Functional Outcomes of Arthroscopic Treatment of Refractory Lateral Epicondylitis

Josefina Zincunegui, Juan Matías Sala
Servicio de Cirugía de la Mano Patagónica (CIMAP), OTI, Clínica del Valle S.R.L., Comodoro Rivadavia, Chubut, Argentina

ABSTRACT

Introduction: Lateral epicondylitis is a common cause of elbow pain and disability. Although most patients respond to conservative treatment, refractory cases may require surgery. In recent years, arthroscopy has gained popularity because it provides a minimally invasive approach and allows associated intra-articular lesions to be treated. **Objective:** To evaluate functional outcomes, pain improvement, and the presence of associated intra-articular lesions in patients with refractory lateral epicondylitis treated with arthroscopic elbow debridement and release. **Materials and Methods:** Statistically significant improvements were observed in the MEPS score (from 45.83 to 85.00; $p < 0.0001$) and VAS score (from 7.50 to 1.25; $p < 0.0001$). Baker grade 2 was the most common. Associated lesions were found in 66.7% of patients; synovial plica was the most common, and all lesions were treated during the same procedure. Transient radial nerve neuropraxia was the only complication. **Results:** Statistically significant improvements were observed in MEPS (45.83 → 85.00; $p < 0.0001$) and VAS (7.50 → 1.25; $p < 0.0001$). Baker grade 2 was the most frequent. 66.7% of patients presented with associated injuries, which were treated during the same procedure, with synovial plica being the most common. A single complication was recorded: transient radial neuropraxia. **Conclusions:** Arthroscopic treatment of lateral epicondylitis through intra-articular debridement resulted in a significant reduction in pain and substantial functional improvement, supporting its use as an effective alternative in patients refractory to conservative management.

Keywords: Lateral epicondylitis; elbow arthroscopy; extensor carpi radialis brevis debridement; Baker classification.
Level of Evidence: IV

Resultados funcionales del tratamiento artroscópico de la epicondilitis lateral refractaria

RESUMEN

Introducción: La epicondilitis lateral es una causa frecuente de dolor del codo y discapacidad. Aunque la mayoría responde al tratamiento conservador, los casos refractarios pueden requerir cirugía. En los últimos años, la artroscopia ha ganado popularidad por permitir un abordaje mínimamente invasivo y el tratamiento de lesiones intrarticulares asociadas. **Objetivo:** Evaluar los resultados funcionales, la mejoría del dolor y la presencia de lesiones intrarticulares asociadas en pacientes con epicondilitis lateral refractaria tratados con desbridamiento y liberación artroscópica del codo. **Materiales y Métodos:** Estudio retrospectivo de 12 pacientes sometidos a una artroscopia de codo entre marzo de 2022 y abril de 2025, con un seguimiento promedio de 14 meses. La función y el dolor se evaluaron con la escala MEPS y la escala analógica visual antes y después de la cirugía. Las lesiones se clasificaron según la escala artroscópica de Baker y se registraron las lesiones asociadas. **Resultados:** Se observaron mejoras estadísticamente significativas en el puntaje MEPS (de 45,83 a 85,00; $p <0,0001$) y en la escala analógica visual (de 7,50 a 1,25; $p <0,0001$). El grado 2 de Baker fue el más frecuente. El 66,7% presentó lesiones asociadas, la más común fue la plica sinovial, y todas fueron tratadas en el mismo procedimiento. Se registró una neuropraxia radial transitoria como única complicación. **Conclusiones:** El tratamiento artroscópico de la epicondilitis lateral mediante desbridamiento intrarticular produjo una reducción significativa del dolor y una mejoría funcional sustancial, por lo que se consolida como una alternativa eficaz en pacientes refractarios al manejo conservador.

