# Management of Chronic Lateral Epicondylitis With Manual Therapy and Local Cryostimulation: A Pilot Study

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## Abstract

**Objective:** The purpose of this pilot study was to evaluate the feasibility and efficacy of adding cryostimulation to manual therapy in patients with chronic lateral epicondylitis.

**Methods:** The control group (n = 19) was treated with manual therapy consisting of soft-tissue therapy and radial head mobilizations. The experimental group (n = 18) received cryostimulation in addition to manual therapy care similar to that for the control group. Both protocols consisted of 8 treatments over a 4-week period. Outcome measures included pain intensity (visual analog scale), pain-free grip strength (handheld dynamometer), and functional index (Patient-Rated Tennis Elbow Evaluation questionnaire). Assessments were performed at baseline, postintervention, and 3-month follow-up. Adherence and dropout rates were also considered.

**Results:** Both groups exhibited significant improvements in pain intensity and functional index at postintervention assessments, which were maintained at follow-up. All participants attended the prescribed number of treatments, but 27% were lost at follow-up. Minor adverse events were reported after cryostimulation in 4 cases.

**Conclusions:** This study indicated that it is feasible to complete a clinical trial evaluating the efficacy of adding cryostimulation to manual therapy in patients with chronic lateral epicondylitis. On the basis of these preliminary data, the combination of cryostimulation and manual therapy care did not provide any additional benefits in both the short term and the long term. Manual myofascial point treatment and mobilization techniques yielded positive outcomes in chronic lateral epicondylitis. Further studies should focus on the sole therapeutic effect of cryostimulation in both patients with acute and those with chronic conditions. (J Chiropr Med 2017;xx:1-10)


**Key Indexing Terms:** *Tendinopathy; Elbow; Cryotherapy; Musculoskeletal Manipulation; Trigger Points*

## Introduction

Lateral epicondylitis (LE) is one of the most frequently encountered lesions affecting the upper extremity.[1] It is defined as an injury involving the wrist common extensor tendons, particularly the extensor carpi radialis brevis and extensor digitorum.[2] The clinical presentation involves a sensation of pain or burn over the humeral insertion of the common extensor tendons. This pain can be exacerbated by wrist extensor activation, passive wrist flexion combined with passive elbow extension,[3] and palpation over the lateral epicondyle or the origin of the wrist extensor muscle group. Patients affected by LE will commonly present with a loss of grip strength[4] and will usually report pain during daily activities such as grasping objects, turning doorknobs, and shaking hands.[5]

Lateral epicondylitis is a frequent complaint among musculoskeletal disorders affecting the upper extremities, with an annual prevalence of 1% to 3% in the active population.[4] Sanders et al, in a 13-year epidemiological study, reported an overall annual age- and sex-adjusted incidence of 3.4/1000 for lateral elbow tendinosis.[6] A peak incidence is observed between 35 and 54 years of age, affecting slightly more women than men and having a higher prevalence for the dominant side.[6-9] The high prevalence of LE leads to a significant socioeconomic burden. Taylor and Hanaffin recently reported that taken together, medial epicondylitis and LE accounted for 11.7% of work-related injury claims, with an average cost of $6593

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US per claim in Washington State from 1987 to 1995.[4] Similar costs have been reported by the Quebec Province Workers Board of Compensation for 2008, with 739 workers having received compensation for LE, averaging 87 days in length and $5860 CAN in cost.[10,11]

Pain around the lateral epicondyle has been, over the years, referred to as tennis elbow, epicondylalgia, epicondylitis, and epicondylosis, reflecting the evolution in the understanding of the pathomechanical mechanisms underlying this lesion. The most common and plausible explanation for LE is now believed to be a degenerative process in which the tendons manifest abundant fibroblastic activity, vascular hyperplasia, and the presence of unstructured collagen fibers.[3] Therefore, it is believed that the tendinopathy results from repetitive strains or overuse of the forearm-extensor tendons rather than from a single trauma.[12-14]

