



## ORIGINAL ARTICLE

## Arthroscopic Management of Tennis elbow

Abdelsalam Eid Abdelsalam<sup>1</sup>, Mohammed Mansour El Zohairy<sup>2</sup>, Fahmy Samir Fahmy Gergis<sup>3</sup>, Ahmed Adel Alsayed Abdel maksoud<sup>4</sup>

Orthopedic Surgery, Department Faculty of Medicine, Zagazig University, Sharkia Egypt

## Corresponding author

Name : Ahmed Adel

Alsayed Abdel maksoud

[kingahmed\\_008@yahoo.com](mailto:kingahmed_008@yahoo.com)

Submit Date 2019-08-27

Revise Date 2019-09-22

Accept Date 2019-09-22

## ABSTRACT

**Background:** Tennis elbow, also known as “Lateral epicondylitis”, is a common disease, affect 1% to 3% of the population between 35 and 50 years old. <sup>1</sup>

**Purpose:** To evaluate the functional outcomes of arthroscopic management of lateral epicondylitis in orthopedic department, Zagazig University Hospitals.

**Study Design:** interventional study.

**Methods:** 20 patients with elbow pain in one side or both sides with persistent disability symptoms at least six months after failed conservative treatment were carried out in the department of orthopedic surgery, Zagazig University Hospitals from November 2017 to December 2018, their age between 25-70 years old,(14)70% males and (6) 30% females, The diagnosis was based on the history, physical examination and magnetic resonance examination, patients were evaluated with VAS and Mayo scores. They were treated with arthroscopic release of ECRB tendon.

**Results:** Patients were reintegrated into their activities at 3 weeks postoperatively. Pain as a sign and capital symptom improved significantly within 10 days of surgery. Mayo score improved postoperatively. The Mean± SD preoperative Mayo score was 60.5±7.23 and raised to 95.25±4.12 postoperative and to 97.5±3.03 after follow up for six months. The Mean± SD preoperative VAS score was 8.8±0.76 and raised to 0.85±0.74 and to 0.6±0.5 after follow up for six months. All patients were satisfied because of small wound size with cosmetic suture, rapid return of movement of elbow after operation and rapid improvement of pain level.

**Conclusion:** Arthroscopic management of lateral epicondylitis has low morbidity, which makes it safe, and efficient therapeutic choice when necessary and implemented appropriately in recurrent cases of chronic lateral epicondylitis and good resolution capacity, which enables improvement of pain and function of the elbow. This technique also has good view of the joint space, to diagnose and treat other disorders using a minimally invasive technique.

**Key words;** Arthroscopic, Tennis elbow, Management.

## INTRODUCTION

Tennis elbow, also known as “Lateral epicondylitis”, is a common disease present in clinical practice. It affects 1% to 3% of the population between 35 and 50 years old. <sup>1</sup>

Although it was previously thought that this pathological condition was common with the act of playing tennis, the cause of this pain in the lateral side of the elbow is more related to excessive use or repeated dorsiflexion and pronosupination exertion of the wrist. The diagnosis is mainly clinically by history and with physical examination. <sup>2</sup>

The pathogenesis of lateral epicondylitis is still has many theories , also it is known that not only the tendon of the extensor carpi radialis

brevis (ECRB) muscle but the annular ligament, lateral capsule, radial nerve and some bands of the extensor digitorum communis muscle are shared. <sup>3</sup>

It was basically thought that the reason of lateral epicondylitis was an inflammation, which responsible of the symptoms. <sup>3</sup>

However, histological studies have viewed that, through repeated injuries at this site, there is a degenerative process and a malrepair in the ECRB tendon. This is more pronounced than inflammation in other sites. <sup>4</sup>

Immature fibroblasts and non-functioning vascular buds invade the normal tissue of the ECRB tendon, thereby characterizing what is called “angio fibroblastic degeneration”, which

contain fibroblastic and vascular responses that are more commonly called "tendinosis".<sup>5</sup>

However it is a pathological condition which responds to conservative treatment, some patients have symptoms that are not responding to this treatment. In these cases, surgical intervention may be needed, and this may be done either by an open or an arthroscopic procedure.<sup>6</sup>

Arthroscopic management for lateral epicondylitis has the advantages of tendon debridement without damaging the aponeurosis of the extensor digitorum communis, good view of intra-articular pathological states and, short time of rehabilitation.<sup>7</sup> The aim of the study is to evaluate the functional outcomes of arthroscopic management of lateral epicondylitis in orthopedic department, Zagazig University Hospitals.