Palabras clave: Epicondilitis lateral; artroscopia de codo; desbridamiento del extensor radial corto del carpo; clasificación de Baker.
Nivel de Evidencia: IV

Received on December 2nd, 2025.Accepted after evaluation on April 26th, 2026 • Dr. JOSEFINA ZINCUNEGUI • josefinazincunegui@gmail.com https://orcid.org/0009-0007-2404-2810
How to cite this article: Zincunegui J, Sala JM. Functional Outcomes of Arthroscopic Treatment of Refractory Lateral Epicondylitis. *Rev Asoc Argent Ortop Traumatol* 2026;91(4):343-352. https://doi.org/10.15417/issn.1852-7434.2026.91.4.2258

INTRODUCTION

Lateral epicondylitis, commonly known as tennis elbow,[1] is an overuse injury resulting from eccentric overload of the common extensor tendon, primarily involving the origin of the extensor carpi radialis brevis (ECRB). This condition is mainly caused by repetitive strain from activities involving gripping under load or repeated wrist extension. It is common among individuals who participate in sports such as tennis or squash, or whose occupational activities require repetitive wrist extension, radial deviation, or forearm supination. In the general population, and particularly among manual workers, the reported incidence ranges from 1% to 3%. It affects men and women equally, with the highest prevalence in the fifth decade of life, and predominantly involves the dominant arm.[2]

It is characterized by microtears and degeneration of the ECRB, leading to a failed healing response.[3]

Initial treatment is conservative and includes relative or complete cessation of the triggering activity, depending on pain severity, together with oral analgesics, cryotherapy, and, in some cases, counterforce braces to reduce stress on the lateral epicondyle. Physical or occupational therapy focusing on stretching, progressive strengthening, and eccentric exercises is a fundamental component of treatment. Surgery should be considered only as a last resort after at least 6-12 months of conservative treatment.[2]

According to the literature, surgical techniques vary. Most surgeons perform varying degrees of ECRB debridement or release of its tendinous origin at the lateral epicondyle. Debridement of pathological tissue, together with the creation of a bleeding bone bed at the lateral epicondyle, is intended to promote healing.[1]

Although this condition is very common, the optimal treatment approach remains a matter of debate, particularly regarding the choice between open and arthroscopic surgery.[4] The latter allows intra-articular visualization of concomitant lesions, with the advantages of lower morbidity, faster recovery, and earlier return to work and sports.[5]

The objective of this study was to evaluate functional outcomes, pain improvement, and associated lesions in a consecutive series of patients with lateral epicondylitis who underwent arthroscopic debridement and release of the elbow after failure of conservative treatment.

MATERIALS AND METHODS

The study protocol was approved by our institution's Ethics Committee, and all patients provided informed consent before inclusion.

A retrospective study was conducted including 12 patients diagnosed with lateral epicondylitis who underwent arthroscopic elbow surgery between March 2022 and April 2025 (Table 1). The mean follow-up was 14 months (range, 6-24), with no patients lost to follow-up during this period.

The inclusion criteria were age >18 years, a clinical diagnosis of lateral epicondylitis, and failure of conservative treatment for at least 6 months.

The exclusion criteria were refusal to participate in the study, elbow osteoarthritis, a history of systemic or rheumatoid arthritis, and previous surgery on the affected elbow.

The clinical diagnosis of lateral epicondylitis was established using the Cozen and Maudsley tests and confirmed by complementary imaging studies, including anteroposterior and lateral radiographs of the elbow and magnetic resonance imaging (MRI).

All patients underwent functional and pain assessment using the *Mayo Elbow Performance Score* (MEPS) and the visual analog scale (VAS) before surgery and postoperatively.

During surgery, lesions were classified according to the Baker arthroscopic classification, and associated lesions were documented and treated (Table 2).

Table 1. Demographic characteristics, intra-articular findings, and clinical outcomes.

