" University of Bacău. Bacău, Romania.*

ABSTRACT

The study aimed to evaluate global trends by analysing bibliometric data on tennis elbow research indexed in the Web of Science (WOS) and to test the significance of bibliometric trends with statistical methods. The study design followed the BIBLIO checklist protocol to ensure high reporting quality. The WOS database was used to obtain bibliometric data, and 895 research articles meeting the inclusion criteria were included in the study. Bibliometric results were reported with figures, while the statistical significance of the data was assessed using Mann–Kendall trend analysis and Chi-square goodness-of-fit test. Research trends were analysed using Bradford's Law, Lotka's Law, thematic mapping, and factor analysis. There was a statistically significant increase in tennis elbow research over the years ($\tau = 0.83$, $p = .01$). Baker CL had the most studies compared to the other authors ($\chi^2 = 2.74$; $df = 9$; $p = .97$). The most commonly used keywords were "pain," "management," and "tennis elbow." The factor analysis showed a clear divide between treatment methods and epidemiological studies. The results highlighted a research gap in connecting risk factors with disease prevalence and assessing the effectiveness of specific treatments. Also, the thematic map revealed that studies on tennis elbow have primarily focused on pain management, while surgical treatment and clinical trials remain underexplored. In conclusion, tennis elbow has been extensively researched in the literature for 40 years. Although pain management is the focus, many research gaps must be developed. Current findings may be guiding for field professionals and practitioners.

Keywords: Tennis elbow, Lateral humeral epicondylitis, Tendinitis, Elbow injuries, Bibliometric analysis.

Cite this article as:

Korkmaz, S., Uysal, H. S., Antohe, B. A., & Panaet, E. A. (2026). Global map of tennis elbow literature: A bibliometric analysis supported with statistical methods. *Journal of Human Sport and Exercise*, 21(1), 227-245. <https://doi.org/10.55860/69931070>



Corresponding author. *Department of Physical Therapy and Occupational Therapy, "Vasile Alecsandri" University of Bacău, 600011 Bacău, Romania.*

E-mail: antohe.bogdan@ub.ro

Submitted for publication September 10, 2025.

Accepted for publication October 27, 2025.

Published November 17, 2025.

[Journal of Human Sport and Exercise](https://doi.org/10.55860/69931070). ISSN 1988-5202.

©Asociación Española de Análisis del Rendimiento Deportivo. Alicante. Spain.

doi: <https://doi.org/10.55860/69931070>

INTRODUCTION

Tennis elbow, also known as lateral epicondylitis, is a condition characterized by pain and inflammation of the tendons that attach to the lateral epicondyle of the humerus. Lateral elbow pain affects 1 to 3% of the population, with peak incidence occurring at 40 to 50 (Bisset et al., 2011). The incidence is higher in athletes, especially overhead-throwing athletes (baseball, track and field, handball, volleyball) and tennis players, who combine forceful and repetitive extension movements (Hassebrock et al., 2019). The prevalence of lateral epicondylitis is seven times higher than medial epicondylitis (Cutts et al., 2020). The right hand has an incidence of 63%, the left one 25%, and both hands are affected in 12% of the population (Sanders et al., 2015). The recurrence rate in the population is 8.5%, and the injury may recur in an average of 19.7 months (Sanders et al., 2015).

The ethology of lateral epicondylitis can be defined as repetitive trauma from overuse (Krosiak & Murrell, 2007). Repetitive extensor carpi radialis brevis muscle eccentric contractions may alter tendon structure and cause a degenerative process to begin (Hofwegen Van et al., 2010). Researchers also argued that other risk factors are microvascular lesions, cutaneous nerve injury, anatomic predispositions, improper technique and equipment, altered loading patterns, and joint biomechanics (Anghel, 2023; Kandemir et al., 2002). This clinical presentation of lateral epicondylitis may vary, and it can lead to cessation of activity in athletes. Functional use of the involved upper extremity can be limited, and usually, gripping activities exacerbate the symptoms. Also, resisted wrist extension, radial deviation, finger extension, and forearm supination can produce pain. Other symptoms include diminished grip strength, elbow stiffness in the morning, limited range of motion secondary to pain, tenderness at the lateral epicondyle, and radiating pain down the forearm. The previous studies reported that radial tunnel compression can accompany lateral epicondylitis in up to 10% of that population (Izzi et al., 2001; Orchard & Kountouris, 2011).

The treatment of tennis elbow can be conservative or surgical. Even if the success rate of nonoperative treatment can be up to 90%, 4 to 11% of the patients ultimately require surgery. For the patients who follow conservative treatment, this includes patient education, physical therapy, medications, acupuncture, braces, and injections (Hofwegen Van et al., 2010; Onu et al., 2021). However, researchers found no evidence that surgical interventions for tennis elbow are more effective than non-surgical interventions (Bateman et al., 2017).

The impact of tennis elbow on athletes' performance may vary based on the intensity of symptoms and the rest period. The return to sports after arthroscopic treatment for lateral epicondylitis reported in the literature varies between 2 to 16 weeks (Dunkow et al., 2004). After arthroscopic surgery, the average return to sports was 8.6 weeks (Oki et al., 2014). Researchers reported that a return to sport was made in 35 days for patients who performed arthroscopic surgery, compared to open surgery patients, who returned to sports in 66 days (Kumar et al., 2015). Some studies reported a local muscle imbalance among forearm muscles (Alizadehkhayat et al., 2007) and global upper limb weakness in recovered tennis elbow (Alizadehkhayat et al., 2009). This indicates an incomplete functional recovery of the patient with lateral epicondylitis and suggests the necessity to follow a global and holistic approach in the treatment of this pathology.

Researchers have recently employed bibliometric analysis to uncover the challenges associated with research on tennis elbow and identify emerging trends within the field (Xu et al., 2023; Zhu et al., 2023). Researchers favour this analytical approach to determine research trends, identify the most cited articles, recognize influential researchers, pinpoint key journals and countries, map collaboration networks, and assess other critical scientific indicators (Donthu et al., 2021). While bibliometric analyses have been

conducted in this research area, existing studies have limitations concerning the bibliometric analysis methodology. The primary limitation is the number of studies included in the analysis. A previous bibliometric analysis examined the 100 most-cited research articles on tennis elbow (Zhu et al., 2023). However, other researchers have argued that the scientific impact cannot be measured solely by citation counts (Vanclay, 2012). Since bibliometric analysis aims to provide a comprehensive overview of a research field (Aria & Cuccurullo, 2017), an analysis based on only 100 articles may not adequately represent the entirety of tennis elbow literature. Another limitation of existing studies is the type of articles included in the analysis. Previous bibliometric analyses also incorporated review articles (Xu et al., 2023; Zhu et al., 2023). However, review articles have been reported to receive three times more citations than the original research articles (Miranda & Garcia-Carpintero, 2018). This discrepancy may compromise the reliability of bibliometric data concerning citation counts and could result in significant studies within the field being overlooked. Additionally, prior studies did not use quotation marks for the keywords identified during the electronic search (Xu et al., 2023; Zhu et al., 2023). Enclosing recorded keywords in quotation marks is essential for enhancing the effectiveness of electronic searches (Bramer et al., 2018). The absence of quotation marks in word combinations may have led to the inclusion of studies not directly related to tennis elbow in the bibliometric analysis. Finally, owing to limitations in the data extraction methods employed in previous studies, researchers have emphasized the need for improved bibliometric analyses of tennis elbow using more precise methodologies (Xu et al., 2023; Zhu et al., 2023).

A bibliometric analysis that addresses the existing limitations can provide a more accurate representation of the research field. More robust interpretations of the study findings can be derived by testing the statistical significance of the obtained bibliometric data and evaluating it using alternative statistical methods. The primary aim of this study was to conduct a bibliometric analysis of research articles on tennis elbow indexed in the Web of Science (WOS). An additional aim was to enhance the study results' reliability by assessing the bibliometric data's accuracy through statistical analyses. The following statement serves as the problem statement for this study: What are the emerging trends in research articles on tennis elbow indexed in the WOS?