### Methods

20 patients attended to the outpatient clinic of Zagazig University Hospitals with elbow pain in one side or both sides with persistent disability symptoms at least six months after last conservative treatment, their age between 25-70 years old with Mean  $\pm$  SD 44.3 $\pm$ 10.34, 70% male and 30% female, occupation (10 workers, 7 employees, 3 housewives and others have same action of elbow movements), 70% are smokers and 8 patients were left side and 12 patients on right side were treated with arthroscopic release of ECRB tendon. Written informed consent was obtained from all participants and the study was approved by the research ethical committee of Faculty of Medicine, Zagazig University. The work has been carried out in accordance with The Code of Ethics of the World Medical Association (Declaration of Helsinki) for studies involving humans. (table 1)

Inclusion criteria were as follows: Elbow pain with weak grip symptoms at least six months after failed conservative (analgesics, anti-inflammatory drugs, local steroid injection and physical therapy) and Provocation of lateral elbow pain with at least one of the following tests - resisted middle finger extension, resisted wrist extension or passive stretch of wrist extensors (Mill's test, Maudsley's test, Cozen's Test and Chair lift test).

Exclusion criteria were as follows: Patient with active infection, patient with pain due to hyper uricemia, history of surgery on affected elbow, history of cortisone injections on the affected

elbow in the past 4 weeks, any physical or mental abnormality that precluded performance of the study testing and presence of concomitant disorders, such as posterior interosseous syndrome, lateral compartment arthrosis, instability and rheumatological diseases, osteochondritis dissecans of the capitellum.

Diagnosis was based on: Local examination of the normal elbow was done first before examination of the affected side, examination of the elbow as a whole assessing the movement, muscle action, mobility of the elbow, examination of the nerves related to see affected or not and examination of degree of pain and mobility according special tests as mill's test, Maudsley's test, Cozen's Test and Chair lift test.

Plain radiographic examination occasionally shows calcifications within the extensor mass origin or intra-articular pathology. All patients were subjected to MRI preoperatively. It was done to confirm the diagnosis, the MRI findings were correlated with clinical examination. Elbow ultrasonography Shows focal hypo echoic areas, intrasubstance tears, peritendinous fluid, and thickening of the common extensor origin.

### Operative Technique:

The patient was placed in the prone position with the operative elbow stabilized in an arm holder. A tourniquet was inflated to 250 mm Hg after the limb had been exsanguinated. The palpable bony landmarks of the olecranon, medial and lateral humeral epicondyles were identified and marked. The ulnar nerve was palpated and marked as well to ensure that it was located in the cubital tunnel and remains so with digital manipulation of the nerve. Then, two arthroscopic portals sites were localized and marked. A proximal anteromedial portal, used for visualization of the lateral epicondyle and anterolateral portal, used for release and debridement. (Fig 1).

The joint was then insufflated with approximately 30 mL of normal saline solution. Adequate insufflation was confirmed when the elbow can be seen to slightly extend and supinate as the joint capsule fully distends. Next, a proximal anteromedial portal was placed to view the joint specially (ECRB) tendon and anterolateral portal was placed by use of No.15 scalped blade through the skin and subcutaneous tissues. (Fig 2).

The knife was then advanced deeper to the

origin of the extensor carpi radialis brevis (ECRB) with care taken to maintain direct contact between the scalpel blade and the anterior bony surface of the lateral epicondyle. Then, scalpel blade was continued until the knife blade was directly visualized arthroscopically as the blade penetrates the anterior compartment of the elbow.