N	Age (years)	Manual laborer	Dominant hand	Baker's classification Baker	Associated injuries	Chondral injuries	Synovial plica	Postero-lateral Instability	SMILE-type finding	Annular ligament injury	Complications	Preoperative MEPS	Postoperative MEPS	Preoperative VAS	Postoperative VAS
1	53	Yes	Yes	2	Yes		x					50	90	8	2
2	46	Yes	Yes	2	Yes		x					60	80	7	1
3	40	Yes	No	3	Yes		x				x	40	85	8	2
4	38	No	Yes	2	No							35	75	6	0
5	45	Yes	Yes	2	Yes				x			40	80	7	1
6	46	Yes	Yes	2	Yes	x	x					45	95	8	2
7	25	No	Yes	1	Yes		x					55	80	9	3
8	41	No	No	2	No							40	100	8	1
9	50	Yes	Yes	2	Yes							65	95	7	0
10	38	No	Yes	3	Yes			x		x		35	75	8	1
11	61	Yes	Yes	1	Yes	x						40	80	7	1
12	61	No	No	1	No	x						45	85	7	1

MEPS = *Mayo Elbow Performance Score*; VAS = visual analog scale.

Table 2. Baker arthroscopic classification.

Type	Description	Arthroscopic Findings
1	Mild injury	Intact articular capsule; origin of the ECRB not visualized; minimal or no degenerative changes
2	Partial injury	Partial tear of the ECRB; thinned or partially torn capsule; partial visualization of the tendon with degenerative changes
3	Complete injury	Complete rupture of the ECRB; evident capsular defect with exposure of the tendon and the lateral condyle

ECRB = extensor carpi radialis brevis.

Surgical Technique

All procedures were performed by the same surgeon. The patient was placed in the lateral decubitus position under general anesthesia, and a pneumatic tourniquet was applied to the affected upper extremity. Elbow arthroscopy was performed using a 2.7-mm, 30° arthroscope. After joint insufflation, a soft-spot portal was established, followed by proximal anterolateral and proximal anteromedial portals.

A systematic inspection of the joint was performed, followed by routine synovectomy. Lesions were classified according to the Baker arthroscopic classification (Figure 1). A capsulotomy was then performed below the equator of the condyle, followed by tenotomy of the ECRB until the muscle belly of the extensor carpi radialis longus was exposed (Figure 2, Video).

