

## **Addition of a Novel Eccentric Wrist Extensor Exercise to Standard Treatment for Chronic Lateral Epicondylitis: A Prospective Randomized Trial**

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**Objective:** Isokinetic eccentric training of the wrist extensors has recently been shown to be effective in treating chronic lateral epicondylitis. However, isokinetic dynamometry is not widely available or practical for daily exercise prescription. Therefore, the objective of this study was to assess the efficacy of a novel eccentric wrist extensor exercise added to standard treatment for chronic lateral epicondylitis.

**Methods:** Twenty-one patients with chronic unilateral lateral epicondylitis were randomized into an eccentric training group (n=11, 6 men, 5 women; age 47±2 yr) and a standard treatment group (n=10, 4 men, 6 women; age 51±4 yr). Both treatment groups received wrist extensor stretching, ultrasound, cross-friction massage, heat and ice. Additionally the Standard Treatment Group performed isotonic wrist extensor strengthening and the Eccentric Group performed isolated eccentric wrist extensor strengthening. The eccentric exercise involved twisting a rubber bar (Thera-Band® FlexBar, The Hygenic Corporation, Akron OH) with concentric wrist flexion of the noninvolved arm and slowly releasing the twist with eccentric wrist extension of the involved arm. Three sets of 15 repetitions were performed daily as part of a home program with intensity increased progressively during the treatment period. DASH questionnaire, visual analog pain scale (VAS), tenderness (measured with a myometer just distal to the lateral epicondyle), and wrist and middle finger extension strength (hand-held dynamometer) were recorded at baseline and after the treatment period. Treatment effects were assessed using Treatment (eccentric vs. standard) by Time (Pre vs. Post) ANOVA on each dependent variable. Based on previous work it was estimated that 15 patients per group would be sufficient to detect a 40% difference in DASH score improvement between groups at P<0.05 with 80% power. Mean±SE is reported.

**Results:** Groups did not differ in terms of duration of symptoms (Eccentric 6±2 mo vs. Standard 8±3 mo, P=0.7), number of physical therapy visits (9±2 vs. 10±2, P=0.81) or duration of treatment (7.2±0.8 wk vs. 7.0±0.6 wk, P=0.69). Improvements in all dependent variables were greater for the Eccentric Group versus the Standard Treatment Group (percent improvement reported): DASH 76% vs. 12%, P=0.01; VAS 81% vs. 22%, P=0.002, tenderness 70% vs. 4%, P=0.003; strength (wrist and middle finger extension combined) 72% vs. 11%, P=0.032.

**Conclusions:** All outcome measures for chronic lateral epicondylitis were markedly improved with the addition of an eccentric wrist extensor exercise to standard physical therapy. In fact, given the consistently poor outcomes for patients in the Standard Treatment Group it was deemed appropriate to terminate the randomization with 21 of the intended 30 patients having completed the study. This novel exercise, using an inexpensive rubber bar, provides a practical means of adding isolated eccentric training to the treatment of chronic lateral epicondylitis.