



Original article

Arthroscopic surgical treatment of recalcitrant lateral epicondylitis – A series of 47 cases[☆]



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ABSTRACT

Objective: To evaluate the results of patients undergoing arthroscopic surgical treatment of refractory lateral epicondylitis, identifying poor prognosis factors.

Methods: A retrospective study of 44 patients (47 elbows) who underwent arthroscopic debridement of the extensor carpi radialis brevis (ECRB) tendon to treat refractory lateral epicondylitis from February 2013 to February 2015, operated by a single surgeon at one center. Patients were assessed by DASH score, visual analog scale of pain (VAS), and ShortForm 36 (SF-36). The mean age at surgery was 44.4 years (32–60). The duration of symptoms prior to the surgery was approximately 2.02 years (range: 6 months to 10 years). Mean follow-up was 18.6 months (range of 6–31.9).

Results: The mean postoperative DASH score was 25.9 points; mean VAS, 1.0 point at rest (all the patients with mild pain) and 3.0 points at activity, of which 31 (66%) cases presented mild pain, 10 (21%) moderate pain, and six (13%) severe pain; mean SF-36 score was 62.5. A moderate correlation was observed between duration of pain before surgery and the DASH score with the final functional outcome. No significant complications with the arthroscopic procedure were observed.

Conclusions: Arthroscopic surgical treatment for recalcitrant lateral elbow epicondylitis presented good results, being effective and safe. The shorter the time of pain before surgery and the lower the preoperative DASH score, the better the prognosis.

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Tratamento cirúrgico artroscópico da epicondilite lateral recalcitrante – Série de 47 casos

R E S U M O

Palavras-chave:

Cotovelo de tenista/patologia
Cotovelo de tenista/terapia
Cotovelo de tenista/cirurgia
Artroscopia
Estudos retrospectivos

Objetivo: Avaliar os resultados dos pacientes submetidos a tratamento cirúrgico artroscópico da epicondilite lateral refratária a tratamento conservador e identificar fatores de pior prognóstico.

Métodos: Estudo retrospectivo de 44 pacientes (47 cotovelos) submetidos a desbridamento cirúrgico artroscópico do tendão extensor radial curto do carpo (ERCC) para tratamento de epicondilite lateral refratária a tratamento conservador de fevereiro de 2013 a fevereiro de 2015, operados por um único cirurgião em um único centro. Os pacientes foram avaliados pelo escore de DASH, pela classificação visual analógica de dor (EVA) e pelo Short-Form 36 (SF-36). A média de idade na cirurgia foi de 44,4 anos (32 a 60). O tempo de sintomas antes da cirurgia foi de 2,02 anos (variação de seis meses a 10 anos). O seguimento médio foi de 18,6 meses (variação de seis a 31,9).

Resultados: A média dos escores pós-operatórios foi de 25,9 pontos no DASH; 1 ponto no EVA de repouso (todos os casos de dores leve) e 3 pontos na EVA em atividade, 31 (66%) casos de dores leves, 10 (21%) de moderadas e seis (13%) de intensas; SF-36 de 62,5. Observou-se uma correlação moderada entre o tempo de dor antes da cirurgia e a pontuação no escore de DASH com o resultado funcional final. Não foram observadas complicações significativas com o procedimento por via artroscópica.

Conclusões: O tratamento cirúrgico artroscópico para epicondilite lateral recalcitrante do cotovelo apresenta bons resultados, é eficaz e seguro. Quanto menor o tempo de dor antes da cirurgia e quanto menor o DASH pré-operatório, melhor o prognóstico.