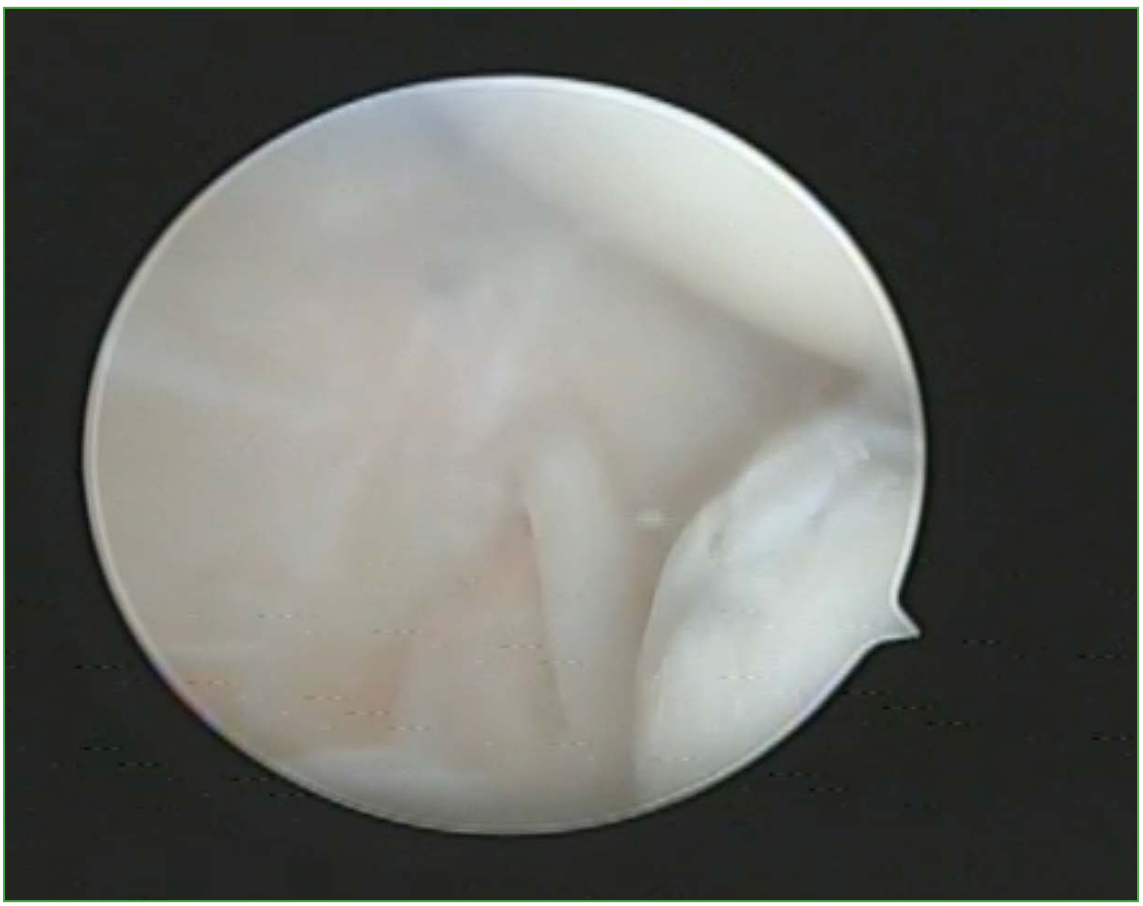

Figure 1. Intraoperative image showing a Baker type 2 lesion.

Figure 2. Intraoperative image showing tenotomy of the extensor carpi radialis brevis to the level of the muscle belly of the extensor carpi radialis longus.

Postoperative management consisted of compressive dressing, clinical follow-up at 48 hours, and an early physical therapy protocol. During the initial phase, active elbow motion within a pain-free range was encouraged while prolonged immobilization was avoided, with the aim of preventing stiffness and promoting functional recovery. During the second and third weeks, active motion was continued. In the fourth week, stretching exercises for the forearm extensor muscles were introduced, together with progressive strengthening, with an emphasis on eccentric exercises for the ECRB. From the fourth to the sixth week, functional strengthening exercises and progressive retraining tailored to the patient's specific activities were added. Gradual return to work and sports was allowed according to clinical progress.

Statistical Analysis

A descriptive analysis of the demographic and clinical variables was performed. Absolute frequencies, percentages, and corresponding mean values were calculated for each category. The distribution of cases according to the Baker classification was also determined, and the percentage of associated lesions was calculated, with the most frequent lesions identified.

Differences between preoperative and postoperative MEPS and VAS scores were assessed using Student's *t*-test for paired samples.

Statistical analysis was performed using RStudio (version 2023.06.0).

RESULTS

Twelve patients were included between March 2022 and April 2025. The study objectives were to analyze the demographic characteristics of the sample, including age, hand dominance, and the percentage of patients engaged in physically demanding work; determine the distribution according to the Baker classification; identify associated intra-articular lesions and their frequency; and compare preoperative and postoperative functional outcomes and pain using the MEPS and VAS.

Most patients were right-handed, reflecting the predominant hand dominance in this cohort.

An intermediate group combining strength and dexterity was identified, which may be relevant when designing specific interventions and making clinical and ergonomic decisions.

Regarding age, patients combining both characteristics tended to be older, suggesting that these functional characteristics may accumulate over time. In contrast, the distribution of manual dexterity was homogeneous, as the mean age of patients with a dominant hand was similar to the overall mean age of the cohort, suggesting that this characteristic was not significantly influenced by age (Table 3).

Table 3. Demographic characteristics of the sample.

Characteristics	n	Mean age
Total number of patients	12	45
Manual laborers	7	49
Skilled labor	9	45
Both conditions	6	50

In the study group, Baker grade 2 was the most common (7 patients). Grades 1 and 3 were less frequent (3 and 2 patients, respectively).

Associated lesions were present in 66.7% of patients. Synovial plica was the most frequent (41.7%), followed by chondral lesions (25%). Less frequent lesions included posterolateral instability, annular ligament injury, and SMILE-type lesions, each occurring in 8.3% of patients. In addition, 16.7% had multiple lesions that were treated during the same procedure. In patients with synovial plica, resection was performed until pronation-supination maneuvers confirmed the absence of impingement against the radial head. SMILE-type lesions (defined as injury to the lateral ligament complex with microinstability) and posterolateral instability (secondary to insufficiency of the lateral ligament complex) were treated with capsular plication, whereas chondral lesions were treated with debridement (Table 4).