MATERIAL AND METHOD

Study design

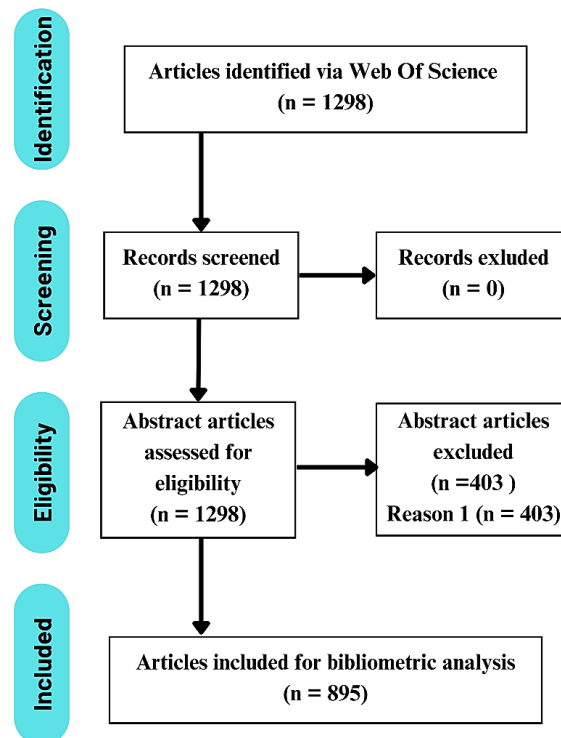
This study employed a quantitative research approach to analyse numerical data. The study protocol was registered in the Open Science Framework (OSF) (DOI:[10.17605/OSF.IO/Y35DE](https://doi.org/10.17605/OSF.IO/Y35DE) accessed August 23, 2024). The study protocol was carried out according to the criteria in the BIBLIO checklist to improve reporting quality (Montazeri et al., 2023). The checklist details are presented in Appendix 1. Additionally, all documents utilized in this study were presented as open access to the OSF (<https://osf.io/y5gke>).

Search strategy

Two independent researchers conducted a literature search using the Web of Science Core Collection (Clarivate Analytics, Toronto, Canada). Medical Subject Headings (MeSH) terms were analysed to identify relevant keywords for the literature search, and expert opinions were considered. The following keyword combinations with Boolean operations were employed to identify studies on tennis elbow: "*Lateral Epicondylitis*" (Title), "*tennis elbow*" (Title), "*Lateral Epicondylitis*" (Title), "*Humeral Epicondylitides*" (Title), and "*Lateral Humeral Epicondylitides*" (Title). (<https://www.webofscience.com/wos/woscc/summary/21ddf5fb-ea61-472f-bdf5960c3c5da50d-fcc6e42a/relevance/1>), accessed August 22, 2024). The researchers reviewed the abstracts and titles of all the studies to confirm their relevance to the research field.

Inclusion and exclusion criteria

The word combination of the study was scanned in the WOS electronic database with only the “Title” criterion, and the aim was to identify the most relevant studies in the research field. Only “Article” was selected as the document type to identify subject trends. There were no restrictions on criteria, such as publication time, publication language, and journal index. Details of the screening results based on the inclusion and exclusion criteria are presented in Figure 1.



Note. Reason 1: Other types of documents that are not original articles (such as reviews, letters to the editor, books).

Figure 1. Study flow diagram for articles included in the bibliometric analysis.

Statistical analysis

The studies were exported as the “*bib.tex*” from the WOS to conduct bibliometric analyses. The certainty of the evidence from the data was reported as a percentage. The statistical frequencies derived from the documents were utilized for bibliometric analyses. Time-based bibliometric data were assessed using Mann–Kendall trend analysis to determine the statistical significance of the results obtained. Changes in bibliometric data over time were reported using tau and *p*-values. Conversely, the Chi-square goodness-of-fit test was employed to assess non-time-based bibliometric data. A *post-hoc* analysis, utilizing the Bonferroni correction, was conducted when statistically significant differences between groups were identified. The results were reported using the chi-square value, degrees of freedom, and *p*-value based on the degree of compliance between the observed frequencies in the bibliometric data and the theoretical or expected frequencies.

In addition to the frequency-based bibliometric analyses conducted in this study, Bradford's law distribution, Lotka's law distribution, thematic analysis, and factor analysis with biplot were employed. Bradford's Law distribution was utilized to illustrate how articles published in the literature on tennis elbow are concentrated in specific journals. In contrast, Lotka's law was applied to interpret the distribution of author productivity in this field. A thematic map was chosen to visually represent the concepts in the research area and the

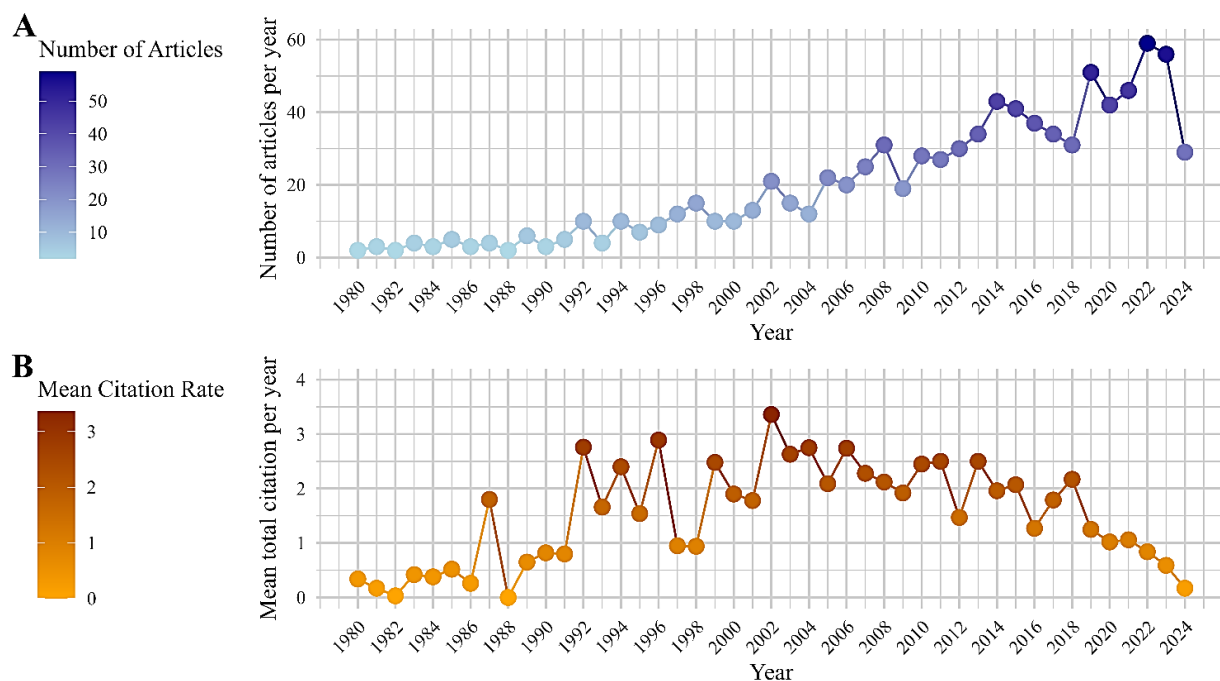
relationships among them, while factor analysis aimed to identify the ideas that differentiated this research area. All statistical analyses were performed using the R software (version 4.1.1, Core Team, Vienna, Austria). The following packages were used to conduct these analyses: {bibliometrix}, {ggplot2}, {dplyr}, {patchwork}, {kendall}, {extrafond}, {tidyverse}, and {scales}.

RESULTS

Scientific productivity results for tennis elbow studies

The literature search indicated that studies on tennis elbow had been indexed in the WOS since 1980. A total of 895 articles were included in this study (Figure 1). The highest number of publications in this research field occurred in 2022, with 59 articles. It was noted that the literature on tennis elbow continued to develop at a rate of 14%. This development was evaluated statistically, revealing a significant upward trend in scientific publications per year ($\tau = 0.83$, $p = .01$). The results demonstrated that this trend has persisted since 1984.

The year with the highest average citation rate for tennis elbow was 2002, with a citation rate of 3.36. A comparison of the yearly citation rates revealed no statistically significant trend in the annual citation rate from 1980 to 2024 ($\tau = 0.18$, $p = .07$). Details regarding scientific productivity are presented in Figure 2.



Note. A: annual number of scientific publications; B: Annual mean total citation rate.

