Academy of PHYSICAL MEDICINE

Research Paper Review

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Manual Physical Therapy for Plantar Heel Pain

Journal of Manual & Manipulative Therapy 2017; 25(1): 3-10.

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ABSTRACT

INTRODUCTION: *Plantar heel pain is common and can be severely disabling. Unfortunately, a gap in the literature exists regarding the optimal intervention for this painful condition. Consequently, a systematic review of the current literature regarding manual therapy for the treatment of plantar heel pain was performed.*

METHODS*: A computer-assisted literature search for randomized controlled trials in MEDLINE, EMBASE, Cochrane, CINAHL, and Rehabilitation & Sports Medicine Source, was concluded on 7 January 2014. After identification of titles, three independent reviewers selected abstracts and then full-text articles for review.*

RESULTS: *Eight articles were selected for the final review and underwent PEDro scale assessment for quality. Heterogeneity of the articles did not allow for quantitative analysis. Only two studies scored ≥7/10 on the PEDro scale and included joint, soft tissue, and neural mobilization techniques. These two studies showed statistically greater symptomatic and functional outcomes in the manual therapy group.*

DISCUSSION: *This review suggests that manual therapy is effective in the treatment of plantar heel pain; however, further research is needed to validate these findings given the preponderance of low quality studies.*

CONCLUSION*: While the results support the use of manual therapy for plantar heel pain, they do not allow us to determine what influence manual therapy would have if applied alone, or identify the most advantageous technique to utilize.*

ANALYSIS

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Background Information

Pain in the plantar aspect of the heel can result from a number of different conditions, including plantar fasciopathy, calcaneal stress fracture, fat pad atrophy, tarsal tunnel syndrome, and more (1). Risk factors for developing plantar heel pain have been well studied and include: limited ankle dorsiflexion, limited first metatarsophalangeal joint extension, increased age, increased weight in a non-athletic population, and prolonged standing (2). Limited ankle dorsiflexion has been identified as the greatest risk factor (3) and excessive pronation has been identified as a possible compensatory response to this (4) - both could increase mechanical stress on the plantar fascia. Manual therapy is commonly used to improve joint mobility and decrease pain (5) and could be used in conjunction with other common treatments for plantar heel pain, such as heel pads, night splints, orthotics, and modalities (6). This review aimed to evaluate the available evidence on the effects of manual therapy in the treatment of plantar heel pain.

Pertinent Results:

Only 8 studies were selected for this review. As a quantitative assessment was not possible due to the heterogeneity of the studies, the results were dichotomized into short-term effects of manual therapy (less than or equal to 4 weeks) and the longer-term effects of manual therapy (greater than four weeks).

Outcome Measures: Psychometric Properties

The included studies showed a large degree of variability in outcome measures. These are outlined below:

Foot Function Index (FFI)

Three of the included studies (9, 10, 12) used the FFI, a scale initially designed for patients with rheumatoid arthritis (16). The FFI has been shown to have moderate-to-high correlation with the SF-36 (18) and excellent reliability (17). All included studies showed changes greater than the calculated minimally clinically important difference (MCID), however, two of those studies (9, 10) showed results exceeding the MCID in the control groups.

SF-36
The SF-36 has not been studied for use in patients with foot or ankle disorders. So, although the study which utilized this scale (11) showed findings meeting the MCID for the subscales, these results may not be as applicable to heel pain.

Pressure Pain Thresholds (PPT)
PPTs can be used to identify signs of central sensitization, however, there is no normative data available for their used on the plantar aspect of the heel. Thus, the interpretation of the measure of magnitude of change in plantar heel pain in the studies including the measure (11, 12) after manual therapy is limited.

Visual Analogue (VAS) and Numeric Pain Rating Scales (NPRS)
Studies in this review utilizing the VAS (9, 10, 15) all showed changes exceeding the MCID in both the experimental and control groups. The study by Cleland et al. (14) showed changes exceeding the MCID in the NPRS at six months in both groups, but only the manual therapy group met the MCID at four weeks. Both groups in the Dimou et al. (13) study showed statistically significant reduction in pain on the NPRS. However, the study lacks a true control group, which may cloud the results.

Foot and Ankle Ability Measure (FAAM)
The FAAM activities of daily living subscale was used by Cleland et al. (14), who found greater than MCID changes in both groups at both four-weeks and six-months.

Lower Extremity Functional Scale (LEFS)
The LEFS shows high reliability, validity, and sensitivity to change for a range of lower extremity conditions. Cleland et al. (14) used the LEFS and reached the MCID only in the manual therapy group at four-weeks and in both groups at the six-month follow-up.

Foot and Ankle Computerized Adaptive Test (FACAT)
One study (15) used the FACAT, a computer administered self-report outcome measure based on the LEFS items identified to be the most indicative of foot and ankle function. This study showed changes meeting the MCID in the group receiving manual therapy.

Short-Term Effects of Manual Therapy

Four lower quality (5/10 PEDro) studies looked at short-term effects. Two studies (9, 10) compared manual therapy to ultrasound, plantar intrinsic stretching and strengthening using baseline and 10-day comparisons of the visual analog scale (VAS) and the foot and function index (FFI). Both studies provided 10 consecutive days of treatment and showed statistically significant differences in the VAS and FFI in the manual therapy + exercise group compared to the ultrasound and exercise group.