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Introduction

Lateral epicondylitis, or “tennis elbow” is the most common complaint related to the elbow, affecting 1–3% of the adult population annually.^{1,2} Despite the classical description related to tennis practice, only 5–10% of patients with epicondylitis practice this sport; the condition is more related to work activities.³ Although the name suggests an inflammatory process, epicondylitis is characterized as a non-inflammatory condition, a type of tendinosis with fibroblast and vascular response, called angiofibroblastic degeneration.⁴ This is a self-limiting pathology, and the vast majority of patients improve with conservative treatment only. However, some factors such as duration of symptoms, previous infiltration, prior orthopedic surgery, and work-related compensation, are known to be related to poor prognosis, increasing the chance of a need for surgery.⁵ The recurrence rate is 8.5%, and patients whose symptoms last over six months have a high risk of presenting them for long periods and will probably require surgical intervention⁶; these are estimated to represent 4–16% of cases.^{5,7,8} Numerous surgical procedures to treat this condition have been described.^{4,9–11} The vast majority have in common the release or debridement of the extensor carpi radialis brevis (ECRB) tendon. Some factors have been attributed to poor prognosis after surgical treatment, especially female gender and injury of the common extensor tendon greater than 6 mm in magnetic resonance imaging¹² (Fig. 1).

Arthroscopic surgical treatment of lateral epicondylitis has advantages over open surgery, including the ability to

debride the inferior surface of the tendon without invading the aponeurosis of the common extensor (Fig. 2), the ability to assess the joint for intra-articular pathology, and a shorter rehabilitation period.^{7,13}

Material and methods

Patients included in this study were operated from February 2013 to February 2015 by a single surgeon at a single center. The study included patients diagnosed with lateral epicondylitis who showed either no improvement or unsatisfactory improvement after conservative treatment, which consisted of six months of physical therapy associated with an orthosis for lateral epicondylitis, two infiltrations or two intramuscular steroid injections, and medications for pain relief.

Patients with lateral epicondylitis who had chondral lesions, incipient arthrosis, or cases with previous elbow surgery were excluded.

The DASH, VAS, and SF-36 scores were calculated for all patients preoperatively and at the postoperative follow-up.

Surgical technique

The surgical technique adopted was based on published reports,^{1,9} with some adjustments.

Patient underwent general anesthesia and brachial plexus block and was then placed in lateral decubitus, opposite to the side to be operated. An elbow support attached to the operating table was positioned under the arm, allowing for the elbow

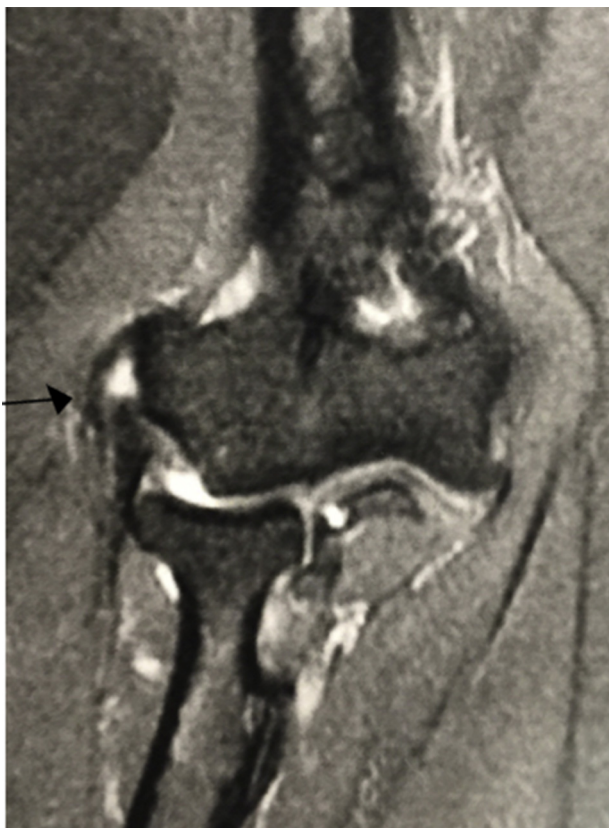


Fig. 1 – Magnetic resonance imaging showing common extensor tendon lesion (arrow).

to be moved from 90° of flexion to full extension. A pneumatic tourniquet was placed at the root of the arm. Surgical landmarks were drawn on the elbow, including the olecranon, lateral epicondyle, medial epicondyle, radial head, and ulnar nerve.

The elbow joint was inflated with 40 mL of saline, placed at the elbow puncture site in the middle of a triangle formed by the lateral epicondyle, the radial head, and the olecranon, to facilitate entrance of the arthroscope into the intra-articular space.