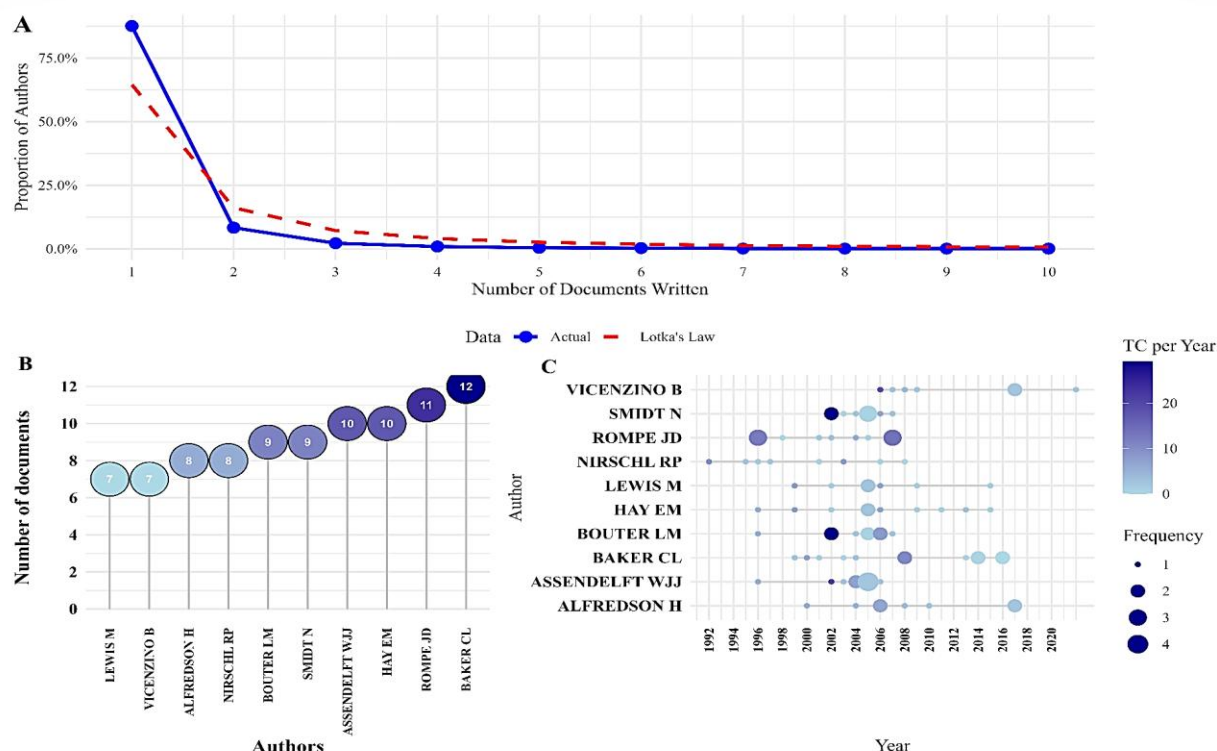
Figure 2. Scientific productivity results for tennis elbow studies.

Results for researchers studying tennis elbow

The distribution of researchers publishing on the subject according to the number of articles was evaluated using Lotka's law (Figure 3a). The results revealed that more than 75% of researchers wrote only one article. The number of researchers decreased as the number of articles written increased, and these results showed that most researchers published a limited number of articles on this subject. Therefore, it is understood that a few researchers have had a dominant effect on the literature.

The obtained dataset determined that 3432 authors were published in the research field, and the number of articles of the ten authors with the most publications was reported. The results showed that Baker CL was the researcher with the most publications on tennis elbow (Figure 3b), but no statistically significant difference was found between the number of articles by the first ten authors ($\chi^2 = 2.74$; $df = 9$; $p = .97$).

When the authors' tendency to research tennis elbows according to the years was evaluated, it was observed that Vicenzino B had conducted research on tennis elbows in recent years (Figure 3c). Although Baker CL last conducted research on tennis elbow in 2016, only Baker CL out of 10 researchers researched tennis elbow with a statistically significant and increasing trend ($\tau = 0.63$, $p = .05$). No statistically significant trend was found in the studies conducted by the other nine researchers over the years ($\tau = -0.11$ to 0.62 , $p = .36$ to 1).



Note. A: Author Productivity Actual vs Lotka's Law. The blue line (Actual) represents the document writing rate of authors with actual data. In contrast, the red dotted line (Lotka's Law) means the document writing rate of authors expected according to Lotka's Law; B: Total number of publications of the top 10 authors who published the most on tennis elbow. Larger and darker bubbles indicate a higher number of document; C: Tendency of the top 10 most published authors to examine tennis elbow by year. The lines on the x-axis represent the years the authors researched the topic. The size and colour of the bubbles indicate the number of citations per year. Larger, darker bubbles indicate higher citation counts.

Figure 3. Results of researchers' scientific productivity.

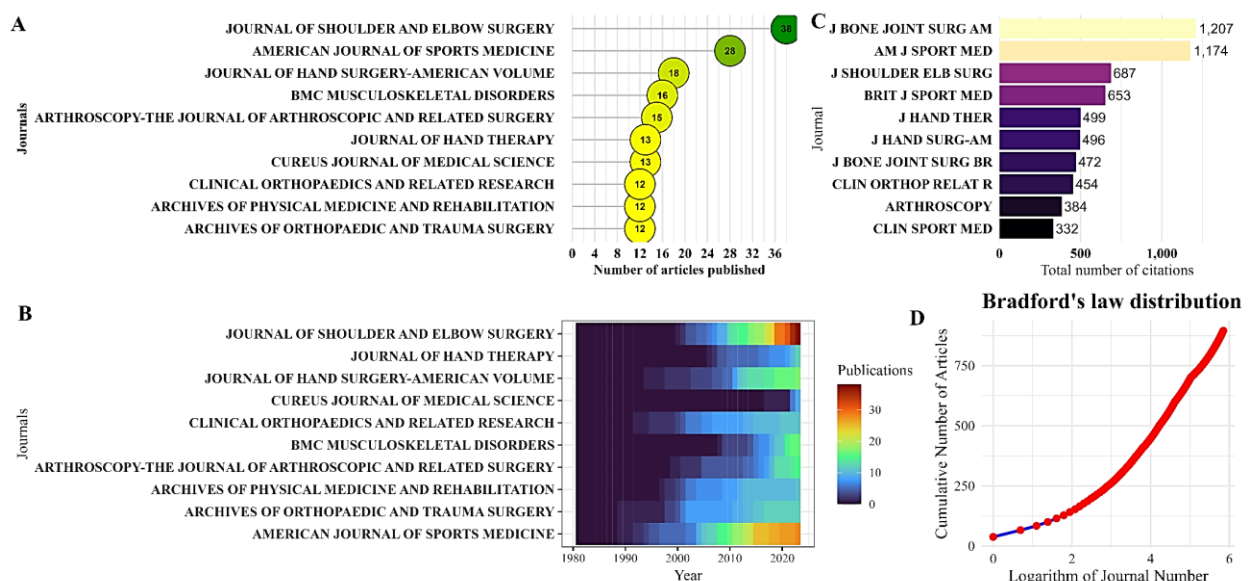
Results for journals accepting studies on tennis elbow

The ten journals that published the most articles on tennis elbow were evaluated, revealing that the Journal of Shoulder and Elbow Surgery exhibited the highest propensity to accept submission (Figure 4a). The results of the chi-square goodness-of-fit test indicated a statistically significant difference in the journals' tendency to accept publications on this topic ($\chi^2 = 37.86$; $df = 9$; $p = .01$). Post-hoc analysis demonstrated that the

Journal of Shoulder and Elbow Surgery had a statistically significant higher acceptance rate for tennis elbow studies than other journals (expected number of articles = 17.7; number of published articles = 38; $p = .01$).

When the journals' tendency to accept publications on tennis elbow was examined by year, it was found that the journals that accepted the most publications since 1980 were the Journal of Shoulder and Elbow Surgery and the American Journal of Sports Medicine (Figure 4b). When these results were compared statistically, no statistically significant tendency was found for the Archives of Orthopaedic and Trauma Surgery ($\tau = 0.08$, $p = .51$) and the Archives of Physical Medicine and Rehabilitation ($\tau = 0.19$, $p = .11$). In contrast, other journals demonstrated a statistically significant and increasing trend in accepting publications on tennis elbow since 1980 ($\tau = 0.96$ to 0.23 , $p = .01$).

When evaluating the total citation counts of the ten journals that published the most articles on tennis elbow, it was found that the journal with the highest number of citations was The Journal of Bone & Joint Surgery, which had 1,207 citations (Figure 4c). Additionally, a statistically significant difference was observed between the total citation counts of the journals ($\chi^2 = 1372.60$; $df = 9$; $p = .01$). Post-hoc analysis revealed that The Journal of Bone & Joint Surgery (expected total citations = 635.8; actual total citations = 1,207; $p = .01$), American Journal of Sports Medicine (expected total citations = 635.8; actual total citations = 1,174; $p = .01$), and Journal of Shoulder and Elbow Surgery (expected total citations = 635.8; actual total citations = 687; $p = .01$) had citation counts significantly higher than expected. Although statistically significant results were found for other journals, their citation counts were lower than anticipated ($p < .05$).



Note. A: Journals that accept the most publications on tennis elbow. Darker bubbles indicate a higher number of articles; B: Number of publications in journals by year. The colour scale shows the number of publications per year. Redder colours represent more publications; C: Most cited journals. The length and colour of the bars vary according to the number of citations. Longer, lighter bars indicate more highly cited journals; D: Bradford's Law distribution. The blue line shows the distribution of journal articles published with the actual data, while the red line shows the expected distribution according to Bradford's Law.

