**Cullinane FL, Boocock MG, and Trevelyan FC. Is eccentric exercise an effective treatment for lateral epicondylitis? A systematic review. Clinical Rehabilitation 2014; 28:1: 3–19.**

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**Reviewer:** Linda Metzger 4-25-16

**Design:** Systematic review of randomized and controlled clinical trials (no meta-analysis)

**Objective:** To assess whether eccentric exercise is an effective physical therapy intervention and treatment either in isolation or as part of a multimodal therapy protocol for patients with lateral epicondylitis (LE).

**Summary of Results:**

* Included 12 studies comparing some form of eccentric exercise to a group not receiving eccentric exercise. One trial compared a regularly supervised eccentric exercise physiotherapy program with an unsupervised eccentric exercise home program. The 12 studies consisted of 616 participants of whom 336 were females and 280 were males.
* This systematic review included 8 randomized clinical trials (RCTs) and 4 controlled clinical trials (CTs). Of the 12 studies, 3 were rated high quality, 7 were medium quality, and 2 were rated low quality. One study was a pilot study.
* The main intervention in all studies was eccentric exercises, with or without adjunctive multimodal therapy, and the comparison interventions could be the same adjunct therapies or different therapies.
* All 12 studies used a visual analogue scale (VAS) as an outcome measure for pain, 8 studies measured grip strength, and 7 studies used a variety of questionnaires such as the DASH, SF-36, or Tennis Elbow Function Scale to measure function and/or disability.
* No statistical pooling of the combined results was performed to produce an overall effect due to the high heterogeneity of the study populations and a variety of comparisons in the included studies. Therefore, instead of a meta-analysis, a best-evidence synthesis was used to summarize the results.
* Four studies compared eccentric exercise plus adjunct therapies given to one group versus the same adjunct therapies given to the other group (control). All 4 studies reported improvements in outcome measures from baseline in both groups. Three of the 4 studies (2 high quality and one medium quality) found that the addition of eccentric exercise led to greater reduction in pain, disability, and/or improvement in grip strength compared with the same adjunct therapies exclusive of eccentric exercise. One medium quality study found no difference in three functional-related measures, grip strength, and pain when eccentric exercise was added to the adjunct treatment.
* Four studies (all medium quality) compared eccentric exercise plus adjunct therapies given to one group versus different therapies given to the other group (control). Only the eccentric exercise group in all 4 studies reported improvements in outcome measures from baseline. Three of the 4 studies found that eccentric exercise when combined with adjunctive therapies in a multi-modal treatment program resulted in significant improvements in pain, function, and grip strength compared with different therapy treatments. However, one study found that the eccentric exercise and adjunct therapies were less effective than a Cyriax therapy program exclusive of eccentric exercise.
* One high-quality study (non-randomized trial) compared a regularly supervised eccentric exercise group with an unsupervised home eccentric exercise group and found significantly decreased pain and improved function at 24 weeks in the supervised group compared with the unsupervised group. This study found improvements in pain and function from baseline in both eccentric exercise groups.
* The authors of this systematic review concluded that patients with lateral epicondylitis who underwent an eccentric exercise program, either in isolation or as an adjunct to other therapies, decreased pain and improved function and grip strength in comparison to their baseline measures. Seven out of the nine medium or high quality studies that added eccentric exercise as part of a multimodal therapy program showed improved outcomes for pain, function, and/or grip strength in comparison to other combined treatment programs.

**Reasons not to Cite as Evidence:**

* Included articles were assessed for methodological quality, and scored independently by 2 of the authors using the valid Modified Cochrane Musculoskeletal Injuries Group score sheet which assesses study design and outcome measures. This Modified Cochrane was designed and exclusively used for this systematic review only. The design is greatly flawed in that none of the 13 scoring questions asks about randomization. This scoring system excludes the very important methodological quality item of randomization, and in doing so, overestimates the quality of most of the included studies. For example, 2 of the high quality rated trials were not even randomized.
* The 12 studies addressed in this critique were rated as low (2), medium (7), or high (3) quality by the authors. These quality ratings may be somewhat inflated compared to the DOWC standards, and some of the studies may actually be marginally adequate due to methodological weaknesses which puts them at a greater risk of bias. The 2 low quality studies and one medium study that was a pilot study clearly do not meet our literature critique criteria. Of the remaining 9 studies, only 2 had complete allocation concealment, only 6 provided adequate randomization, and only 6 blinded outcome assessors. All had clearly defined outcome measures, but only 5 studies had similar baseline parameters for both the treatment and control groups. Three studies were non-randomized controlled clinical trials.
* These 12 studies represent a large number of studies that are methodologically compromised with a high risk of bias. Even though eccentric exercise is likely to be beneficial and supports the active participation of the patient which is preferred, the studies fail methodologically and their overall quality of evidence is low or unclear. This low quality evidence does not meet our literature critique criteria and cannot support a good evidence statement for the beneficial effects of eccentric exercise.
* Because the limited evidence is of low quality, further research is very likely to have an important impact on our confidence in the estimate of effect and is likely to change the estimate, and so we are uncertain about the magnitude of the effect, and thus no useful conclusions can be drawn.
* Most study authors failed to accurately report exercise protocols and the substantial variation in exercise parameters made it difficult to assess the effectiveness of each study’s ability to isolate an eccentric exercise component and provide a progressive muscle stimulus and also exclude a concentric component of the exercise.
* Another major concern across the studies was the lack of reporting of compliance and adherence to the exercise programs, with only 4 studies documenting exercise adherence. Compliance and adherence are known to be important mediators impacting the effectiveness of an exercise program. Lack of adherence could dilute the effect of an eccentric exercise intervention.
* Eccentric exercise is rarely used as an isolated treatment intervention for LE, but is instead generally combined with multimodal therapy as in the studies in this review, especially exercise or physical therapy. It is difficult to discern if the addition of eccentric exercise produces effectiveness beyond using multimodal therapy alone or stems from the combined effects of the treatment protocols. However, multimodal treatment protocols are reflective of real world practice.
* As none of the studies had control groups who did not participate in any form of treatment, it is not known what affect the natural healing process had on recovery. There is evidence to suggest that some patients with lateral epicondylitis do recover within12 months without treatment.
* This review provides insufficient evidence and very low quality evidence of effectiveness for eccentric exercise for improving symptoms and functional ability for people with lateral epicondylitis. More high quality randomized controlled trials assessing the effectiveness of eccentric exercise is needed before recommending this intervention.

**Assessment:**

* Low quality, inadequate systematic review that is inadequate to support any evidence for the effectiveness of eccentric exercise included within a multimodal therapy program compared with other treatment therapies for the treatment of patients with lateral epicondylitis (LE).