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Extracorporeal Shockwave for Chronic Patellar Tendinopathy

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Background: Chronic patellar tendinopathy is an overuse syndrome with pathologic changes similar to tendinopathies of the shoulder, elbow, and heel. Extracorporeal shockwave was shown effective in many tendinopathies.

Hypothesis: Extracorporeal shockwave therapy may be more effective than conservative treatment for chronic patellar tendinopathy.

Study Design: Randomized controlled clinical trial; Level of evidence, 2.

Methods: This study consisted of 27 patients (30 knees) in the study group and 23 patients (24 knees) in the control group. In the study group, patients were treated with 1500 impulses of extracorporeal shockwave at 14 KV (equivalent to 0.18 mJ/mm² energy flux density) to the affected knee at a single session. Patients in the control group were treated with conservative treatments including nonsteroidal anti-inflammatory drugs, physiotherapy, exercise program, and the use of a knee strap. The evaluation parameters included pain score, Victorian Institute of Sports Assessment score, and ultrasonographic examination at 1, 3, 6, and 12 months and then once a year.

Results: At the 2- to 3-year follow-up, the overall results for the study group were 43% excellent, 47% good, 10% fair, and none poor. For the control group, the results were none excellent, 50% good, 25% fair, and 25% poor. The mean Victorian Institute of Sports Assessment scores were 42.57 ± 10.22 and 39.25 ± 10.85, respectively, before treatment ($P = .129$) and 92.0 ± 10.17 and 41.04 ± 10.96, respectively, after treatment ($P < .001$). Satisfactory results were observed in 90% of the study group versus 50% of the control group ($P < .001$). Recurrence of symptoms occurred in 13% of the study group and 50% of the control group ($P = .014$). Ultrasonographic examination showed a significant increase in the vascularity of the patellar tendon and a trend of reduction in the patellar tendon thickness after shockwave treatment compared with conservative treatments. However, no significant difference in the appearance, arrangement, and homogeneity of tendon fibers was noted between the 2 groups. There were no systemic or local complications or device-related problems.

Conclusion: Extracorporeal shockwave therapy appeared to be more effective and safer than traditional conservative treatments in the management of patients with chronic patellar tendinopathy.

Keywords: patellar; tendinopathy; chronic; shockwave; conservative treatment

Patellar tendinopathy is a common orthopaedic problem characterized by pain and tenderness just below or, less commonly, above the patella.^{1,6,34} With an increase in frequency, duration, and intensity of quadriceps contraction

in activities that require repetitive knee extension and flexion, the patellar tendon can develop microtears at the attachment site to the inferior pole of the patella. The pathologic changes seen in this condition are similar to those of other overuse injuries, including lateral epicondylitis (tennis elbow) or plantar fasciitis (painful heel syndrome).^{8,11,12} Conservative treatments have been proposed as the initial choice for patellar tendinopathy, including cessation of the offending activity until symptoms subside; stretching and strengthening exercises for the quadriceps, hamstrings, and patellar tendon; applying heat before and ice after exercise; the use of nonsteroidal anti-inflammatory drugs (NSAIDs); and the use of a patellar strap to reduce

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