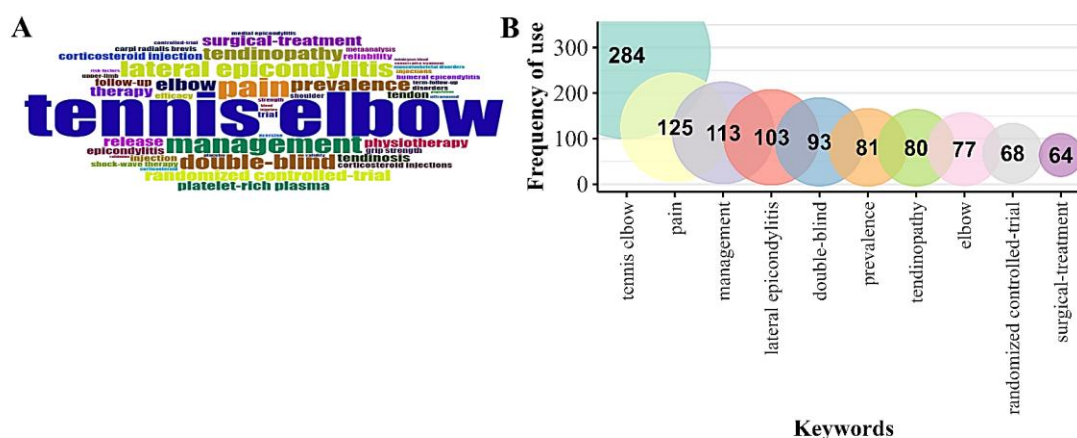
Figure 4. Journal publication trends in tennis elbow studies.

The results for journals accepting studies on tennis elbow were evaluated according to Bradford's law distribution (Figure 4d). The results showed that the cumulative number of articles increased at a specific

rate, with more journals providing fewer articles. Bradford's law revealed that most articles on tennis elbow were published in a relatively small number of journals. Details of the journals accepting studies on tennis elbow are presented in Figure 4.

Results for keywords used in tennis elbow studies

The most preferred keywords in the studies on tennis elbow were tennis elbow, pain, management, and lateral epicondylitis (Figures 5a and 5b). Researchers significantly preferred the tennis elbow keyword compared to other keywords (expected total keyword frequency = 108.8; actual total keyword usage = 284; $p = .01$). The usage frequencies of the keywords pain, management, lateral epicondylitis, and double-blind revealed similar results to the expected usage frequency, and no statistically significant difference was found ($p < .05$). Although a statistically significant difference was found for the keywords surgical treatment, randomized controlled trial, elbow, tendinopathy, and prevalence ($p = .01$), it was understood that these keywords were preferred less than the expected usage frequency. Details regarding the keywords used in tennis elbow studies are presented in Figure 5.



Note. A: Keyword cloud for keywords. More prominent keywords indicate more frequent usage; B: The ten most used keywords by researchers and their frequencies.

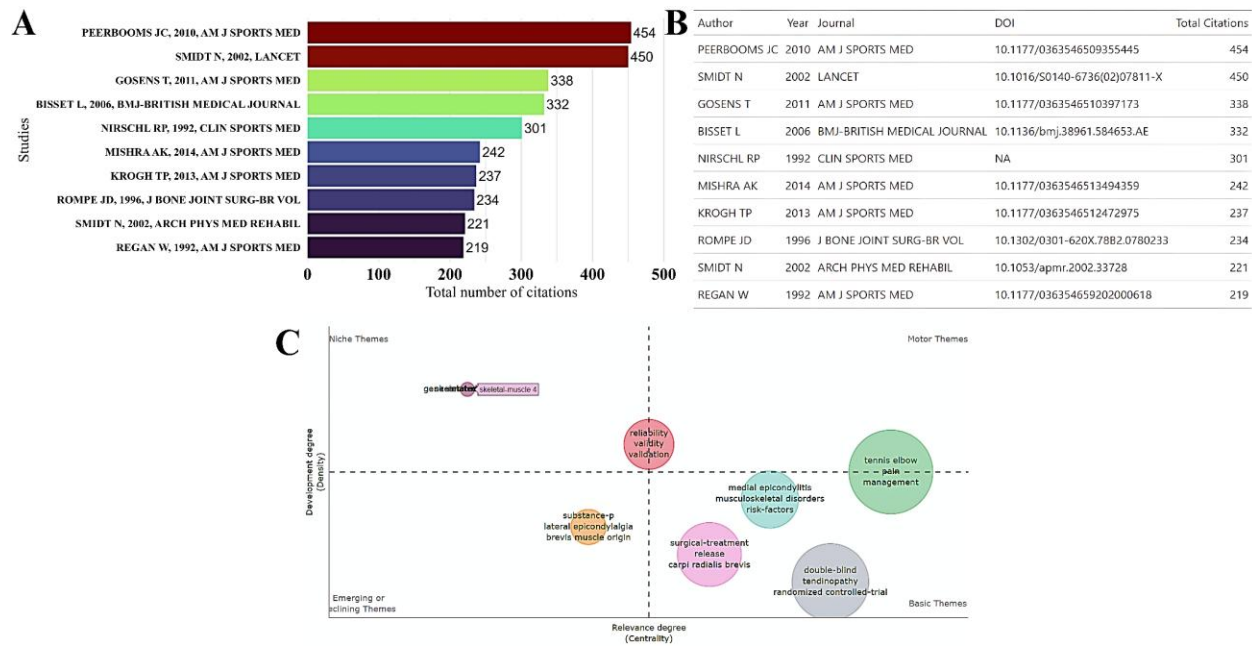
Figure 5. Frequency of keyword usage by researchers.

Results for study trend in tennis elbow studies

Trends in studies on tennis elbow were assessed (Figures 6a and 6b), and four studies (Bisset et al., 2006; Gosens et al., 2011; Peerbooms et al., 2010; Smidt, Van Der Windt, et al., 2002) were found to have a statistically significant number of citations exceeding expectations (expected total citations = 302.8; actual total citations = 332 to 454; $p = .01$). Although statistically significant results were also observed in other studies, the total citation counts were below the expected number per study (expected total citations = 302.8; actual total citations = 219 to 301; $p = .01$).

When the thematic map for tennis elbow was evaluated (Figure 6c), it was evident that research on tennis elbow and pain management was the most developed and extensively studied area within this field. However, surgical treatment and clinical trials are essential to address tennis elbows effectively. In addition, researchers have paid little attention to these topics. Studies examining the impact of skeletal muscle structure on tennis elbow have exhibited low centrality despite being intensively researched. Finally, research topics such as substance-p, lateral epicondylalgia, brevis, and muscle origin also demonstrated low centrality and were included in only a limited number of studies. Consequently, it can be inferred that these themes are either

newly emerging or that researchers have lost interest in them. Details regarding the trends in tennis elbow studies are presented in Figure 6.



Note. A: Most cited studies. Longer bars indicate more citations; B: Information on most cited studies; C: Thematic map of tennis elbow studies. Relevance degree (Centrality) indicates the degree of relevance of the study topics, while development degree (Density) describes the degree of development. The upper right theme (Motor themes) generally represents the field's most important and influential research topics. In contrast, the upper left theme (Niche themes) means the study topics necessary for a particular subfield or research group. The lower right theme (Basic themes) forms the basis of the research field and represents research topics with the potential for further development. The lower left theme (Emerging or Declining Themes) indicates potential changes or trends in the research field.

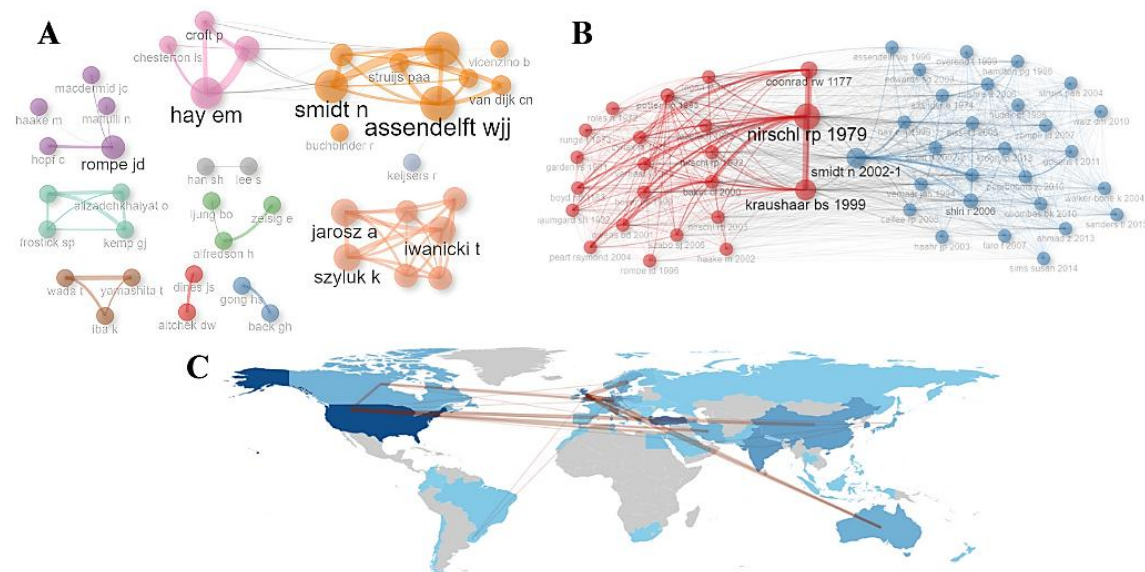
Figure 6. Trends in tennis elbow studies.