Table 4. Associated injuries.

Types of injuries	n	%
Cartilage	3	25.0
Plica	5	41.7
Posterolateral instability	1	8.3
SMILE-type finding	1	8.3
Annular Ligament	1	8.3
Multiple	2	16.7

The MEPS showed an improvement in elbow function postoperatively, increasing from 45.83 ± 9.73 to 85.00 ± 8.26 (mean difference, 39.17 ± 10.62; p <0.0001). The VAS score decreased from 7.50 ± 0.80 to 1.25 ± 0.87 (mean difference, -6.25 ± 0.45; p <0.0001).

Overall, these results indicate that surgical treatment resulted in significant functional improvement and a marked reduction in pain (Figures 3 and 4).

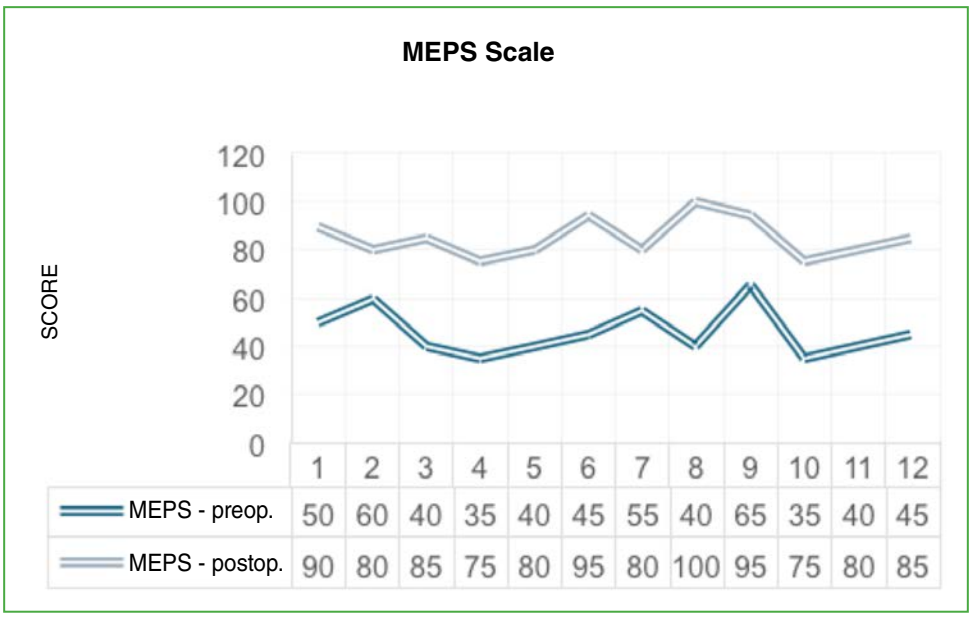

Figure 3. Comparison of preoperative and postoperative function assessed using the *Mayo Elbow Performance Score* (MEPS).

