



# Treatment of Lateral Epicondylitis: Steroid Injection versus Extra-Corporeal Shock Wave Therapy

Lateral Epikondilit Tedavisi: Ekstra Korporeal Şok Dalga Terapisine Karşı Steroid Enjeksiyonu

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## ABSTRACT

**Objective:** Several treatments have been proposed to treat lateral epicondylitis. Both steroid injection and extra-corporeal shock wave therapy (ESWT) are treatment modalities.

**Methods:** Thirty-four patients suffering from lateral epicondylitis for at least 6 months were treated in this study. The patients were divided into two groups: the first group included 17 patients treated by ESWT, and the second group included 17 patients treated by local injection of steroid. The results were evaluated using the visual analog scale and the DASH score.

**Results:** In the first group (ESWT), the mean follow-up period was 20.42 months. The VAS improved from 8.1 to 1.85, and the DASH score improved from 73.32 to 52.3. Moreover, 10 cases were satisfied, 2 cases were satisfied with reservation, and 5 cases were not satisfied. In the second group (steroid), the average follow-up period was 17.39 months. The VAS improved from 8.71 to 1.32, and the DASH score improved from 72 to 48.23. Concerning patient satisfaction, 13 cases were satisfied, 3 cases were satisfied with reservation, and 1 case was not satisfied.

**Conclusion:** Steroid injection had good results when compared to ESWT as regards pain relief, improvement of elbow function, and patient satisfaction at follow-up. (*JAREM 2014; 2: 58-61*)

**Key Words:** Lateral epicondylitis, ESWT, DASH score, steroid injection

## ÖZET

**Amaç:** Lateral epikondilit için bir çok tedavi yöntemi önerilmiştir. Hem steroid enjeksiyonu hem de ESWT (ekstra korporeal şok dalga terapisi) kullanılan tedavi metodlarıdır.

**Yöntemler:** Bu çalışmaya en az 6 aydır lateral epikondilitten dolayı ağrısı olan 34 hasta dahil edildi. Hastalar iki gruba ayrıldı, birinci gruptaki 17 hasta ESWT ile ve ikinci gruptaki 17 hasta ise steroid enjeksiyonu ile tedavi edildi. Sonuçlar Visual Analog Skala ve DASH skalaları kullanılarak değerlendirildi.

**Bulgular:** Birinci gruptaki hastaların (ESWT) ortalama takip süresi 20,42 ay idi. Ortalama VAS skorunda 8,1 den 1,85'e kadar, ortalama DASH skorunda ise 73,32'den 52,3'e kadar bir düzelme sağlandı. 10 hastada tatmin edici sonuca ulaşıldıkça, 2 hastada sınırlı memnuniyet sağlandı, 5 hastada ise tatmin edici sonuç sağlanamadı. İkinci grupta (steroid enjeksiyonu) ise ortalama takip süresi 17,39 ay idi. Ortalama VAS skorunda 8,71 den 1,32'ye, ortalama DASH skorunda ise 72 den 48,23'e kadar düzelme sağlandı. 13 hastada tatmin edici sonuca ulaşıldıkça, 3 hastada sınırlı memnuniyet sağlandı, 1 hastada ise tatmin edici sonuç sağlanamadı.

**Sonuç:** Steroid enjeksiyonu ESWT ile karşılaştırıldığında ağrının giderilmesi, dirsek fonksiyonlarının iyileşmesi ve hasta memnuniyeti açısından daha iyi sonuçlara sahiptir. (*JAREM 2014; 2: 58-61*)

**Anahtar Sözcükler:** Lateral epikondilit, ESWT, DASH skoru, steroid enjeksiyonu

## INTRODUCTION

Tennis elbow is the most common cause of elbow pain in patients attending orthopedic clinics. It occurs most commonly in the tendon of the extensor carpi radialis brevis (1).

However, other tendons of the extensor bundle, such as the extensor digitorum communis, may be involved (2).

The pathophysiology involves microtears in the tendon leading to hemorrhage, rough granulation tissue formation, and later repair. The initial management of tennis elbow is conservative treatments. These measures result in up to 90% of patients being in transient remission (3-5).

If conservative treatment does not benefit, the last chance is surgery, with the primary objective of pain relief (6-8).

Shock wave therapy has been employed in orthopedic and traumatic conditions, including any tendonitis, plantar fasciitis, fracture non-unions, and pseudoarthrosis (9).

The mechanism of action of extra-corporeal shock wave therapy (ESWT) is not clear, but we think that direct stimulation of the healing process is important. This may direct suppression on nociceptors and a hyperstimulation mechanism. Also, growth factor technologies are increasingly used to heal musculoskeletal disorders (10-16).