Results for the collaboration network in tennis elbow studies

The networks of researchers collaborating on tennis elbow were evaluated, revealing ten groups that exhibited significant collaboration. Among these groups, the most collaborative researchers were Hay EM, Smidt N, and Assendelft WJJ (Figure 7a). Based on the co-citation network results, the studies were categorized into two groups (Figure 7b). Notably, three publications emerged as the most cited within these groups (Kraushaar et al., 1999; Nirschl & Pettrone, 1979; Smidt, Van der Windt, et al., 2002) (Figure 7b). The cross-country collaboration network indicated that the United States had the highest level of collaboration (Figure 7c). Additional details regarding the collaborations on tennis elbow are presented in Figure 7.

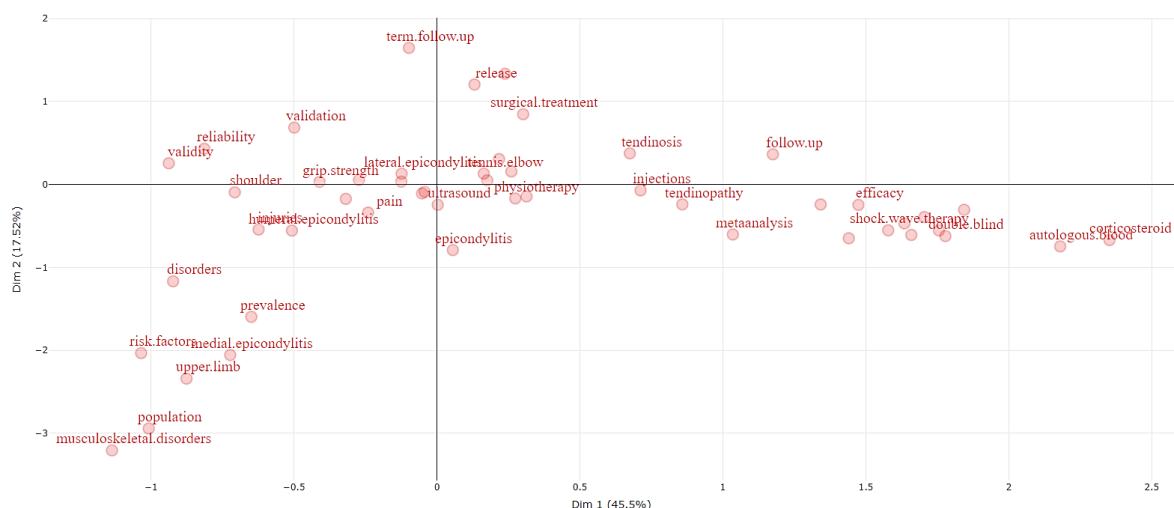
Results for factor analysis in tennis elbow studies

The two-dimensional map of the tennis elbow literature presented in Figure 1 illustrates the field's broad scope and research focus. The first dimension (Dim 1) explains 45.5% of the total variance and reflects a spectrum of the literature that moves from general epidemiology to specific treatment methods. A clear distinction was observed between treatment methods, such as "autologous blood" and "corticosteroid" in the upper right part of the graph, and epidemiological terms, such as "risk factor" and "prevalence" in the lower left part. This finding indicated that studies examining the relationship between risk factors and disease prevalence and the effectiveness of specific treatment methods were insufficient. Details on the factor analysis are presented in Figure 8.



Note. A: Collaboration network between authors. The colour of the node groups defines researchers who collaborate more frequently with each other. The size of the nodes indicates the researchers who collaborates more frequently. The lines explain the collaboration between researchers; B: Co-citation network. The colour of the node groups identifies researchers who are more frequently cited. The size of the nodes indicates the more frequently cited researchers. The lines describe the citation exchange between researchers. C: Collaboration network between countries.

Figure 7. Collaboration network for studies on tennis elbow.



Note. Dim 1 represents the x-axis and Dim 2 represents the y-axis. Dim 1 and 2 percentages represent the proportion of components that make up the data set. A higher percentage is a more critical component for the subject area. Variables that are closer together are described as having a stronger relationship with each other, while variables that are farther apart are defined as less related or independent. Positive values identify variables with a linear relationship with the component in question, while negative values identify variables with a negative relationship with the component in question.

Figure 8. Visualization of study topics on tennis elbow with biplot.

Certainty of evidence of bibliometric data

Articles indexed in the WOS database were used to obtain bibliometric data. No data loss occurred when exporting information on authors, document types, journals, publication years, titles, and citation information. Data loss occurred between 0.67% and 5.92% in the affiliation information of authors and abstracts. While

12.74% of data loss occurred in the information on DOI numbers, data loss for keywords was between 20-30%. Details on data loss are provided in Appendix 2.

DISCUSSION

The aim of this study was to conduct a bibliometric analysis of research articles on tennis elbow indexed in WOS and to evaluate the significance of the results by statistical analysis. The results provided empirical and original evidence for researchers on tennis elbow literature.

The annual number of studies on the tennis elbow has been increasing with fluctuations, while the average number of citations has decreased since 2002. The analysis indicated that these results were statistically significant. Baker CL has conducted research on tennis elbow for 17 years and is the author who has done the most research on the subject. The analysis confirmed the importance of Baker CL for tennis elbow with the statistical significance of the results. The author developed an arthroscopic classification system for lateral epicondylitis and investigated the appropriate arthroscopic treatment methods for patients in different stages. Arthroscopic methods are used more frequently in the treatment of lateral epicondylitis. Arthroscopic debridement and ECRB tendon resection include excision of pathological tissues and partial resection. However, aggressive resection may cause tendon insufficiency and residual pain (Matache et al., 2016). Arthroscopic repair techniques can be used in partial or full-thickness ECRB tendon tears, but inadequate healing may be observed in chronic cases due to poor tendon quality (Burn et al., 2018). Arthroscopic decortication and bone stimulation may increase the fracture risk in the lateral epicondyle and may be limited in chronic cases (Miyazaki et al., 2015). Arthroscopic reconstruction using autologous or allogeneic tendon grafts may cause complications such as donor site morbidity, graft failure, and risk of infection and require a long rehabilitation period (Ruch et al., 2015). Therefore, each patient's condition should be evaluated individually, and the appropriate arthroscopic treatment method should be selected.

Only one of the top 10 journals accepting the most publications on tennis elbow (Cureus Journal of Medical Science) was included in the “*Emerging Sources Citation Index*.” In contrast, the others were included in the “*Science Citation Index*.” These journals focused on traumatology, therapy, and orthopaedics, while the journal accepting the most publications on the subject area was the Journal of Shoulder and Elbow Surgery. This journal focused on medical, surgical, and physical treatment methods for injuries and diseases in the shoulder and elbow region. The analyses confirmed that the Journal of Shoulder and Elbow Surgery accepted the most publications on the subject area with statistical significance levels.

On the other hand, words such as tennis elbow, pain, and management were the most preferred keywords on the subject. The frequent use of these keywords together shows these concepts are closely related. Tennis elbow is a disorder characterized by pain and tenderness on the outer side of the elbow, and pain is the most prominent and disturbing symptom of tennis elbow. An effective treatment/management strategy is essential to controlling pain and improving patients' quality of life. An effective treatment program requires collaboration between different medical disciplines and a multidisciplinary approach. This may explain why treatment/management is often used with pain and tennis elbow. Similar multidisciplinary approaches have been shown to be effective in other upper limb conditions, such as ulnar nerve paralysis (Adina Camelia & Marius, 2021).

This study has also revealed guiding research gaps for researchers who want to research tennis elbow. The thematic map (Figure 6c) showed that the focus of research on tennis elbow revolves around pain management. Most studies have aimed to mitigate pain while addressing physiological, psychological, and

social dimensions (Glowacki, 2015). Various strategies have been explored for pain relief, including physiotherapy, manual therapy, therapeutic exercises, pharmacological interventions, and electrotherapy (Landesa-Piñeiro & Leirós-Rodríguez, 2022). Although surgical treatment and clinical trials are essential for effectively managing tennis elbow, these topics require further investigation. One reason for the limited research on surgical interventions may be that only 2% of patients diagnosed with tennis elbow require surgery (Degen et al., 2018).