Among the factors contributing to the chronic nature of the condition, tasks requiring forceful and repetitive recruitment of the extensors of the forearm, repetitive wrist and elbow motions such as flexion and extension for more than 2 hours a day, and forceful gripping such as lifting heavy objects (≥20 kg) more than 10 times a day are brought forward by many researchers.[1,15-17]

Lateral epicondylitis remains a challenging condition to manage considering its high rate of recurrence and episodes that can last from 6 months to 2 years.[6,8,18] Many conservative treatments used alone or in combinations have been reported to have modest effects, but no single option seems to be clearly superior.[13,18-20] This may be due to the lack of a definite understanding or identification of a clear pathophysiological mechanism, the lack of good-quality studies, or the presence of many confounding factors influencing the treatment outcome.[21,22]

Many systematic reviews assessing the effectiveness of treatment modalities used for LE report a lack of evidence favoring one specific treatment option over another.[18,23,24] For instance, a review by Dingemanse et al investigating the effectiveness of electrical modalities in the treatment of LE included the following modalities: ultrasound, lasers, extracorporeal shock wave therapy, transcutaneous electrical nerve stimulation (TENS), and pulsed electromagnetic field.[25] The authors concluded that moderate evidence exists for the effectiveness of ultrasound and laser therapy, whereas the evidence for other modalities was inconclusive or mixed.[25] A careful review of original studies, however, indicated that when included, exercises, whether as add-ons or as a control group, contributed to enhance patients' recovery. This finding seems to be in agreement with recent reviews[1,26] and an individual article[27] on the effectiveness of exercises in the treatment of LE.

Studies looking at the outcome of manual therapy, including myofascial treatment and manual mobilizations of the elbow and wrist joint, present a different treatment centered on myofascial and articular lesions found in patients with LE. Ajimsha et al reported a positive effect on self-reported functional capacity after a 4-week treatment protocol. Positive outcomes were significant in both the short (4 weeks) and long (12 weeks) term.[28] Manual mobilization of the elbow and wrist joints has also been studied.[21] Many types of mobilization exist, and an extensive literature review by Herd and Meserve revealed a significant effect in favor of manipulative therapy on a short-term basis even though many studies reviewed were of low quality.[22]

Clinicians facing LE are trying different approaches, and multimodality is often observed.[29-31] It is with this idea in mind that our team wanted to test the addition of a new cryotherapy device to manual therapy commonly provided in the treatment of LE. Cryostimulation is believed to rapidly induce vasoconstriction and local analgesia. A fast drop in skin surface temperature is induced by vaporizing high-pressured cooled carbon dioxide on the skin.[32] To our knowledge, no study has investigated the effects of cryostimulation on chronic injuries; thus, we decided to add it to already confirmed effects of manual therapy.

Given the current knowledge on treatments for LE, we hypothesized that the addition of cryostimulation to conservative care including tender point (trigger point) treatment with manual therapies and radial head mobilizations would improve the clinical outcomes—pain-free grip strength, perceived pain intensity, and functional level—in subjects affected by chronic LE. We hypothesized that like conventional ice, the temporary analgesia provided by cryostimulation would enhance patients' forearm mobility.[33] Mobility has been used by many researchers to stimulate tendon healing.[34] The purpose of this pilot study was to evaluate the feasibility and efficacy of adding cryostimulation to manual therapy in patients with chronic LE.

## Methods

### Study Design

This study is a pilot clinical trial focused on feasibility outcomes such as side effects related to cryostimulation, participants' retention rate throughout the protocol, and challenges related to running the experiment in a university-based chiropractic clinic. The secondary objective was to provide estimates of treatment effect on common chronic LE clinical outcomes. One protocol consisted of manual therapy, and the second included manual therapy combined with cryostimulation. The study was designed to test the hypothesis that cryostimulation can be used (feasibility) and is effective as an adjunct therapy in the treatment of chronic LE.

### Study Population

Potential participants were recruited through the university website, a billboard posting, and local newspapers. A