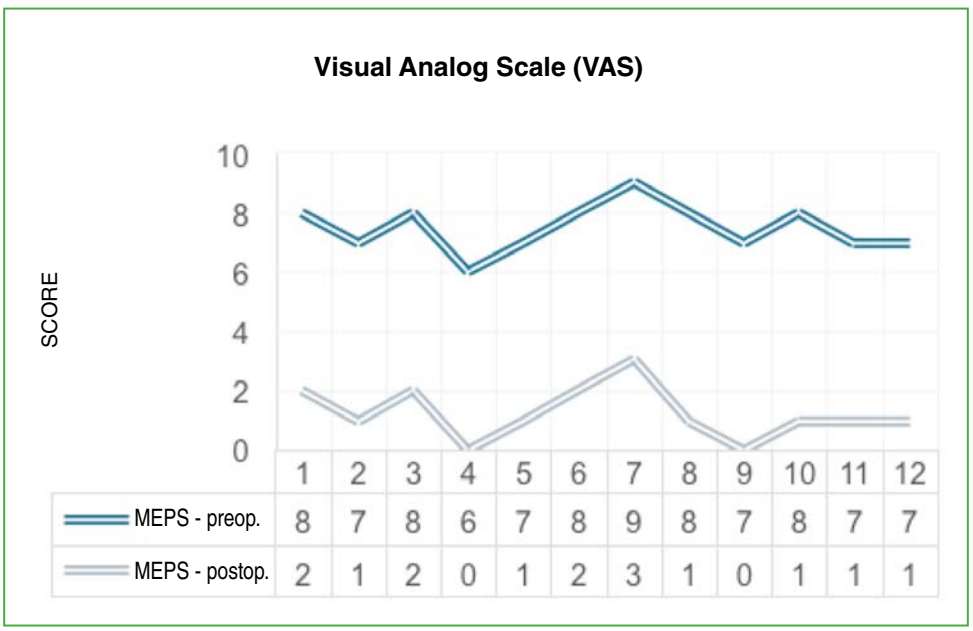

Figure 4. Comparison of preoperative and postoperative pain assessed using the visual analog scale (VAS).

The mean time to return to work was 21 days, while return to sports occurred at approximately 6 weeks. Patients who underwent tenotomy regained strength at approximately 2 months. Patients with associated lesions treated with capsular plication had a slower recovery, possibly because of the 2-week immobilization period; nevertheless, they showed progressive improvement with physical therapy.

Complications

One complication occurred in the series (Patient 3): transient radial nerve neuropraxia, which resolved completely within 24 hours.

DISCUSSION

This study included 12 patients who underwent elbow arthroscopy between March 2022 and April 2025, with a mean follow-up of 14 months. Function and pain were assessed using the MEPS and VAS both before surgery and postoperatively. Lesions were classified according to the Baker arthroscopic classification, and associated lesions were documented and treated. This technique yielded favorable outcomes, with significant functional improvement and pain reduction, supporting its use as an effective option for patients with lateral epicondylitis refractory to conservative treatment. In a long-term follow-up study, Baker and Baker demonstrated the sustained efficacy of arthroscopic ECRB debridement,[6] while Baker et al. initially proposed an arthroscopic classification and reported good clinical outcomes at 2 years.[7]

These findings have been reinforced by systematic reviews and meta-analyses. Pierce et al. reported that patients undergoing arthroscopic and percutaneous release experienced less pain than those treated with open procedures.[8] Similarly, Muir et al. reported encouraging outcomes with arthroscopic surgery and suggested that it should be considered a valid alternative in refractory cases.[9]

The literature has reported comparable functional outcomes between open and arthroscopic approaches, although arthroscopy offers practical advantages. Szabo et al. evaluated three surgical techniques and found no significant differences in complications, recurrence rates, or pain scores.[10] However, in a recent comparative meta-analysis, Ghandour et al. concluded that arthroscopy had a safety profile similar to that of open surgery, with additional benefits related to its minimally invasive nature.[11]

Regarding complications in our series, only one case of transient radial nerve neuropraxia occurred. Moran et al. reported no significant differences in complication or reoperation rates between arthroscopic and open surgery.[12] Pomerantz reported complication rates of 4.3% for open surgery and 1.1% for arthroscopy.[13] Similarly, Danaher emphasized that patients have favorable outcomes after resection of pathological ECRB tissue, regardless of the technique used. These findings suggest that procedural safety depends on surgical technique and surgeon experience.[14]

The presence of concomitant lesions in two-thirds of our patients reinforces the value of arthroscopy as a comprehensive diagnostic and therapeutic technique. In our series, synovial plica was the most common associated lesion, consistent with previous reports. Baker et al. reported that arthroscopy allows identification of intra-articular abnormalities, including synovitis and synovial folds, which may contribute to persistent pain.[7] Similarly, Pierce et al. and Muir et al. highlighted the diagnostic role of arthroscopy in identifying associated lesions, such as plicae and chondral lesions, which may go undetected during open surgery.[8,9]

Early return to work is one of the most notable benefits of arthroscopy. Baker et al. reported a mean time to return to work of 35 days compared with 66 days after open surgery.[7] Choudhury et al. also reported that arthroscopic release and decortication allowed an earlier return to work, with satisfaction levels similar to those achieved with intensive conservative management.[15] These findings are consistent with the early recovery observed in our series and with published evidence supporting arthroscopy as a first-line surgical option.