Although studies over the last decade have linked tennis elbow to medial epicondylitis and various musculoskeletal disorders, such as carpal tunnel syndrome, De Quervain disease, and rotator cuff tendinosis (Otoshi et al., 2015; Titchener et al., 2013), a comprehensive research strategy is needed to clarify the links between lateral epicondylitis, medial epicondylitis, and other musculoskeletal disorders, this strategy should emphasize the fascial, neurological, and biomechanical factors that contribute to the development of these disorders (Bianco, 2019). A decreasing trend in focus is observed in relation to lateral epicondylalgia, substance P, and the origin of the extensor carpi radialis brevis muscle. Epicondylalgia term was proposed instead of "*lateral epicondylitis*" in 2005. However, experts have not widely accepted this proposal (Waugh, 2005). In addition, the initial focus on the origin of lateral epicondylitis from the extensor carpi radialis brevis muscle has been largely ignored. This concept was central to the early stages of research on lateral epicondylitis. It is now understood that the etiology of lateral epicondylalgia can be tendinogenic, articular, fascial, vascular, or neurogenic (Bales et al., 2007; Shirato et al., 2015). When analysing the study topics on tennis elbow (Figure 8), it is seen that the authors mainly focused on the most frequently encountered keywords, such as pain, lateral epicondylitis, and tennis elbow, and therapeutic methods, such as physiotherapy, ultrasound, and injections.

The literature has confirmed the effectiveness of newer treatment modalities, such as platelet-rich plasma and shock wave therapy (Yao et al., 2020), in managing lateral epicondylitis. However, the positioning of these topics in the lower right quadrant of the graph indicates a deficiency in studies evaluating the effectiveness of these treatments. This scarcity is primarily because these therapies have been widely utilized in clinical practice for approximately a decade, which is insufficient time to establish comprehensive links (Nazaroff et al., 2021). Consequently, the limited number of studies makes it currently unfeasible to develop robust correlational models that involve risk factors, population characteristics, prevalence, and musculoskeletal disorders. These findings suggest potential directions for future research. As previously mentioned, studies investigating the relationships between risk factors, other musculoskeletal disorders, and specific populations should consider emerging trends in the pathophysiological understanding of lateral epicondylitis. This is particularly important for research that emphasizes the roles of the fascial, neurological, and biomechanical systems in identifying sources of pain. Although these connections are present, they are functional, making it challenging to uncover them through evidence-based studies.

This study had some limitations. The first limitation was related to the electronic databases searched. In this study, only the WOS database was searched. In addition, it was understood that the bibliometric findings for keywords had low certainty of evidence. Future studies can conduct research with similar study protocols in different databases. In addition, bibliometric analysis can be limited to current studies to increase the certainty of evidence.

CONCLUSION

This bibliometric analysis comprehensively evaluated the global literature on tennis elbow. The findings indicated a significant upward trend in the volume of publications, particularly in recent years, with pain

management emerging as a central theme. Despite the increasing number of studies, gaps persist in exploring surgical treatments and their efficacy compared to conservative methods. Furthermore, while Baker CL's contributions have notably influenced the field, there was limited collaboration among researchers. Future studies should prioritize a multidisciplinary approach that integrates therapeutic innovations and investigates under-researched areas, such as the relationship between lateral epicondylitis and other musculoskeletal disorders. This analysis can offer valuable insights for guiding future research and clinical practices related to tennis elbow.

AUTHOR CONTRIBUTIONS

Conceptualization: B.A.A., E.A.P., and S.K.; Methodology: S.K. and HŞU; Software: H.Ş.U. and S.K.; Validation: B.A.A. and E.A.P.; Formal analysis: H.Ş.U., and S.K.; Investigation: B.A.A. and S.K.; Resources: E.A.P. and B.A.A.; Writing—original draft preparation: S.K., H.Ş.U., B.A.A., and E.A.P.; Visualization: H.Ş.U.; Supervision: S.K. and E.A.P.; Project administration: S.K., B.A.A. All authors have read and agreed to the published version of the manuscript.

SUPPORTING AGENCIES

No funding agencies were reported by the authors.

DISCLOSURE STATEMENT

No potential conflict of interest was reported by the authors.

DATA AVAILABILITY

Open access to the data is presented available through OSF (<https://osf.io/y5gke/>)

CODE AVAILABILITY

Open access to the codes is presented available through OSF (<https://osf.io/y5gke/>)

ACKNOWLEDGMENTS

We thank all the researchers who contributed to this bibliometric analyses by doing research on tennis elbows.

REFERENCES

- Adina Camelia, Şlicaru, & Marius, P. (2021). Rehabilitative physical therapy intervention for the ulnar nerve paralysis. *Science, Movement and Health*, XXI(2), 480-485.
- Alizadehkhayat, O., Fisher, A. C., Kemp, G. J., Vishwanathan, K., & Frostick, S. P. (2007). Upper limb muscle imbalance in tennis elbow: A functional and electromyographic assessment. *Journal of Orthopaedic Research*, 25(12), 1651-1657. <https://doi.org/10.1002/jor.20458>
- Alizadehkhayat, O., Fisher, A. C., Kemp, G. J., Vishwanathan, K., & Frostick, S. P. (2009). Assessment of functional recovery in tennis elbow. *Journal of Electromyography and Kinesiology*, 19(4), 631-638. <https://doi.org/10.1016/j.jelekin.2008.01.008>

- Anghel, M. (2023). Biomechanical aspects regarding restoration of shoulder stability in athletes. *Bulletin of the Transilvania University of Braşov. Series IX: Sciences of Human Kinetics*, 16(65), 115-120. <https://doi.org/10.31926/but.shk.2023.16.65.1.14>
- Aria, M., & Cuccurullo, C. (2017). bibliometrix: An R-tool for comprehensive science mapping analysis. *Journal of Informetrics*, 11(4), 959-975. <https://doi.org/10.1016/j.joi.2017.08.007>
- Bales, C. P., Placzek, J. D., Malone, K. J., Vaupel, Z., & Arnoczky, S. P. (2007). Microvascular supply of the lateral epicondyle and common extensor origin. *Journal of Shoulder and Elbow Surgery*, 16(4), 497-501. <https://doi.org/10.1016/j.jse.2006.08.006>
- Bateman, M., Littlewood, C., Rawson, B., & Tambe, A. A. (2017). Surgery for tennis elbow: a systematic review. *Shoulder & Elbow*, 11(1), 35-44. <https://doi.org/10.1177/1758573217745041>
- Bianco, G. (2019). Fascial neuromodulation: an emerging concept linking acupuncture, fasciology, osteopathy and neuroscience. *European Journal of Translational Myology*, 29(3), 195-201. <https://doi.org/10.4081/ejtm.2019.8331>
- Bisset, L., Beller, E., Jull, G., Brooks, P., Darnell, R., & Vicenzino, B. (2006). Mobilisation with movement and exercise, corticosteroid injection, or wait and see for tennis elbow: randomised trial. *BMJ*, 333(7575), 939. <https://doi.org/10.1136/bmj.38961.584653.AE>
- Bisset, L., Coombes, B., & Vicenzino, B. (2011). Tennis elbow. *BMJ Clinical Evidence*, 2011.
- Bramer, W. M., de Jonge, G. B., Rethlefsen, M. L., Mast, F., & Kleijnen, J. (2018). A systematic approach to searching: an efficient and complete method to develop literature searches. *Journal of the Medical Library Association : JMLA*, 106(4), 531. <https://doi.org/10.5195/jmla.2018.283>
- Burn, M. B., Mitchell, R. J., Liberman, S. R., Lintner, D. M., Harris, J. D., & McCulloch, P. C. (2018). Open, arthroscopic, and percutaneous surgical treatment of lateral epicondylitis: A systematic review. *Hand*, 13(3), 264-274. <https://doi.org/10.1177/1558944717701244>
- Cutts, S., Gangoo, S., Modi, N., & Pasapula, C. (2020). Tennis elbow: A clinical review article. *Journal of Orthopaedics*, 17, 203-207. <https://doi.org/10.1016/j.jor.2019.08.005>
- Degen, R. M., Conti, M. S., Camp, C. L., Altchek, D. W., Dines, J. S., & Werner, B. C. (2018). Epidemiology and disease burden of lateral epicondylitis in the USA: Analysis of 85,318 Patients. *HSS Journal*, 14(1), 9-14. <https://doi.org/10.1007/s11420-017-9559-3>
- Donthu, N., Kumar, S., Mukherjee, D., Pandey, N., & Lim, W. M. (2021). How to conduct a bibliometric analysis: An overview and guidelines. *Journal of Business Research*, 133, 285-296. <https://doi.org/10.1016/j.jbusres.2021.04.070>
- Dunkow, P. D., Jatti, M., & Muddu, B. N. (2004). A comparison of open and percutaneous techniques in the surgical treatment of tennis elbow. *The Journal of Bone and Joint Surgery*, 86(5), 701-704. <https://doi.org/10.1302/0301-620X.86B5.14469>
- Glowacki, D. (2015). Effective pain management and improvements in patients' outcomes and satisfaction. *Critical Care Nurse*, 35(3), 33-41. <https://doi.org/10.4037/ccn2015440>
- Gosens, T., Peerbooms, J. C., Van Laar, W., & Den Ouden, B. L. (2011). Ongoing positive effect of platelet-rich plasma versus corticosteroid injection in lateral epicondylitis. 39(6), 1200-1208. <https://doi.org/10.1177/0363546510397173>
- Hassebrock, J. D., Patel, K. A., Makovicka, J. L., Chung, A. S., Tummala, S. V., Hydrick, T. C., Ginn, J. E., Hartigan, D. E., & Chhabra, A. (2019). Elbow injuries in national collegiate athletic association athletes: A 5-season epidemiological study. *Orthopaedic Journal of Sports Medicine*, 7(8). <https://doi.org/10.1177/2325967119861959>
- Hofwegen Van, C., Baker, C. L., & Baker, C. L. (2010). Epicondylitis in the athlete's elbow. *Clinics in Sports Medicine*, 29(4), 577-597. <https://doi.org/10.1016/j.csm.2010.06.009>

