

MANIPULATIVE THERAPY AND REHABILITATION FOR RECURRENT ANKLE SPRAIN WITH FUNCTIONAL INSTABILITY: A SHORT-TERM, ASSESSOR-BLIND, PARALLEL-GROUP RANDOMIZED TRIAL



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ABSTRACT

Objective: The purpose of this study was to compare manipulative therapy (MT) plus rehabilitation to rehabilitation alone for recurrent ankle sprain with functional instability (RASFI) to determine short-term outcomes.

Methods: This was an assessor-blind, parallel-group randomized comparative trial. Thirty-three eligible participants with RASFI were randomly allocated to receive rehabilitation alone or chiropractic MT plus rehabilitation. All participants undertook a daily rehabilitation program over the course of the 4-week treatment period. The participants receiving MT had 6 treatments over the same treatment period. The primary outcome measures were the Foot and Ankle Disability Index and the visual analogue pain scale, with the secondary outcome measure being joint motion palpation. Data were collected at baseline and during week 5. Missing scores were replaced using a multiple imputation method. Statistical analysis of the data composed of repeated-measures analysis of variance.

Results: Between-group analysis demonstrated a difference in scores at the final consultation for the visual analogue scale and frequency of joint motion restrictions ($P \leq .006$) but not for the Foot and Ankle Disability Index ($P = .26$).

Conclusions: This study showed that the patients with RASFI who received chiropractic MT plus rehabilitation showed significant short-term reduction in pain and the number of joint restrictions in the short-term but not disability when compared with rehabilitation alone. (*J Manipulative Physiol Ther* 2015;38:22-34)

Key Indexing Terms: *Ankle Injuries; Musculoskeletal Manipulations; Rehabilitation*

Recurrent ankle sprain with functional instability (RASFI) is a common ankle disorder, with more than 40% of inversion sprain injuries progressing beyond RASFI to chronic ankle instability (CAI).^{1,2}

Because approximately 85% of all ankle injuries are from forced inversion and plantarflexion is a primary cause of recurrent inversion sprain, RASFI would therefore account for a significant portion of all ankle injuries.³ In the United

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States, it is estimated that, for up to 23 000 individuals and athletes per day, it is the most common site of injury in 24 of 70 sports that have been examined.³⁻⁵ Inversion ankle sprain is one of the most common injuries in sport, making up for 10% to 30% of all sports injuries and is high in court games such as volleyball, handball, and basketball and/or in contact team sports, such as rugby, American football, and soccer.^{5,6} Inversion sprain is a cause of a significant absence from sport, with a high rate of recurrent sprain or persistent symptoms in athletes on their return.^{5,7} Such injury is estimated to account for 15% of all athletic injuries, and in an incidence rate estimated to be 2.15 per 1000 person years, up to 72% of all athletes will sustain chronic or long-term ankle signs and symptoms (lasting up to and >18 months).^{5,6,8}

Commonly injury occurs first to the anterior talofibular, then calcaneofibular, and, finally, the posterior talofibular ligaments with an associated increase in severity, chronic pain, altered gait, and significant loss of dorsiflexion.^{5,6,8} These features of RASFI, including restricted ankle dorsiflexion range of motion due reputedly to loss of anterior-to-posterior talar glide with, associated intermittent pain and prevent locking of the mortise joint into full dorsiflexion leaving the ankle slightly plantarflexed and inherently less stable with a predisposition to further periodic “giving way” and recurrent sprain.^{7,9-11}

The mechanical injury thought responsible for RASFI is a tear predominantly in the anterior talofibular or more severely the full, lateral collateral ligament, which often manifests as “functional” instability (ie, instability brought out only in significantly stressful activities of the ankle in sports or other activities) and not easily detectable mechanical instability (ie, by simple testing with the anterior drawer test).⁷⁻¹⁰ Loss of ankle dorsiflexion and posterior glide of the talus with a concomitant slight plantarflexion appears to lead to an associated loss of neuromuscular control (proprioceptive and muscular) and is associated with even lesser grades of ligamentous injury (grades I-II), even if no mechanically detectable instability is apparent.⁶⁻¹⁰ The definition of RASFI used in this article is drawn from work that describes this disorder as the same ankle, sprained on at least 2 occasions, with associated feelings of instability, or reports of it “giving way” with continued pain and impaired proprioception, neuromuscular balance, and control—and becoming a recurrent and chronic problem.^{2,6-12}

In participants with RASFI, preventing chronic pain, avoiding the development of mechanical instability, and reducing the chance of repeated injury is a goal, particularly in athletes where a return to sport or optimal performance is a priority.¹³⁻¹⁵ A combination of early proprioceptive and strength training is advocated after inversion sprain to reduce the symptoms of RASFI and avoid progression to CAI.^{1,13-15} For example, local muscle strengthening is considered essential in regaining full functionality and to

reduce the risk of resprain.^{1,9} Consequently, trials have demonstrated significant improvement in functional stability and ankle range of motion scores after primarily proprioceptive and secondarily traditional ankle strength training.^{8,16,17}

Joint mobilization and manipulation of the foot/ankle joints are emerging as promising treatments for ankle sprain and often form part of a package of care in clinical practice, as an adjunct to rehabilitation.^{5,16} However, it is unclear if the addition of manipulative therapy (MT) to rehabilitation will show a benefit over rehabilitation alone in terms of pain and disability. Therefore, the purpose of this trial was to compare rehabilitation alone vs an MT plus a rehabilitation protocol in the treatment of RASFI.

METHODS

Background of Study Design and Changes to the Methods

This study was initially set out to test MT for CAI, designed as a single-center, assessor-blind, parallel-group clinical trial with balanced randomization and 1- and 3-month follow-up. However, as the project evolved, it emerged that the full criteria for CAI were not being achieved based on an apparent growing consensus in published definitions.^{2,12,17} In particular, the mechanical instability encountered; and the just then growing consensus on “chronicity” to reflect 6 months, within the diagnosis of CAI, was not being reflected in this trial’s sample. There was not a clear and detectable positive test for tear of the anterior talofibular ligament greater than 4° on anterior draw test nor a clear and detectable positive inversion talar tilt test with all participants included as some suggest must be included in CAI due to mechanical instability, instead functional ankle instability was confirmed in all subjects.^{2,7} Thus, the narrative diagnosis for included participants was adjusted to represent RASFI rather than CAI including definitions of “chronicity” at the time of protocol development and later and current consensus and definitions of “chronicity.”^{2,7,11} However, at the time this protocol was developed significant disagreements as to what constituted mechanical or functional CAI, chronicity and to other ankle diagnoses were extant as clearly explicated in the work of a number of authors.^{2,11} Chronic ankle instability due to functional instability may include subjective complaint of ankle weakness, pain and/or swelling, and a perception of less functionality and range of motion than the opposite normal ankle but not necessarily exceeding normal physiologic limits yet experienced as beyond voluntary control with perceived or actual giving way of the ankle or both.² This study was also intended as a fully powered trial with medium-term follow-up; but due to internal financial restrictions and resources, which developed during the course of the project,

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