The incised and proximally released ECRB tendon was then “shelled out” by passing the knife blade circumferentially around it. Using the knife blade in this capacity allowed for a very controlled and defined release of the ECRB tendon, minimizing risk to the adjacent neurovascular and ligamentous structures. The scalpel blade was used to release the ECRB, and the superior margin of the intra-articular capsular and ECRB scalpel blade incision was confirmed arthroscopically when the extensor carpi radialis longus muscle fibers were seen in (Fig 3).

Care was taken to avoid injury to the adjacent lateral collateral ligament complex. After release of the ECRB tendon, a 4.5-mm arthroscopic shaver was placed directly through the anterolateral portal (Fig 4), and the released ECRB was excised for approximately 1 cm distally until healthy-appearing ECRB tendon was visualized by 30° arthroscopy. (Fig 5).

After completion of ECRB release and debridement, the arthroscopy was placed into the anterolateral portal so as to identify any additional pathology that may be present on the medial aspect of the anterior compartment.

After completion of the procedure, a further inspection of the joint, the portals will be sutured using 3-0 monofilament thread and a soft dressing is applied, Mobility of the elbow, wrist and fingers was encouraged from the first day as tolerated.

After 2 weeks, the stitches were removed and the physiotherapy program was started.

#### **Postoperative Rehabilitation and follow up**

All patients were submitted to careful follow up by: Postoperative medication (Analgesia was given in the form of diclofenac sodium 75mg IM every 12 hours, antibiotic 1.5gm every 12 hours, antiedematous: chymotrypsin injection

every 24 hours for 3 days then oral tablet for 1 week), follow up of any post-operative complications such as wound infection, haematoma and numbness along the arm, sutures of the wound were removed from 10-14 days, patients were advised for outpatient clinic visit weekly during the first month and monthly until complete recovery with clinical examination, careful examination of the elbow during the follow up period up to six months for any possible recurrence, patients encouraged for periodic self-examination for early detection of any new symptoms and physical therapy is lasted for 4 to 8 weeks post-operatively. Evaluate patients by same tests that done preoperative and compare scores to show improvement. All data were collected then statistically analyzed and tabulated.

#### **STATISTICAL ANALYSIS**

Data were imported into Statistical Package for the Social Sciences (SPSS version 20.0) (Statistical Package for the Social Sciences) software for analysis. Differences between quantitative paired groups by paired t test or sign, P value was set at <0.05 for significant results & <0.001 for high significant result.

#### **RESULTS**

The mean operative time was 70 minutes, the mean follow up time was 6 months. There were no neurological injuries. There were no additional pathological findings detected by arthroscopy. The patients were reintegrated into their activities at 3 weeks postoperatively. Pain as a sign and capital symptom improved significantly within 10 days of surgery. Mayo score improved postoperatively. The Mean± SD preoperative Mayo score was 60.5±7.23 and raised to 95.25±4.12 postoperative and to 97.5±3.03 after follow up for six months (table 2).

The Mean± SD preoperative VAS score was 8.8±0.76 and raised to 0.85±0.74 and to 0.6±0.5 after follow up for six months (table 3).

All patients were satisfied because of small wound size with cosmetic suture, rapid return of movement of elbow after operation and rapid improvement of pain level.

**Table 1-Demographic data**

<b>Age</b>	Mean± SD	44.3±10.34	
	<b>Median (Range)</b>	<b>45.0 (27-60)</b>	
		<b>N</b>	<b>%</b>
<b>Sex</b>	<b>Female</b>	<b>6</b>	<b>30.0</b>
	<b>Male</b>	<b>14</b>	<b>70.0</b>
	<b>Total</b>	<b>20</b>	<b>100.0</b>
		<b>N</b>	<b>%</b>
<b>Occupation</b>	<b>worker</b>	<b>10</b>	<b>50</b>
	<b>employee</b>	<b>7</b>	<b>35</b>
	<b>housewife</b>	<b>3</b>	<b>15</b>
	<b>Total</b>	<b>20</b>	<b>100.0</b>
		<b>N</b>	<b>%</b>
<b>Site</b>	<b>Left</b>	<b>8</b>	<b>30.0</b>
	<b>Right</b>	<b>12</b>	<b>50.0</b>
	<b>Total</b>	<b>20</b>	<b>100.0</b>