Wang et al. reported that, despite the benefits of arthroscopy, the open approach remains the technique most commonly used by recently trained orthopedic surgeons, accounting for more than 90% of cases, although the use of arthroscopy is increasing.[16] This suggests that the learning curve remains a barrier to its wider adoption.

Among emerging techniques, percutaneous ultrasonic tenotomy has yielded favorable long-term clinical and ultrasonographic outcomes, with a low complication rate.[17] Satake et al. explored selective neurectomy as an alternative treatment and reported significant pain reduction, although residual sensory disturbances represented a limitation.[18]

More recently, studies of arthroscopic repair using suture anchors have demonstrated significant clinical improvement and high patient satisfaction,[19] reflecting the ongoing evolution of minimally invasive techniques for this condition.

Overall, the evidence supports satisfactory outcomes with both open and arthroscopic surgery in patients with refractory lateral epicondylitis. However, arthroscopy offers additional advantages, including lower morbidity, simultaneous identification and treatment of associated lesions, earlier return to work, and low complication rates, supporting its role as an effective and safe surgical alternative.[11,19]

This study has several limitations that should be considered when interpreting the results. First, the small sample size limits the generalizability of the findings. In addition, the absence of a control group precludes direct comparison with other surgical techniques. For these reasons, future studies with larger samples, prospective controlled designs, and standardized structural assessments are needed to validate and expand upon our findings.

CONCLUSION

Arthroscopic treatment of lateral epicondylitis with intra-articular debridement resulted in a significant reduction in pain and substantial functional improvement, supporting its use as an effective alternative in patients refractory to conservative treatment.

AI Use Statement

During the preparation of this manuscript, the authors used ChatGPT as a language support tool for the initial draft of the abstract as well as for stylistic adjustments to the manuscript.

Conflicts of interest: The authors declare no conflicts of interest.

J. M. Sala ORCID: https://orcid.org/0000-0001-5542-5004

REFERENCES

1. Ikonen J, Lähdeoja T, Ardern CL, Buchbinder R, Reito A, Karjalainen T. Persistent tennis elbow symptoms have little prognostic value: a systematic review and meta-analysis. *Clin Orthop Relat Res* 2022;480(4):647-60. https://doi.org/10.1097/CORR.0000000000002058
2. Buchanan BK, Varacallo MA. Lateral epicondylitis (tennis elbow). En: *StatPearls* [Internet]. Treasure Island (FL): StatPearls Publishing; 2023 Aug 4 [citado enero 15, 2025]. Available at: https://www.ncbi.nlm.nih.gov/books/NBK431092/
3. Walz DM, Newman JS, Konin GP, Ross G. Epicondylitis: pathogenesis, imaging, and treatment. *Radiographics* 2010;30(1):167-84. https://doi.org/10.1148/rg.301095078
4. Wang W, Chen J, Lou J, Shentu G, Xu G. Comparison of arthroscopic debridement and open debridement in the management of lateral epicondylitis: a systematic review and meta-analysis. *Medicine (Baltimore)* 2019;98(44):e17668. https://doi.org/10.1097/MD.0000000000017668
5. Gowda A, Kennedy G, Gallacher S, Garver J, Blaine T. The three-portal technique in arthroscopic lateral epicondylitis release. *Orthop Rev (Pavia)* 2017;8(4):6081. https://doi.org/10.4081/or.2016.6081
6. Baker CL Jr, Baker CL III. Long-term follow-up of arthroscopic treatment of lateral epicondylitis. *Am J Sports Med* 2008;36(2):254-60. https://doi.org/10.1177/0363546507311599
7. Baker CL Jr, Murphy KP, Gottlob CA, Curd DT. Arthroscopic classification and treatment of lateral epicondylitis: two-year clinical results. *J Shoulder Elbow Surg* 2000;9(6):475-82. https://doi.org/10.1067/mse.2000.108533
8. Pierce TP, Issa K, Gilbert BT, Hanly B, Festa A, McInerney VK, et al. A systematic review of tennis elbow surgery: open versus arthroscopic versus percutaneous release of the common extensor origin. *Arthroscopy* 2017;33(6):1260-8.e2. https://doi.org/10.1016/j.arthro.2017.01.042