The anterosuperomedial and anterosuperolateral portals were preferred, starting with the former, where the trochanter and the arthroscope were placed. The second portal is made with the help of a needle under intra-articular visualization to

enhance its positioning. A complete analysis of the anterior compartment of the elbow joint is made, including the joint and the capsule surfaces.

Then, a partial capsulotomy of the lateral region is performed to allow the visualization of the ECRB origin, which is extra-articular. With a radiofrequency device, the ECRB tendon is detached from the humerus. Then, the disengaged tendon is debrided with a soft tissue shaver and the lateral portion of the humerus, with a bone shaver, in order to cause bleeding and cell migration to the region. The origin of the ECRB tendon is not reinserted.

The collateral ligament may be damaged if the ECRB resection is made “blindly,” due to the collapse of the anterior soft tissue into the viewing space. For this reason, an infusion pump was used in all cases (approximately 60 mmHg), maintaining the joint inflated.

Postoperative period

In the immediate postoperative period, patients were immobilized with a sling (for three to five days), for comfort only; movement was authorized according to pain, and only exertion with the affected limb was avoided. Physiotherapy for range of motion gain was started after two weeks; isometric strengthening was initiated after full range of motion was achieved, typically around four weeks postoperatively. Resistance exercises were initiated four to six weeks after surgery. Unrestricted use of the limb was authorized after approximately 12 weeks.

Statistical analysis

Statistical analysis compared the pre- and postoperative measurements with Student's t-test. Two-tailed paired tests were used in all cases; p -values <0.05 were considered as significant. Pearson's coefficient was used to assess possible factors that interfere in the final result; values between 0 and 0.3 were considered as weak correlation, between 0.3 and 0.6, as moderate, and greater than 0.6, as strong. Negative values indicate an inverse correlation; positive values, a direct correlation.

Results

Inclusion criteria were met by 44 patients (47 elbows), 30 men and 14 women. Mean age at surgery was 44.4 years (32–60). The mean duration of symptoms before surgery was 2.02

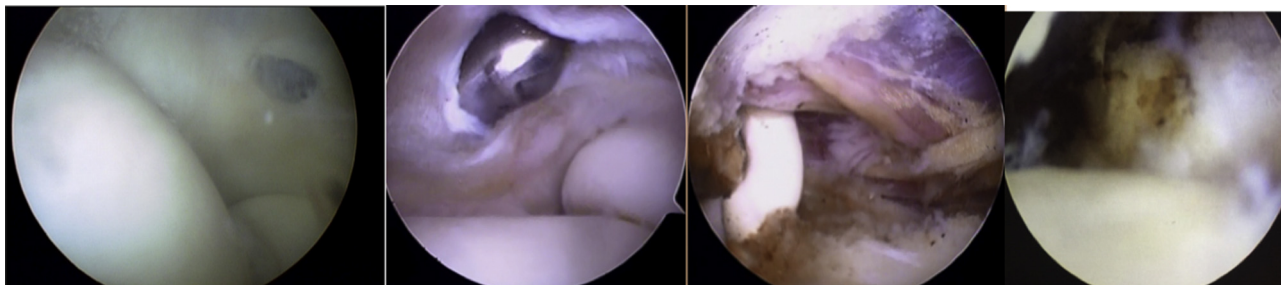


Fig. 2 – Arthroscopic images showing a case of a Baker II epicondylitis,⁷ opening of the lateral capsule, debridement, and detachment of the ECRB tendon.

Table 1 – Results of DASH and VAS scores.

	DASH	VAS
Preoperative period	50.1 ± 19.9 (3.33-90) ^a	7.8 ± 1.8 (3-10) ^a
Postoperative at rest	25.9 ± 23.8 (0-85) ^a	1.0 ± 0.9 (0-3) ^a
Postoperative during activity	25.9 ± 23.8 (0-85) ^a	3.0 ± 2.7 (0-9) ^a
p-Value	<0.001	<0.001

^a Values are expressed as mean and standard deviation; the range is presented in parentheses.

years (range: six months to 10 years). Mean follow-up was 18.6 months (range: 6-31.9). A total of 31 right elbows and 16 left were operated. The dominant arm was affected in 65% of cases. Overall, 82% of all patients described their work as “repetitive motion”; 24% received some social security benefit. The cause of the disease was classified as associated with labor activity in 32 patients (73%); in three (7%), due to tennis practice; and in five (11%), due to trauma.