**Table -2 VAS distribution among studied group at different time.**

	Vas score	Vas post	Vas follow
<b>Mean± SD</b>	<b>8.8±0.76</b>	<b>0.85±0.74</b>	<b>0.6±0.5</b>
<b>Median (median)</b>	<b>9.0 (8-10)</b>	<b>1.0 (0-2)</b>	<b>1.0 (0-1)</b>

**Table 3- Mayo score distribution among studied group at different time.**

	Mayo score	Mayo post	Mayo follow
<b>Mean± SD</b>	<b>60.5±7.23</b>	<b>95.25±4.12</b>	<b>97.5±3.03</b>
<b>Median (Range)</b>	<b>60.0 (50-70)</b>	<b>95.0 (90-100)</b>	<b>100.0 (90-100)</b>



**Fig1: The patient is in the prone position with an arm holder**



**Fig2 :With the 30° arthroscopy viewing from the proximal-anterior medial portal and following the trajectory established with the spinal needle, a No. 15 blade scalpel was used to incise the skin and release the ECRB tendon along the anterior cortical.**



**Fig 3: With the 30° arthroscopy viewing from the proximal-anterior medial portal and following the trajectory established with the spinal needle, a No. 15 blade scalpel was used to incise the skin and release the ECRB tendon along the anterior cortical.**

### DISCUSSION

Lateral epicondylitis is the main cause of elbow pain, but many theories exist regarding its pathophysiology and etiology. The most accepted theory shows that micro and macro lesions occur at the origin of the extensors (especially the ECRB) as a failed response to regeneration and causing lateral epicondylitis.<sup>9,1</sup>

Treatment in most patients is conservative and only a small number of cases have failed and referred for surgical management.<sup>10</sup>

The literature showed different types of therapy for treating epicondylitis including shock waves, platelet-rich plasma and corticoid injection, to surgery, which can be done either open, percutaneous or arthroscopic.

In our study, 20 cases were subjected to

arthroscopic release and debridement of ECRB tendon after failure of conservative treatment.

The arthroscopic management has good view of the elbow joint and the pathological states that may present. However, this technique takes a long period to be done and surgeons need training and experience to achieve good results. The technique presents results that are similar to those from conventional techniques.<sup>11</sup>

Studies have indicated that there is no matching between the type of lesion and the postoperative clinical and functional evaluation. This type of matching was also not found in our results.<sup>12</sup>

In other studies by Morteza,<sup>13</sup> Arthroscopic Versus Open Techniques for Lateral epicondylitis that made evaluations using Mayo



scores divided 38 patients who were applied to the technique according to the technique used: debridement and release of the ECRB were done to 19 patients and another 19 release of ECRB only done. All groups presented a mean of 40 points on Mayo. While in our study, mean of  $60.5 \pm 7.23$  points and improved post operatively to mean  $95.25 \pm 4.12$  points and after six months of follow up increased to  $97.5 \pm 3.03$  points.

In other study by Lech,<sup>14</sup> according to open surgery technique twenty-four cases (9 men and 15 women) were included in the study. The mean age at the time of surgery was 38.5 years (ranged from 25 to 64). The main limb was involved in almost 62.5% of the patients. The average period of preoperative symptoms was 3.7 years (ranged from 2 to 7 years). All cases had previous conservative treatment with failure to improve their symptoms. The mean time of post-operative follow up was 34.8 months (25 to 50). The VAS pain score decreased from a pre-operative mean of 7.2 to a post-operative mean of 3.5. While in our study the VAS pain score improver from preoperative mean of 8.8 to a postoperative of 0.85 and after follow up six months improved to mean of 0.6.