9. Muir D, Blakeway H, Morris R, Narvani AA, Elgebaly A, Imam MA. Surgical management of lateral epicondylitis: a scoping review of published literature. *JSES Rev Rep Tech* 2024;5(1):79-85. https://doi.org/10.1016/j.xrrt.2024.08.008
10. Szabo SJ, Savoie FH III, Field LD, Ramsey JR, Hosemann CD. Tendinosis of the extensor carpi radialis brevis: an evaluation of three methods of operative treatment. *J Shoulder Elbow Surg* 2006;15(6):721-7. https://doi.org/10.1016/j.jse.2006.01.017
11. Ghandour M, Al Salloum D, Jaber MH, Abou Orm G, Ghosn A, Jaber S, et al. A comparative meta-analysis of the efficacy and safety of arthroscopic versus open surgery in patients with lateral epicondylitis. *J Orthop* 2024;59:41-50. https://doi.org/10.1016/j.jor.2024.07.018
12. Moran J, Gillinov SM, Jimenez AE, Schneble CA, Manzi JE, Vaswani R, et al. No difference in complication or reoperation rates between arthroscopic and open debridement for lateral epicondylitis: a national database study. *Arthroscopy* 2023;39(2):245-52. https://doi.org/10.1016/j.arthro.2022.08.022
13. Pomerantz ML. Complications of lateral epicondylar release. *Orthop Clin North Am* 2016;47(2):445-69. https://doi.org/10.1016/j.ocl.2015.10.002
14. Danaher MJ. Editorial commentary: for refractory elbow lateral epicondylitis, patients do well after excision of the diseased part of the extensor carpi radialis brevis, regardless of open or arthroscopic technique, debridement alone, or debridement with repair. *Arthroscopy* 2025;41(8):2831-3. https://doi.org/10.1016/j.arthro.2024.12.033
15. Choudhury AK, Niraula BB, Bansal S, Gupta T, Das L, Goyal T. Arthroscopic release and decortication provide earlier return to work with similar patient satisfaction compared to continued intensive conservative therapy for recalcitrant tennis elbow: a retrospective observational study. *Eur J Orthop Surg Traumatol* 2024;34(1):175-80. https://doi.org/10.1007/s00590-023-03628-5
16. Wang D, Degen RM, Camp CL, McGraw MH, Altchek DW, Dines JS. Trends in surgical practices for lateral epicondylitis among newly trained orthopaedic surgeons. *Orthop J Sports Med* 2017;5(10):2325967117730570. https://doi.org/10.1177/2325967117730570
17. Sharma K, Katoch P, Sharma V. Ultrasonic percutaneous tenotomy for recalcitrant lateral elbow tendinopathy: clinical and sonographic results at 90 months: letter to the editor. *Am J Sports Med* 2022;50(2):NP9-NP10. https://doi.org/10.1177/03635465211049369
18. Satake H, Honma R, Naganuma Y, Shibuya J, Takagi M. Strategy for the treatment of lateral epicondylitis of the elbow using denervation surgery. *JSES Int* 2019;4(1):21-4. https://doi.org/10.1016/j.jses.2019.10.102
19. Yao L, Xiong Y, Ma W, Li J, Tang X. Arthroscopic repair with suture anchor and debridement for refractory lateral epicondylitis shows significant clinical improvement. *Arthroscopy* 2025;41(8):2821-30. https://doi.org/10.1016/j.ensm.2025.104295