



# Comparison of extracorporeal shock wave therapy in acute and chronic lateral epicondylitis

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**Objective:** The aim of this study is to evaluate and compare the results of extracorporeal shock wave therapy (ESWT) in the treatment of acute (<3 months) lateral epicondylitis (LE) and chronic (>6 months) LE groups.

**Methods:** Fifty-four patients who were diagnosed with LE and treated with BTL-5000 SWT Power (BTL Türkiye Medikal Cihazlar, Ankara, Turkey) ESWT were included in the study. Twenty-four patients who had symptoms for <3 months were defined as the acute LE group (Group A), and 30 patients who had symptoms for >6 months were defined as the chronic LE group (Group B). All cases were evaluated pretherapy and at Weeks 2, 12, and 24 posttherapy according to pain while resting, pain while stretching, pain when pressed, pain while lifting chair, pain while working, nighttime pain on LE zone.

**Results:** Almost all values in both Group A and Group B were significantly improved at Weeks 2, 12, and 24 compared to the baseline values.

**Conclusion:** ESWT is equally effective in the treatment of acute LE and chronic LE. In addition, the current data suggest the progression of LE cases from acute phase to chronic phase may be prevented by treatment with ESWT.

**Keywords:** Epicondylitis; extracorporeal shock wave therapy; tennis elbow.

**Level of Evidence:** Level III Therapeutic Study

Lateral epicondylitis (LE) is a pathology caused by excessive use of the limbs, especially during sports and professional activities. It is characterized by pain originating from the lateral epicondyle and extending to the humerus and forearm, as determined during physical examination. It is generally observed in patients aged between

40–50 years. Its incidence is equal in men and women.<sup>[1]</sup> While acute onset is common in young athletes, chronic phase is more common in the elderly.

LE is described as acute if symptoms are <3 months and chronic if symptoms are >6 months.<sup>[2]</sup> There are many treatment methods for LE in the existing litera-

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rank test and differences between groups using Mann-Whitney U test. Results were evaluated with a 95% confidence interval and a significance level of  $p < 0.05$ . Institutional Review Board approval and informed consents were obtained for all patients.

## Results

Twenty-four patients (14 men, 10 women) were included in Group A, and 30 patients (18 men, 12 women) were included in Group B. The right elbows of 16 patients and left elbows of 8 patients were affected in Group A, while the right elbows of 18 patients and left elbows of 12 patients were affected in Group B. NSA administration was discontinued in all patients 2 weeks prior to beginning ESWT. Average symptom duration was 1.6 months in Group A and 8.4 months in Group B. Average age of patients in Group A was 47 (range: 32–61) and 48 (range: 32–66) in Group B. Mild pain was observed at the application site in 50% of patients in both groups. Ice application was recommended for such patients, and they did not require medication. Ecchymose, hematoma, or swelling was not observed in any patient.

When the pretherapy pain scores were compared with those obtained at Weeks 2, 12, and 24 posttherapy, no significant improvement was observed in pain while lifting chair, pain during working, and pain when pressed in Group A at Week 2 posttherapy, while these parameters were significantly improved at Weeks 12 and 24 posttherapy compared to the baseline. All other values in both Group A and Group B were significantly improved at Weeks 2, 12, and 24 posttherapy compared to the baseline values (Table 1). There was no difference in pre- and posttreatment scores regarding the dominant hand.

Baseline nighttime pain values were higher in LE cases comparing both baseline and posttherapy scores of chronic and acute LE cases ( $p = 0.04$ ). Similarly, it was found that the pain when pressed values were higher in acute LE cases at Weeks 2 ( $p = 0.03$ ) and 12 ( $p = 0.02$ ) posttherapy (Table 2, Figure 1).

Pain while lifting chair and pain pressed values were higher in acute LE cases compared to chronic cases at Week 12 posttherapy ( $p = 0.02$  in both), while pain while working values were higher in chronic cases at Week 24 posttherapy ( $p = 0.02$ ) (Table 2). Both groups benefited from the therapy equally when the efficiency of the therapy was considered in terms of values while pain while resting, pain while stretching, pain while nighttime.

## Discussion

We analyzed the results of ESWT therapy applied to cases of acute and chronic LE. Our results show that there is a significant clinical improvement in the parameters of pain while resting, pain while stretching, pain when pressed, pain while working, and nighttime pain at Weeks 2, 12, and 24 posttherapy compared to the baseline values in chronic LE cases. It is also seen that all parameters decreased and a clinical improvement was achieved at Weeks 12 and 24 posttherapy in acute LE cases. It was observed that parameters such as pain while resting, pain while stretching, and nighttime pain decreased, a clinical improvement was achieved at Week 2 posttherapy compared to baseline values, and that pain when pressed, pain while lifting chair, and pain while working also decreased at Week 2 posttherapy compared to baseline values, although it was not statistically significant. When the baseline values and values at Weeks 2, 12, and 24 posttherapy of acute and chronic