## METHODS

The study included two groups according to the methods of treatment either by ESWT or steroid.



**Inclusion criteria:**

- a) Pain over the common extensor origin increases with pressure over the lateral epicondyle and with resisted extension of the wrist and or middle finger.
- b) Duration of symptoms for at least 6 months.

**Exclusion criteria:**

- a) Active inflammatory disease.
- b) Concurrent pain in the cervical spine or ipsilateral shoulder due to other causes.

The method of treatment was discussed with the patient before the treatment. The ESWT technique depends upon application of ESWT three times with a 1-week interval between each therapy, whereas steroid method depends on a local anesthetic injection (prilocaine 1 mL) to the skin and subcutaneous tissues, followed by methylprednisolone acetate (1 mL) injection with skin penetration at the tendon. So, the choice of treatment was based on the patient's choice after discussing the two techniques.

The first group included 17 patients treated by ESWT (13 males and 4 females); all cases were unilateral, and the age of the patients was between 24 to 55 years with an average of 36.2 years. The pre-treatment period ranged between 6 months and 35 months with an average of 17.95 months. The pre-treatment VAS scale ranged between 6 to 9 points with an average of 8.1, and the pre-treatment DASH score ranged between 60 to 88 with an average of 73.32.

The second group included 17 patients treated by steroid injection (12 males and 5 females); all cases were unilateral, and the age of the patients was between 22 to 55 years with an average of 35.66 years. The pre-treatment period ranged between 6 months and 36 months with an average of 17.88 months. The patients were evaluated pre-operatively using the visual analog scale (VAS) and the Disabilities of the Arm, Shoulder, and Hand (DASH) score. The pre-treatment VAS scale ranged between 7 to 9 points with an average of 8.71, and the pretreatment DASH score ranged between 60 to 88 with an average of 73 (Table 1).

The patient was seen after treatment on the first day, after 1 week and 1 month, and then every 3 months for evaluation of pain and elbow function.

Every patient was given three sessions of ESWT at weekly intervals. A total of 2000 shock waves were administered at each session under ultrasound guide and without anesthesia.

Statistical Package for the Social Sciences (SPSS) was used. Chi-square test was used to compare the results between the two groups. The Kruskal-Wallis test was applied to compare VAS score changes before and after treatment. The difference in the VAS in the early results and at follow-up was estimated using the Wilcoxon signed-ranks test. Concerning the demographic data, including age ( $p=0.807007$ ), pre-treatment period ( $p=0.853325$ ), VAS ( $p=0.110115$ ), and DASH score ( $p=0.30697$ ), consequently, there was no significant difference.

**RESULTS**

In the first group (ESWT), all cases were unilateral, and all patients were available for follow-up. The follow-up period ranged between 8 months and 40 months with an average of 20.42 months. The average VAS improved from 8.1 to 1.85 with a mean improvement of 6.25 ( $p=0.0001$ ), and the average DASH score improved from 73.32 to 52.3 with a mean improvement of 20.55 ( $p=0.0001$ ). Concerning patient satisfaction, 10 cases were satisfied (55%), 2 cases (15%) were satisfied with reservation, and 5 cases (30%) were not satisfied. The success rate was 70%.

In the second group (steroid), all cases were unilateral. The follow-up period ranged between 7 months and 33 months with an average of 17.39 months. The average VAS improved from 8.71 to 1.32 with a mean improvement of 7.05 ( $p=0.0001$ ), and the DASH score improved from 72 to 48.23 with a mean improvement of 23.77 ( $p=0.0001$ ). Concerning patient satisfaction, 13 cases were satisfied (83.33%), 3 cases (10.52%) were satisfied with reservation, and 1 case (5.55%) was not satisfied. The success rate was 93.85%. There were no reported complications in either group at either the early or late follow-up.

In the post-treatment results of the ESWT group, the mean change in the VAS was 6.25 ( $p=0.0001$ ), and the mean change in the DASH score was 20.55 ( $p = 0.0001$ ). In the steroid group, the mean change in the VAS was 7.05 ( $p=0.001$ ), and the mean change in the DASH score was 23.77 ( $p=0.001$ ).

Regarding the difference in the results between the two groups, the mean improvement in the VAS in the ESWT group was 6.25 and 7.05 in the steroid group ( $p$  value = 0.05), and in the DASH score, the mean improvement in the ESWT group was 20.55 and 23.77 in the steroid group ( $p$  value = 0.05). Accordingly, there was a significant difference in the results of both groups in favor of the steroid group.

For outcome and success rate, the steroid group achieved much better results than the ESWT group-i.e., 93.85% versus 70%, respectively ( $p=0.001$ ).