A third study (11) compared stretching exercises for the plantar fascia, gastrocnemius, and soleus to the same exercises combined with trigger point pressure release and a

neuromuscular release technique applied to the gastrocnemius. Both interventions were provided four times on a weekly schedule. A significant group-by-time interaction was revealed for the physical function and bodily pain components of the Medical Outcomes Study 36-item Short Form Health Survey (SF-36) and for pressure pain threshold (PPT).

The final study (8) compared counterstrain manual therapy to placebo. The H-reflex and stretch reflex of the calf muscles were monitored after three weeks of treatment and a two to four-week washout period. No significant changes were found in electronically recorded reflexes, however, the participants in the manual therapy group reported decreased pain over the 48 hours following treatment.

Longer-Term Effects of Manual Therapy

The four articles looking at the longer-term effects of manual therapy were of higher quality, all scoring of 6/10 on the PEDro scale. A study by Ajimsha et al. (12) looked at the effects of myofascial release to the gastrocnemius, soleus, and plantar fascia compared to sham ultrasound over the same areas, with statistically significant differences found between the two groups on the FFI at both week four and week twelve in favour of the myofascial release. At weeks four and twelve, the myofascial release group also showed decreased pain as measured by the FFI pain subscale.

A single study (13) looked at chiropractic manipulation and Achilles stretching versus the use of custom orthotics. The manipulation group received manipulations to the ankle and foot twice per week for four weeks and again at a one-month follow-up, as well as daily gastrocnemius and soleus stretching for the entire eight-week period. Both groups showed non-statistically significant improvement in PPT. As well, no statistically significant differences were found in self-reported resting heel pain.

Saban et al. (15) compared the use of ultrasound and triceps surae stretching exercises to deep massage, neural mobilizations, and the same stretching exercises. Over a six-week period, both groups showed improvements on the Foot and Ankle Computerized Adaptive Test (FACAT), however, the manual therapy and stretching group showed significantly larger improvements.

Finally, a study by Cleland and colleagues (14) compared the use of ultrasound, dexamethasone, and therapeutic exercise to manual therapy, including aggressive soft tissue mobilization to the tricep surae and plantar fascia insertion, followed by rearfoot eversion mobilization, and therapeutic exercise. Both groups received treatment two times per week for two weeks followed by one time per week for two weeks. The manual therapy and exercise group showed significant improvements at both four-weeks and six-month follow-up on the Foot and Ankle Ability Measure (FAAM) and Lower Extremity Functional Scale (LEFS). As well, the manual therapy and exercise group also showed statistically significant improvement on the Numeric Pain Rating Scale (NPRS) at four-weeks, but not at the six-month follow-up.

CLINICAL APPLICATION & CONCLUSIONS

This systematic review shows that manual therapy may be effective in treating patients with plantar heel pain, which is in concordance with recent clinical practice guidelines for heel pain (6). Optimal dosing of manual therapy remains unclear. In addition, due to the outcome measures used, it is difficult to determine conclusively if manual therapy was effective in the short term. It is more clearly suggested that manual therapy may be an effective treatment for plantar heel pain in the long term.

The highest quality study in this review (14) showed superior results in the manual therapy group using validated outcome measures (NPRS in the short term, and Foot and Ankle Ability Measure [FAAM] and Lower Extremity Functional Scale [LEFS] in the long term). The manual therapy group received multimodal care which included manual therapy applied to the hip, knee, and ankle based on the individual's impairment, combined with soft tissue mobilization to the calf musculature and plantar fascia, and a rearfoot eversion mobilization. Similar results were seen in the study by Saban et al. (15), which used a combination of neural mobilizations, deep tissue massage and stretching exercises in the manual therapy group. While these results support the use of manual therapy for plantar heel pain, they do not allow us to determine what influence manual therapy would have if applied alone, or identify the most advantageous technique to utilize.

This review identifies a significant gap in the literature with regard to long-term outcomes and effectiveness of manual therapy treatment for plantar heel pain. More higher quality studies are needed. However, it is important to note that the PEDro scale used to evaluate quality of studies uses categories based on the presence of blinding. This can be hard to achieve in studies involving manual therapy so may have artificially decreased the scores of the included studies.

STUDY METHODS

This systematic review was designed using the guidelines of the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) and conducted using the PICOS methodology - comprised of: Population (adults with plantar heel pain), Intervention (manual therapy), Comparison (standard care or control), Outcome (self-reported outcome measures and/or physiological outcomes), and Study design (randomized control trials).

One author conducted a comprehensive and systematic literature search using MEDLINE, EMBASE, Cochrane, CINAHL, and Rehabilitation & Sports Medicine Source for randomized control trials involving human participants and published as a full text in English from the database inception through July, 2014. Studies were excluded if they did not demonstrate an identifiable manual therapy technique, addressed a foot or ankle diagnosis not specific to heel pain, or used trigger point dry needling as the only form of manual therapy.

Article titles and abstracts were independently screened by three authors, with final decisions made by the primary author in cases of disagreement. Once full articles were obtained for the selected articles the three authors assessed the quality of the studies using the PEDro scale (7) and given a quality score out of 10.

STUDY STRENGTHS/WEAKNESSES

Strengths:

- The study utilized the PEDro scale to assess the quality of included studies. This is a well validated assessment tool.

Weaknesses:

- The reviewers' internal reliability in scoring the PEDro scale was not assessed.
- Due to the heterogeneity of the studies, quantitative analysis was not possible.
- Some of the outcomes measures included in the studies were not validated for the plantar heel pain population, making the validity of treatment effectiveness more difficult to determine.
- The majority of studies included utilized co-interventions, making it difficult to determine the effectiveness of manual therapy alone for plantar heel pain.

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