**Table 2.** Comparative statistical results of the groups.

	Pain while resting	Pain while stretching	Pain when pressed	Pain while lifting chair	Pain while working	Nighttime pain
Pretherapy	A: 5.79±1.91 B: 5.62±1.88 p=0.69	A: 7.25±1.29 B: 6.73±1.12 p=0.14	A: 8.5±0.98 B: 8.19±1.17 p=0.36	A: 6.63±1.21 B: 6.31±1.23 p=0.45	A: 6.38±1.01 B: 6.81±1.17 p=0.14	A: 7.04±1.2 B: 6.27±1.31 p=0.04
2 weeks posttherapy	A: 5.08±1.14 B: 5.19±1.5 p=0.79	A: 6.67±1.31 B: 6.31±1.01 p=0.21	A: 8.17±1.13 B: 7.5±1.07 p=0.03	A: 6.33±0.92 B: 5.92±1.02 p=0.21	A: 6.08±0.97 B: 6.04±1 p=0.92	A: 6.04±1.37 B: 5.38±1.13 p=0.046
12 weeks posttherapy	A: 4.71±1.46 B: 4.31±1.26 p=0.25	A: 6.13±1.7 B: 5.54±0.95 p=0.07	A: 7.71±1.49 B: 6.77±0.91 p=0.02	A: 5.96±1.16 B: 5.38±0.8 p=0.02	A: 5.46±1.28 B: 5.88±1.21 p=0.20	A: 4.83±1.49 B: 4.5±1.1 p=0.37
24 weeks posttherapy	A: 3.67±1.63 B: 3.5±1.1 p=0.78	A: 4.71±1.83 B: 5.04±0.96 p=0.26	A: 5.88±1.9 B: 5.65±1.02 p=0.83	A: 4.58±1.61 B: 4.69±0.93 p=0.91	A: 4.63±1.31 B: 5.58±1.24 p=0.02	A: 3.38±1.71 B: 3.35±1.23 p=0.95

A: Group A; B: Group B.

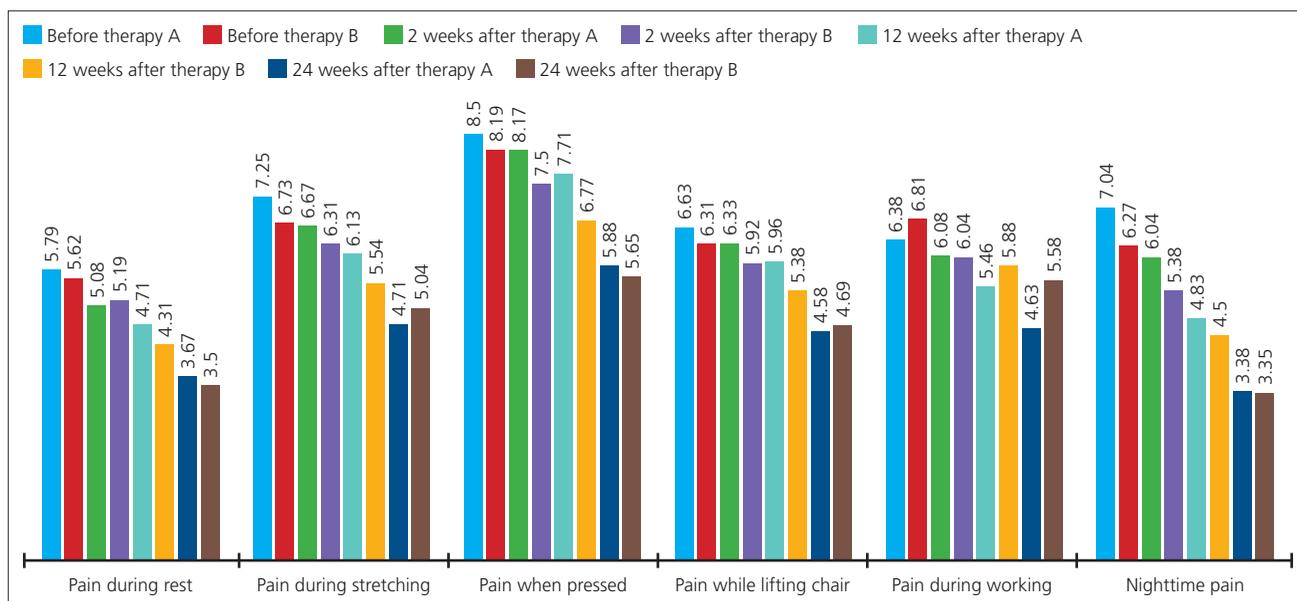


Fig. 1. Comparison of acute and chronic LE pain scores. [Color figure can be viewed in the online issue, which is available at [www.aott.org.tr](http://www.aott.org.tr)]

LE cases were compared, it was observed that nighttime pain was higher in acute LE cases. Efficiency of ESWT on pain when pressed was lower in acute cases than chronic cases at Weeks 2 and 12 posttherapy, and similarly, its efficiency on pain while lifting chair was lower in acute cases than chronic cases at Week 12 posttherapy. It was found that the effect of ESWT on pain while working was lower in chronic cases at Week 24 posttherapy.