**Table 1. Pre-treatment data of both groups**

	ESWT	STEROID	p
Age (years)	24-55 (36.2)	22-55 (35.66)	0.807007
Sex (Male/Female)	13/4	12/5	-
Pre-treatment period (months)	6-36 (17.95)	6-36 (17.88)	0.853325
Pre-treatment VAS	6-9 (8.1)	7-9 (8.71)	0.110115
Pre-treatment DASH score	60-88 (73.32)	60-88 (72)	0.306979

VAS: visual analogue scale; DASH: the disabilities of the arm shoulder and hand; ESWT: extra-corporeal shock wave therapy

**Table 2. Post-treatment results of the study**

	ESWT	STEROID	p
Follow up period (months)	20.42	17.39	0.376395
Post-treatment VAS	1-4 (1.85)	1-3 (1.32)	0.02
Post-treatment DASH score	46-58 (52.3)	40-54 (48.23)	0.01

VAS: visual analogue scale; DASH: the disabilities of the arm shoulder and hand; ESWT: extra-corporeal shock wave therapy

Successful results were defined as a reduction of as much as 25% in VAS and DASH score in either group at late follow-up. Consequently, the steroid group achieved more success as compared to the ESWT group ( $p < 0.001$ ) (Table 2).

## DISCUSSION

Tennis elbow is a common problem with many treatments. Symptoms is important and is economically advantageous. If conservative treatment does not provide satisfactory results, a patient may pursue other treatment options (13).

Rompe et al. (17) have described the use of low-dose ESWT in patients with chronic tennis elbow. There was a significant reduction in pain and increase in grip strength in the group that received shock wave therapy.

Haake et al. (18), in a double-blind controlled study, involved 270 patients with tennis elbow who received either ESWT or placebo at weekly intervals for 3 weeks; no difference was noted between the two groups.

Pettrone and McCall found significant improvement after a full dose of ESWT at 3 months, ranging between 33% to 70%, and at 6 months, ranging between 55% to 79% (19).

Staples et al. (20) conducted a double-blind randomized controlled trial on 68 patients to determine whether ultrasound-guided ESWT reduced pain in patients with tennis elbow. Patients received 3 ESWT treatments at a subtherapeutic dose given weekly. There were significant improvements in almost all outcome measures for both groups over the 6 months of follow-up. There was little evidence to support the use of ESWT as a therapeutic for the treatment of tennis elbow.

Hechtman et al. (21), in a similar study using PRP, treated 31 patients with epicondylitis not responding to conservative treatment for 6 months. Two cases elected surgery 1 month post-injection, and 29 cases continued follow-up. The overall success rate was 90% (28 of 31 elbows). Patient satisfaction improved from  $5.1 \pm 2.5$  at 1 month to  $9.1 \pm 1.9$  at last follow-up.

Thanasas et al. (22) treated two groups of patients with lateral epicondylitis; the first group included 14 patients treated by PRP injection, and the second group included 14 patients treated by injection of autologous blood. They concluded that PRP treatment is superior to autologous blood concerning short-term results but saw no statistically significant difference in elbow function at follow-up.

Gosens et al. (23) compared the results of two groups of patients with chronic lateral epicondylitis. The first group was treated by PRP injection, and the second group was treated by corticosteroid injection. Both groups significantly improved across time.

After 2 years of follow-up, the DASH scores of the corticosteroid group returned to baseline levels, while those of the PRP group significantly improved.

Chaudhury et al. (16) treated 6 patients who had a baseline ultrasound confirming tendinosis of the common extensor tendon. Patients received 3 ml PRP under sonographic control. Five patients were available for follow-up, and they gained improvement of tendon morphology rather than tendon vascularity at 6 months of follow-up.

In the current study, the results showed that both ESWT and steroid can be used for treatment of such a condition. However, the steroid group of patients achieved better results and more patient satisfaction. In the steroid group, the overall success rate was 93.85% (16 of 17 elbows), whereas in the ESWT group, it was 80%. The recorded levels of patient satisfaction were much higher in the steroid group. The assessment of our results was based totally on subjective and clinical data during the pre-treatment and post-treatment periods. Maybe it will be more reliable to use ultrasonographic measurement of the thickness and vascularity of the common extensor tendon at the start of treatment and at late follow-up.

## CONCLUSION

Lateral epicondylitis, or tennis elbow, can be treated effectively with non-surgical methods of treatment. Both ESWT and steroid can be successfully used for treatment of tennis elbow. However, steroid injection is more effective concerning pain relief and improvement of elbow function. Steroid injection is a good technique for treatment of tendinopathy.

**Ethics Committee Approval:** Ethics committee approval was not received due to the retrospective nature of the study

**Informed Consent:** Written informed consent was obtained from patient who participated in this case.

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