- Izzi, J., Dennison, D., Noerdlinger, M., Dasilva, M., & Akelman, E. (2001). Nerve injuries of the elbow, wrist, and hand in athletes. *Clinics in Sports Medicine*, 20(1), 203-217. [https://doi.org/10.1016/S0278-5919\(05\)70256-8](https://doi.org/10.1016/S0278-5919(05)70256-8)
- Kandemir, U., Fu, F. H., & McMahon, P. J. (2002). Elbow injuries. *Current Opinion in Rheumatology*, 14(2), 160-167. <https://doi.org/10.1097/00002281-200203000-00013>
- Kraushaar, B. S., Emerson, N. J., Nirschl, R. P., & Arlington, V. (1999). Current Concepts Review Tendinosis of the Elbow (Tennis Elbow). *The Journal of Bone & Joint Surgery*, 81(2), 259-278. <https://doi.org/10.2106/00004623-199902000-00014>
- Kroslak, M., & Murrell, G. A. C. (2007). Tennis elbow counterforce bracing. *Techniques in Shoulder and Elbow Surgery*, 8(2), 75-79. <https://doi.org/10.1097/BTE.0b013e318047c176>
- Kumar, S., Stanley, D., Burke, N. G., & Mullett, H. (2015). Tennis elbow. *The Annals of The Royal College of Surgeons of England*, 93(6), 432-432. <https://doi.org/10.1308/rcsann.2011.93.6.432>
- Landesa-Piñeiro, L., & Leirós-Rodríguez, R. (2022). Physiotherapy treatment of lateral epicondylitis: A systematic review. *Journal of Back and Musculoskeletal Rehabilitation*, 35(3), 463-477. <https://doi.org/10.3233/BMR-210053>
- Matache, B. A., Berdusco, R., Momoli, F., Lapner, P. L. C., & Pollock, J. W. (2016). A randomized, double-blind sham-controlled trial on the efficacy of arthroscopic tennis elbow release for the management of chronic lateral epicondylitis. *BMC Musculoskeletal Disorders*, 17(1). <https://doi.org/10.1186/s12891-016-1093-9>
- Miranda, R., & Garcia-Carpintero, E. (2018). Overcitation and overrepresentation of review papers in the most cited papers. *Journal of Informetrics*, 12(4), 1015-1030. <https://doi.org/10.1016/j.joi.2018.08.006>
- Miyazaki, A. N., Fregoneze, M., Santos, P. D., da Silva, L. A., Pires, D. C., Neto, J. da M., Rossato, L. H., & Checchia, S. L. (2015). Evaluation of the results from arthroscopic treatment of the lateral epicondylitis. *Revista Brasileira De Ortopedia*, 45(2), 136-140. [https://doi.org/10.1016/S2255-4971\(15\)30282-2](https://doi.org/10.1016/S2255-4971(15)30282-2)
- Montazeri, A., Mohammadi, S., M.Hesari, P., Ghaemi, M., Riazi, H., & Sheikhi-Mobarakeh, Z. (2023). Preliminary guideline for reporting bibliometric reviews of the biomedical literature (BIBLIO): a minimum requirements. *BMC Systematic Reviews*, 12(1), 1-10. <https://doi.org/10.1186/s13643-023-02410-2>
- Nazaroff, J., Oyadomari, S., Brown, N., & Wang, D. (2021). Reporting in clinical studies on platelet-rich plasma therapy among all medical specialties: A systematic review of Level I and II studies. *PloS One*, 16(4). <https://doi.org/10.1371/journal.pone.0250007>
- Nirschl, R. P., & Pettrone, F. A. (1979). Tennis elbow. The surgical treatment of lateral epicondylitis. *The Journal of Bone & Joint Surgery*, 61(6), 832-839. <https://doi.org/10.2106/00004623-197961060-00005>
- Oki, G., Iba, K., Sasaki, K., Yamashita, T., & Wada, T. (2014). Time to functional recovery after arthroscopic surgery for tennis elbow. *Journal of Shoulder and Elbow Surgery*, 23(10), 1527-1531. <https://doi.org/10.1016/j.jse.2014.05.010>
- Onu, I., Iordan, D.-A., Codreanu, C. M., Matei, D., & Galaction, A.-I. (2021). Anti-inflammatory effects of exercise training. A systematic review. *Balneo and PRM Research Journal*, 12(4), 418-425. <https://doi.org/10.12680/balneo.2021.473>
- Orchard, J., & Kountouris, A. (2011). The management of tennis elbow. *BMJ*, 342(7808). <https://doi.org/10.1136/bmj.d2687>
- Otoshi, K., Takegami, M., Sekiguchi, M., Onishi, Y., Yamazaki, S., Otani, K., Shishido, H., Fukuhara, S., Kikuchi, S., & Konno, S. (2015). Chronic hyperglycemia increases the risk of lateral epicondylitis: the

- Locomotive Syndrome and Health Outcome in Aizu Cohort Study (LOHAS). SpringerPlus, 4(1). <https://doi.org/10.1186/s40064-015-1204-3>
- Peerbooms, J. C., Sluimer, J., Bruijn, D. J., & Gosens, T. (2010). Positive effect of an autologous platelet concentrate in lateral epicondylitis in a double-blind randomized controlled trial. 38(2), 255-262. <https://doi.org/10.1177/0363546509355445>
- Ruch, D. S., Orr, S. B., Richard, M. J., Leversedge, F. J., Mithani, S. K., & Laino, D. K. (2015). A comparison of débridement with and without anconeus muscle flap for treatment of refractory lateral epicondylitis. Journal of Shoulder and Elbow Surgery, 24(2), 236-241. <https://doi.org/10.1016/j.jse.2014.09.035>
- Sanders, T. L., Maradit Kremers, H., Bryan, A. J., Ransom, J. E., Smith, J., & Morrey, B. F. (2015). The epidemiology and health care burden of tennis elbow: a population-based study. The American Journal of Sports Medicine, 43(5), 1066-1071. <https://doi.org/10.1177/0363546514568087>
- Shirato, R., Wada, T., Aoki, M., Iba, K., Kanaya, K., Fujimiya, M., & Yamashita, T. (2015). Effect of simultaneous stretching of the wrist and finger extensors for lateral epicondylitis: a gross anatomical study of the tendinous origins of the extensor carpi radialis brevis and extensor digitorum communis. Journal of Orthopaedic Science : Official Journal of the Japanese Orthopaedic Association, 20(6), 1005-1011. <https://doi.org/10.1007/s00776-015-0758-9>
- Smidt, N., Van der Windt, D. A., Assendelft, W. J., Mourits, A. J., Devill, W. L., De Winter, A. F., & Bouter, L. M. (2002). Interobserver reproducibility of the assessment of severity of complaints, grip strength, and pressure pain threshold in patients with lateral epicondylitis. Archives of Physical Medicine and Rehabilitation, 83(8), 1145-1150. <https://doi.org/10.1053/apmr.2002.33728>
- Smidt, N., Van Der Windt, D. A. W. M., Assendelft, W. J. J., Devillé, W. L. J. M., Korthals-de Bos, I. B. C., & Bouter, L. M. (2002). Corticosteroid injections, physiotherapy, or a wait-and-see policy for lateral epicondylitis: a randomised controlled trial. The Lancet, 359(9307), 657-662. [https://doi.org/10.1016/S0140-6736\(02\)07811-X](https://doi.org/10.1016/S0140-6736(02)07811-X)
- Titchener, A. G., Fakis, A., Tambe, A. A., Smith, C., Hubbard, R. B., & Clark, D. I. (2013). Risk factors in lateral epicondylitis (tennis elbow): A case-control study. The Journal of Hand Surgery, European Volume, 38(2), 159-164. <https://doi.org/10.1177/1753193412442464>
- Vanclay, J. K. (2012). Impact factor: Outdated artefact or stepping-stone to journal certification? Scientometrics, 92(2), 211-238. <https://doi.org/10.1007/s11192-011-0561-0>
- Waugh, E. J. (2005). Lateral epicondylalgia or epicondylitis: what's in a name? The Journal of Orthopaedic and Sports Physical Therapy, 35(4), 200-202. <https://doi.org/10.2519/jospt.2005.0104>
- Xu, J., Chen, M., Xue, X., Zhou, W., & Luo, X. (2023). Global research trends and hotspots in lateral epicondylitis during the past 30 years: A bibliometric and visualization study. Medical Science Monitor, 29. <https://doi.org/10.12659/MSM.939309>
- Yao, G., Chen, J., Duan, Y., & Chen, X. (2020). Efficacy of extracorporeal shock wave therapy for lateral epicondylitis: A systematic review and meta-analysis. BioMed Research International, 2020. <https://doi.org/10.1155/2020/2064781>
- Zhu, S., He, Z., Bi, Q., Cao, L., Gu, H., Zhang, Q., & Chai, F. (2023). The 100 most cited articles in lateral epicondylitis research: A bibliometric analysis. Frontiers in Surgery, 9. <https://doi.org/10.3389/fsurg.2022.913818>



This work is licensed under a [Attribution-NonCommercial-ShareAlike 4.0 International](https://creativecommons.org/licenses/by-nc-sa/4.0/) (CC BY-NC-SA 4.0 DEED).