In other study by Mishra<sup>15</sup>, according to outcome of Percutaneous release of lateral epicondylitis : A Trial Study, fifty cases (50 elbows) were in the study. Thirty-two cases were women (64%) and 18 were men (36%). The right side was affected in 37 cases (74%) and left side in 13 (26%). The time taken to get a completely pain-free elbow ranged from one day to two months (average of 26.2 days). Those who did not get a pain-free elbow had a residual pain of 1.5 to six on the visual analogue scale (VAS) (average 2.32). Excellent outcome was achieved in 24 patients (48%); Good result in eight cases (36%); Fair in four cases (eight percent) and Poor in four cases (eight percent).

While in our study the VAS pain score improver from a preoperative mean of 8.8 to postoperative of 0.85 and after follow up six months improved to a mean of 0.6.

In the study on 18 cases who underwent arthroscopy, Zoppi.<sup>16</sup> Arthroscopic surgical treatment of recalcitrant lateral epicondylitis, 10 cases had found scores more than 90 points ranged from a minimum of 60 points to a maximum of 100 points (mean of 90), which matches the data in the literature in relation to good functional scores.<sup>17</sup>

In another study by Bernardo,<sup>18</sup> Arthroscopic management for tennis elbow. The VAS pain score decreased from a preoperative mean of 9.2 to a postoperative mean of 0.64, While in our study the VAS pain score improved from a preoperative mean of 8.8 to a postoperative of 0.85 and after follow up six months improved to a mean of 0.6.<sup>19</sup>

In a postoperative study on 20 cases with a mean follow-up of 20 months, Othman,<sup>20</sup> found that only one case was upset with the results, and this was because the case presented reflex sympathetic dystrophy as a complication. These results were similar to our study as only one case of 20 was upset with the results.

With a mean follow-up of 14 months by Wada,<sup>21</sup> found that 8 cases of 12 were satisfied with the results. Latterman,<sup>5</sup> reported that, out of 32 cases with a mean follow-up of 3.5 years, 20 (63%) would repeat the surgery. These data show that the procedure used presented satisfactory clinic results for the cases regarding pain control.

The complications after the procedure are rare and consist of posterolateral ligament lesions, neurovascular lesions, hematomas and infection of the surgical site.

Most studies have not showed any complications.<sup>22</sup>

In a study on 18 patients operated using this maneuver, 14 did not show any complications, but this author's histological analysis reported microscopic findings of residual tendinopathy in ten cases had one case who presented paresthesia in the forearm for 14 days after the surgery, with spontaneous improvement. In our study, we found a complication rate of 5% (one case with local alterations of sensitivity in the region of the lateral portal).<sup>23</sup>

In our study, only one case was complicated with local alterations of sensitivity in the region of the lateral portal, treated with neurotonic and healed within one month postoperative.

The limitations of our study were:

- Small number of patients and short term follow up.
- Type of study not comparative.
- No control group to compare with other methods of treatment that doesn't allow us to increase percent of work to confirming that other methods not effective like arthroscopy.
- It is technically demanding.

## CONCLUSION

We conclude that arthroscopic management

of tennis elbow has low morbidity, which makes it safe, and good therapeutic option when needed and implemented appropriately in recurrent cases of chronic lateral epicondylitis and good resolution capacity, which improve the pain and function of the elbow. This maneuver also allows good viewing of the joint space, to diagnose and treat associated disorders using a minimally invasive technique.

#### Declaration of interest

The authors report no conflicts of interest. The authors alone are responsible for the content and writing of the paper.