Prevalence of LE has been reported as 1–3% in various studies.<sup>[1]</sup> This problem is observed rarely in patients <30 years and most commonly in patients in their 30s. The disease generally occurs on the dominant side, and the right side is affected twice as frequently as the left side. In our series, the dominant sides of 18 patients were affected in both groups.

Causes of LE are multifactorial. The natural course of LE is not clear, and there is not sufficient evidence in the literature that supports any definitive therapy method. In a randomized clinical study in which the patients were followed using a wait-and-see procedure by only limiting their activities, it was reported that equivalent outcomes with physical therapy and better outcomes than corticosteroid treatment were achieved in the elimination of the primary symptoms.<sup>[8]</sup> It has been demonstrated that corticosteroid injection is effective in a short period of 2–6 weeks.<sup>[9]</sup> In a prospective randomized study that compared corticosteroid injection with ESWT application, it was found that corticosteroid injection was more effective in elimination of pain, but it was reported that longer follow-up periods were re-

quired for comparing efficiency in acute cases.<sup>[10]</sup> It was reported that topical diclofenac administration was effective in decreasing elbow pain.<sup>[11]</sup> It is recommended that surgical therapy should be applied in patients who do not respond to conservative therapy but benefit from shock wave therapy.

In a randomized controlled study conducted in 198 patients by Bisset et al., they reported that the most effective strategy was corticosteroid injection in order to achieve short-term outcomes; however, this application was less effective than physical therapy—including elbow and wrist manipulations, frictions, stretches, exercises (isometric and isotonic) with a treatment of pulsed ultrasound, and acupuncture—due to recurrence of symptoms and its long-term outcomes.<sup>[5]</sup>

The mechanism of action of shock wave therapy is not clear. The operating logic of ESWT is to create an acute or new injury at lesion site over chronic condition, thereby triggering self-repair mechanisms of the body. As a result, vascularization and blood flow increase. It is suggested that hyperstimulation relieves pain by its analgesic effects.<sup>[5,12]</sup> Positive impacts of shock wave therapy on improvement after injury of the Achilles tendon have been suggested.<sup>[13,14]</sup>

In a prospective randomized controlled study conducted by Chung and Wiley, they reported that there was no significant difference between the shock wave therapy group and the placebo group.<sup>[15]</sup> Chung and Wiley applied shock wave therapy in patients with LE who were not treated previously (patients with symp-

toms for <1 year and >3 weeks), but they were unable to show its efficiency with long-term outcomes.<sup>[15]</sup> In another study with a similar patient group conducted by the same authors, it was found that ESWT was more effective in treatment of patients with symptoms for <16 weeks than in patients with symptoms >16 weeks.<sup>[16]</sup> In our study, average symptom duration was 1.6 months in Group A and 8.4 months in Group B. In a study conducted by Haake, the efficiency of shock wave therapy was not shown in treatment of LE.<sup>[17]</sup> Ko reported that perfect and good outcomes were achieved in 57.9% of the patients at Week 12 posttherapy and 73.1% of the patients at Week 24 posttherapy in a study he conducted including 56 elbows with LE.<sup>[10]</sup> Rompe et al. reported that low dose ESWT application decreased pain in chronic tennis elbow cases.<sup>[18]</sup> As an alternative approach, Ozturan et al. compared outcomes of corticosteroid, autologous blood injection, and ESWT application in treatment of chronic LE and reported that autologous blood injection and ESWT application were more effective.<sup>[19]</sup>

We did not find any existing study in the literature that compares ESWT application in acute and chronic LE. ESWT application is becoming an increasingly common method in the treatment of chronic LE. We attempted to reveal the efficiency of ESWT application in the treatment of chronic LE by assessing the response of ESWT application in patients in the acute phase. Process is an early treatment method in acute LE; the body is aware of the problem but has not been desensitized, as in the case of chronic LE. Even though it appears that this contradicts the operating logic of ESWT, we believe that ESWT applied in the acute phase triggers improvement. Additionally, our study reveals that the concerns regarding the excessive increase of inflammation are not valid. No exacerbation or increase in the inflammation table was observed in the symptoms of any patient. On the contrary, patients who were treated with ESWT did not progress to chronic phase or suffer from long-term pain due to its analgesic efficacy.

With regard to the differences between the groups, the higher baseline nighttime pain in the acute group may be accounted for by the fact that the disease was in the acute phase. When the general pain scores are considered, pain increased in the early stages of ESWT treatment, though this increase was not significant. A higher pain while working in the chronic group at Week 24 posttherapy may be explained by the persistence of chronic symptoms.

There was no untreated control group in this study, and the number of patients was relatively low to assess

such a disputed therapy method, and these constitute the weaknesses of the study.

We suggest that ESWT is effective in the treatment of acute LE as it is in the treatment of chronic LE. In addition, the current data suggests that the progression from acute phase to chronic phase in cases of LE may be prevented by treatment with ESWT.

**Conflicts of Interest:** No conflicts declared.

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