The study included patients diagnosed with lateral epicondylitis who showed either no improvement or unsatisfactory improvement after conservative treatment, which consisted of six months of physical therapy associated with an orthosis for lateral epicondylitis, two infiltrations or two intramuscular steroid injections, and medications for pain relief. The results for the improvement in the VAS and DASH scores are shown in Table 1. The mean postoperative DASH score was 25.9 points. Mean post-operative VAS was 3 points; 31 patients (66%) presented mild pain, 10 (21%), moderate pain, and six (13%), intense pain. For the VAS, pain was assessed during activities, not during rest. Mean SF-36 was 62.5. Three patients (6.3%) showed no improvement with the procedure. Thirteen patients (29%) were amateur athletes; after the procedure, 10 (77%) were able to return to the same level of activity prior to the injury and three (23%) were unable to return to previous sport. Pearson’s coefficient demonstrated a moderate correlation between duration of pain before surgery and DASH score with final functional outcome.

The results of SF-36 were subdivided according to its areas; the detailed results are presented in Table 2.

After evaluating results of scores, the correlation of some variables with the outcome was assessed (Table 3). Pearson’s coefficient was used for this analysis, and no variable was shown to have a strong correlation with the outcome. Two variables showed moderate correlation with the final DASH

Table 3 – Pearson’s coefficient for the correlation between the variables and the outcome of treatment by DASH and VAS.

	DASH	VAS
Patient receives pension benefit	0.25	0.20
Repetitive work	0.01	0.01
Age	-0.24	-0.15
Duration of preoperative	0.30	0.16
Pre-op functional capacity by SF-36	-0.09	-0.16
Pre-op limitation due to physical aspects by SF-36	0.3	0.18
Pre-op pain by SF-36	-0.22	-0.13
Pre-op general health by the SF-36	-0.17	-0.09
Pre-op vitality by SF-36	-0.18	-0.21
Pre-op social aspects by SF-36	-0.29	-0.29
Pre-op limitations due to emotional aspects	-0.13	-0.10
Pre-op mental health	-0.13	-0.18
DASH	0.58	0.52
VAS	0.15	0.22
Female gender	0.1	0.17

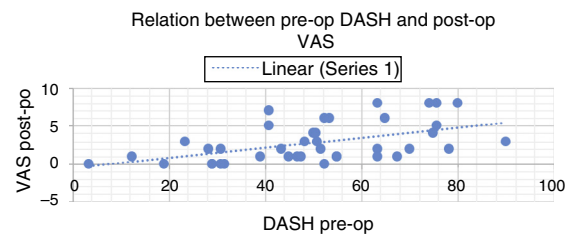


Fig. 3 – Scatter plot (variable: DASH pre-op).

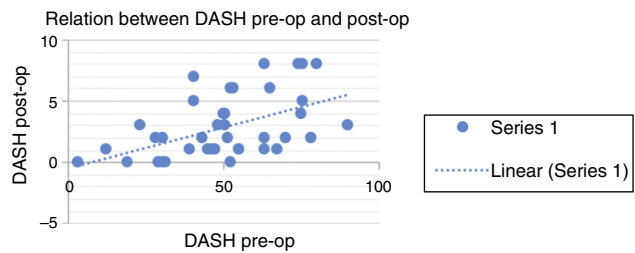


Fig. 4 – Scatter plot (variable: DASH pre-op).

and VAS; the correlation was stronger for preoperative DASH score than for duration of pain before surgery. This superiority in the correlation can be observed in Table 3 (Pearson’s coefficient), and in the scatter plots shown in Figs. 3-5.