APPENDIX 1. The BIBLIO checklist of the study.

The BIBLIO checklist for reporting the bibliometric reviews of the biomedical literature.

Section/Topic	Item No.	Checklist item	Reported on page No.
Title			
Identification	1	Identify the report as a bibliometric review in the title.	Page 1, Lines 1-2
Issues/topics	2	Indicate the key issues/topics under investigation and coverage of time period.	Page 1, Lines 1-2
Abstract			
Structured summary	3	Structured summary including (as applicable): background, methods, results (key findings) and conclusions.	Page 1, Lines 21-52
Introduction/ Background			
Justification/ Rationale/ Explanation	4	Present review of existing knowledge and epidemiological information.	Pages 2-6, Lines 69-138
Objectives	5	Statement of the objective (s) or question (s).	Page 6, Lines 133-136
Methods			
Search engines (data sources)	6	Describe all information sources (such as electronic databases, contact with study authors, trial registers or other grey literature sources).	Page 7, Lines 151-156
Search strategy	7	Keywords and systematization criteria (date of search, language, type of document) for the search.	Page 7, Lines 147-158
Time period	8	The period that the review covers and the justification.	Page 7, 155-156
Eligibility criteria	9	Describe all inclusion and exclusion criteria; languages; study design, type of publication and time period.	Page 7, Lines 159-166
Data refinement (data selection procedure)	10	Remove the irrelevant articles; inspection to eliminate duplicate and unrelated articles (after evaluation of the title, abstract and content).	Page 7, Lines 159-166, Figure 1
Quality assessment (optional)	11	Assessment of papers by three authors and the use of assessing checklists.	N/A
Data synthesis	12	Describe the methods used for summarizing, handling, synthesis, tabulations or schematic displays. Describe how the data were analysed.	Pages 8, Lines 168-190
Results			
Descriptive findings (statistics)	13	- Provide details of the search and selection process in a flow diagram. - Number of citations retrieved (number of publication, year of publication, type of documents, country of publication, articles with the highest impact, most impactful authors, most impactful articles, authors with the highest production, top journals, top institutions, ...)	Pages 9-14, Figures 1-8
Schematic map and trend	14	Summarize and/or present the schematic maps and trends using an appropriate software to present citations, journals, authors, top journals, time trends, emerging literature, and any relevant indicators (as applicable) [1-5].	Pages 9-14, Figures 1-8
Tabulation and summarizing the findings	15	General recommendation: Studies under consideration could be summarized and organized by different subtitles and different scenarios. Regardless, results need to be presented in separate tables covering each subtitle. The followings are some options that could help to summarize the findings.	Pages 9-14 The results section

		<i>Option 1:</i> - Start the presentation with a historical view [when and who first published on the topic]. - Report on review papers. The result should be listed in a separate table. Also, specify the review type (scoping review, narrative review, systematic review, and meta-analysis). - Summarize the findings according to the study designs and main study types. <i>Option 2:</i> - Start the presentation with a historical view [when and who first published on the topic]. - Report on review papers. The result should be listed in a separate table. Also, indicate the review type (scoping review, narrative review, systematic review, and meta-analysis) should be specified. - Summarize the findings according to outcome measures or populations. For example, see [6]. <i>Option 3:</i> - Start the presentation with a historical view [when and who first published on the topic]. - Report on review papers. The result should be listed in a separate table. Also, specify the review type (scoping review, narrative review, systematic review, and meta-analysis). - Summarize the findings according to concept [7]. <i>Option 4.</i> - Start the presentation with a historical view [when and who first published on the topic]. - Report on review papers. The result should be listed in a separate table, and also specify the review type (scoping review, narrative review, systematic review, and meta-analysis). - Summarize the findings according to different subtitles relevant to the main topic [8].	
Synthesis of findings	16	Synthesize the findings as much as possible, find the gap, and propose a model, hypothesis, etc. (if applicable).	Pages 14-17, Discussion section
Discussion			
Summary of evidence	17	Summarize the main findings. The findings should be presented in more "general" or "accessible" terms.	Pages 14-17, Discussion section
Interpretation	18	Include interpretation consistent with results. Explanations for observed outcomes, similarities, and differences reported would be essential.	Pages 14-17, Discussion section
Strengths and limitations	19	Discuss the strengths and limitations.	Page 17, Lines 395-399
Conclusion(s)	20	Provide a general interpretation of the results with respect to the review questions and objectives, as well as potential implications.	Page 17, Lines 400-410
1. McDougal L, Dehingia N, Cheung WW, Dixit A, Raj A. COVID-19 burden, author affiliation and women's well-being: A bibliometric analysis of COVID-19 related publications including focus on low-and middle-income countries. <i>eClinicalMedicine</i> 2022; 52: 101606. 2. Henstock L, Wong R, Tsuchiya A, Spencer A. Behavioral theories that have influenced the way health state preferences are elicited and interpreted: A bibliometric mapping analysis of the time trade-off method with VOSviewer visualization. <i>Front Health Serv</i> 2022; 2: 848087. 3. Bodea F, Bungau SG, Negru AP, Radu A, Tarce AG, Tit DM, et al. Exploring new therapeutic avenues for ophthalmic disorders: Glaucoma-related molecular docking evaluation and bibliometric analysis for improved management of ocular diseases. <i>Bioengineering</i> 2023; 10(8): 983. 4. Sang XZ, Wang CQ, Chen W, Rong H, Hou LJ. An exhaustive analysis of post-traumatic brain injury dementia using bibliometric methodologies. <i>Front Neurol</i> 2023; 14: 1165059. 5. Ramli MI, Hamzaid NA, Engkasan JP, Usman J. Respiratory muscle training: a bibliometric analysis of 60 years' multidisciplinary journey. <i>Biomed Eng Online</i> 2023; 22(1): 50. 6. Akosman I, Kumar N, Mortenson R, Lans A, De La Garza Ramos R, Eleswarapu A, et al. Racial differences in perioperative complications, readmissions, and mortalities after elective spine surgery in the United States: A systematic review using AI-assisted bibliometric analysis. <i>Glob Spine J</i> 2023; 21925682231186759. 7. Tavousi M, Mohammadi S, Sadighi J, Zarei F, Kerami RM, Rostami R, Montazeri A. Measuring health literacy: A systematic review and bibliometric analysis of instruments from 1993 to 2021. <i>Plos One</i> 2022; 17(7): e0271524. 8. Montazeri A. Health-related quality of life in breast cancer patients: A bibliographic review of the literature from 1974 to 2007. <i>J Exp Clin Cancer Res</i> 2008; 27: 32.			

Rights and permissions: The original source of the checklist is: Montazeri A, Mohammadi S, M.Hesari P, Ghaemi M, Riazi H, Sheikhi-Mobarakeh Z. Preliminary guideline for reporting bibliometric reviews of the biomedical literature (BIBLIO): a minimum requirements. *Systematic Reviews* 2023; 12: 239. doi.org/10.1186/s13643-023-02410-2 The article is licensed under a Creative Commons Attribution 4.0 International License (<http://creativecommons.org/licenses/by/4.0/>). A changes was made to the original checklist to add in full references to the cited sources.

Appendix 2. Certainty of evidence of bibliometric data.

Metadata	Description	Missing Counts	Missing %	Status
AU	Author	0	0.00	Excellent
DT	Document Type	0	0.00	Excellent
SO	Journal	0	0.00	Excellent
LA	Language	0	0.00	Excellent
NR	Number of Cited References	0	0.00	Excellent
PY	Publication Year	0	0.00	Excellent
TI	Title	0	0.00	Excellent
TC	Total Citation	0	0.00	Excellent
C1	Affiliation	6	0.67	Good
RP	Corresponding Author	6	0.67	Good
CR	Cited References	37	4.13	Good
AB	Abstract	53	5.92	Good
DI	DOI	114	12.74	Acceptable
ID	Keywords Plus	180	20.11	Poor
DE	Keywords	261	29.16	Poor
WC	Science Categories	895	100.00	Completely missing