**Funding information** None declared

#### REFERENCES

- Johnson GW, Cadwallader K, Scheffel SB, Epperly TD. Treatment of lateral epicondylitis. *Am Fam Physician*. 2017;76(6):843–8.
- Savoie III, F. H. "Arthroscopic tennis elbow release." *Journal of shoulder and elbow surgery* 2012; 19(2): 31-36.
- Baker CL Jr, Baker CL 3rd. Long-term follow-up of arthroscopic treatment of lateral epicondylitis. *Am J Sports Med*. 2018 Feb;36(2):254-60.
- Kim JW, Chun CH, Shim DM. *Knee Surgery, Sports Traumatology, Arthroscopy*, July 2013, Volume 19, Issue 7, pp 1178–1183
- Lattermann C, Romeo AA, Anbari A, Meininger K, McCarty LP, Cole BJ, et al. Arthroscopic debridement of the extensor carpi radialis brevis for recalcitrant lateral epicondylitis. *J Shoulder Elbow Surg*. 2014;19(5):651–6.
- Baker Jr CL, Murphy KP. Arthroscopic treatment of Lateral epicondylitis. *J Shoulder Elbow Surg*. 2015 Nov-Dec;9(6):475-82.
- Gattlob CA, Curd DT. Arthroscopic classification and treatment of lateral epicondylitis: two-year clinical results. *J Shoulder Elbow Surg Am J Sports Med* 2014;27:251–264
- Villasenor-Ovies, P.,. "Clinical anatomy of the elbow and shoulder." *Reumatologia clinica* 8: 13-24. (2012).
- Hastie, G. "Platelet rich plasma injections for lateral epicondylitis of the elbow reduce the need for surgical intervention." *Journal of orthopaedics* 2018; 15(1): 239-241.
- Schmitz, C. "Efficacy and safety of extracorporeal shock wave therapy for orthopedic conditions: a systematic review on studies listed in the PEDro database." *British medical bulletin* 2015; 116(1): 115
- Daley, R. A. *Orthotic Use in the Management of Epicondylitis: What is the Evidence? Tennis Elbow*, Springer 2015; 93-98.
- Hu, M. Effectiveness of Extracorporeal Shockwave Therapy Compared to Non-exercise Modalities for Treatment of Lateral Epicondylitis: A Meta Analysis, California State University, Fresno 2017; e25-27.
- Morteza Nakhaei Amroodi, Ali Mahmuudi, Mostafa Salariyeh and Arash Amiri. Surgical Treatment of Tennis Elbow; Minimal Incision Technique. *Arch Bone* 2016 Oct; 4(4): 366–370.
- Lech O, Piluski PCF, Severo AL. open surgery technique versus Arthroscopic Epicondilite lateral do cotovelo. *Rev Bras Ortop*. 2013;38(8):421–35.
- Mishra, A. K. " Arthroscopic versus percutaneous release of common extensor origin for treatment of chronic tennis elbow 2014; 42(2): 463-471.
- Zoppi Filho A, Vieira LAG, Ferreira Neto AA, Benegas E. Arthroscopic treatment for chronic lateral epicondylitis. 2014;39(3):93–101.
- Merrell, Greg, and Manuel F. DaSilva. "Arthroscopic treatment of lateral epicondylitis." *The Journal of hand surgery* 2012; 1130-1134.
- Terra, Bernardo Barcellos, "Arthroscopic treatment for chronic lateral epicondylitis." *The American journal of medicine* 2015; 126(4): 357. e351-357. e356.
- Regan W, Wold LE, Coonrad R, Morrey BF. Microscopic histopathology of chronic refractory lateral epicondylitis. *Am J Sports. Med* 2012; 20: 746-749.
- Othman AM. Arthroscopic versus percutaneous release of common extensor origin for treatment of chronic tennis elbow. *Arch Orthop Trauma Surg*. 2011;131(3):383–8.
- Wada T, Moriya T, Iba K, Ozasa Y, Sonoda T, Aoki M, et al. Functional outcomes after arthroscopic treatment of lateral epicondylitis. *J Orthop Sci*. 2013;14(2):167–74.
- Sagar Panthi, Alexander Muacevic and John R Adler. Outcome of Percutaneous Release of Tennis Elbow: A Non-Randomized Controlled Trial Study. *Cureus*. 2017 Jan; 9(1): e952. Published online 2017 Jan 2. doi: 10.7759/cureus.952.
- Savoie III, VanSice .Arthroscopic tennis elbow release." *Journal of shoulder and elbow surgery* (2013); 19(2): 44-62.

To Cite This Article: Abdelsalam AE , El Zohairy MM, Gergis FS, Abdel maksoud AA. Arthroscopic Management of Tennis elbow. *Zumj* 2020; 27(2):248-254: doi : 10.21608/zumj.2019.16344.1463.