Table 2 – SF-36 – comparison of the pre- and postoperative periods.^a

	Functional capacity	Limitation due to physical aspects	Pain	General health	Vitality	Social aspects	Limitations due to emotional aspects	Mental health
Pre-op	67.5 ± 16.9 (25-100)	22.4 ± 35.7 (0-100)	35.8 ± 21.3 (0-80)	69 ± 19.6 (30-100)	55.4 ± 24.5 (5-100)	78.3 ± 27.2 (0-100)	39.5 ± 45.1 (0-100)	63.5 ± 23 (4-100)
Post-op	72 ± 21.5 (15-100)	37.5 ± 46.2 (0-100)	55.5 ± 25.2 (10-90)	65.7 ± 21 (15-100)	68 ± 23.5 (0-100)	76.9 ± 24.6 (0-100)	47 ± 45.3 (0-100)	77.7 ± 17.6 (28-100)
p-Value	0.03	0.01	0.000003	0.25	0.004	0.007	0.40	0.0003

^a Values are presented as mean and standard deviation; the range is in parentheses.

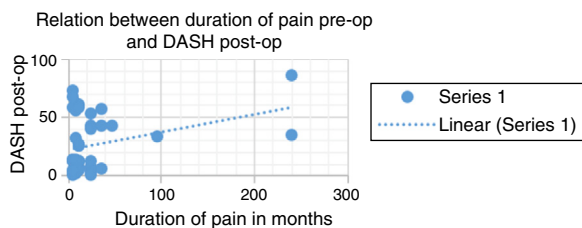


Fig. 5 – Scatter plot (variable: duration of pain before surgery).

Complications

Two patients had superficial infection, which improved after one week of oral antibiotic therapy. A second debridement was not necessary, and no additional complications were observed.

Discussion

Lateral epicondylitis is a common diagnosis that responds well to conservative treatment. Surgical intervention is necessary when symptoms do not improve or when improvement is unsatisfactory after at least six months of treatment, which occurs in 4–16% of cases.^{5,7,8} The present study evaluated the functional response and pain in this group of patients with recalcitrant epicondylitis who underwent arthroscopic debridement of the ECRB tendon. Significant improvements were observed in scores studied, with the exception of only two items from SF-36. Results obtained at the VAS are consistent with the literature, which shows slightly better results when the score is measured with the patient at rest than during activity with the upper limb.¹⁴

The literature indicates that the DASH score results for this type of treatment are good. In a study comparing the arthroscopic procedure with a percutaneous technique, the DASH score was assessed before and after surgery, showing significant results ($p < 0.05$). The DASH score changed from 72 to 48 points in arthroscopic cases and from 70 to 50 in the percutaneous group.¹⁵ In the present study, patients had a lower mean final score (25.9 points), but the mean preoperative values were also lower. Other Brazilian studies have also shown good results with this surgery, observing a significant improvement in the scores evaluated.^{16–18}

Despite the good results, it should be noted that approximately 23% of patients who were amateur athletes failed to return to the level of activity prior to the injury or had to change sports. Another point to consider is that three patients (6% of cases) did not observe any improvement with surgical treatment.

Some studies indicate that, regardless of the technique used, results of epicondylitis surgery are not uniform. Verhaar et al.¹⁹ reported a patient satisfaction rate of 66% in one year of follow-up. Only one-third of the patients had returned to work. Nirschl and Pettrone⁴ reported that 85% of patients treated with open technique had complete relief of symptoms and had no activity restrictions. In the present study, only seven patients (15%) had complete remission of symptoms even during manual activity.

One of the advantages of the arthroscopic treatment is earlier rehabilitation. Owens et al.¹¹ reported improvements in 16 patients after arthroscopic release, with a mean return to work without restriction of six days.

Baker and Baker²⁰ published the long-term results of a cohort study and indicated that they did not deteriorate over time. Patients who were well after two years maintained their functional level, without worsening pain in some cases, even ten years after the procedure.

As for prognostic factors, preoperative DASH and duration of pain presented a moderate correlation. These factors may be related to the severity of the condition. Other studies¹² have detected as prognostic factors the female gender, which in the present study showed no association, and the stage of the condition at resonance, not assessed in the present study.

Conclusions

Arthroscopic surgery for the treatment of recalcitrant lateral epicondylitis showed good results, representing an effective and safe technique. With this treatment, a significant improvement in all scores was observed. The shorter the duration of pain before surgery and the lower the preoperative DASH, the better the postoperative results are.

Conflicts of interest

The authors declare no conflicts of interest.

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