



A Systematic Review on Muscle Energy Technique versus Passive Manual Soft Tissue Therapies on Plantar Fasciitis

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Abstract

Aims of study: Plantar fasciitis [PF] is a common cause of heel pain. Muscle energy technique [MET] and passive soft tissue therapies are widely used for its management. The objective of this review was to evaluate the comparative effectiveness of MET and passive soft tissue therapies on PF.

Methodology: An extensive electronic literature search was made using different databases and search engines. Studies regarding MET and soft tissues therapies were investigated according to the eligibility criteria, using extracted data from and assessed for risk of bias. Outcome measures were pain and functional status.

Results: Five articles met the selection criteria, were systematically reviewed for quantitative synthesis on comparative effects of MET and passive soft tissue therapies on PF. The quality of studies was moderate to high.

Originality: This review is the independent creation of authors.

Conclusion: Manual soft tissue techniques are more effective than MET on improving pain and function in plantar fasciitis.

Keywords: Soft tissue therapy, myofascial release, plantar fasciitis, ischemic compression, static stretching.

Introduction

Heel pain is one of the most prevalent musculoskeletal diseases of the lower limb, affecting both physically active and sedentary people.¹ Heel pain is a common presenting complaint in the foot and ankle practice, and plantar fasciitis (PF) is the most common cause of chronic pain beneath the heel in adults, making up 11–15% of the foot symptoms requiring professional care among adults.^{2,3,4,5} It is estimated that 1 in 10 people will develop PF during their lifetime.⁶ PF, which is more common in middle-aged obese females and young male athletes, has a higher incidence in the athletic population though not all suffering require medical treatment.

Plantar fasciitis is a degenerative syndrome caused by the overuse or repeated injury at the level of calcaneum.⁷ Tightness of achilles tendon, soleus & gastrocnemius & weakness of intrinsic foot muscles are the functional risk factors that strains the plantar fascia & limits the dorsiflexion.⁸ As plantar fascia serves to provide dynamic shock absorption & help in

the longitudinal arch,⁹ so the risk of developing PF are increased in individual with pes planus, pes cavus & other anatomical risk factors are excessive femoral anteversion, excessive lateral tibial torsion, over-pronation & leg length discrepancy.¹⁰

Patho-anatomical features

The differential diagnosis of PF precedes an understanding of the local anatomy. The calcaneum is separated from plantar skin by a complete honeycombed fibro-fatty fat pad that acts as a shock absorber. The posterior tuberosity of calcaneum has medial and lateral processes. The medial process gives attachment to the Flexor digitorum brevis (FDB), Abductor hallucis (AH), and the medial head of Quadratus plantae (QP) as well as the central band of plantar fascia.

The plantar fascia or deep fascia of the sole proximally has a direct fibro cartilaginous attachment to the calcaneum, whose central band is constant along with medial and lateral band. It has a triangular shape and develops from the medial process of the calcaneal tuberosity, and diverges distally at mid-metatarsal level into five separate strands, which are attached at the forefoot onto the plantar skin, the base of proximal phalanges (via plantar plate), the metatarsophalangeal(MTP) joints via the collateral ligaments and deep transverse metatarsal ligaments.¹¹ Heel skin is innervated by the medial calcaneal nerve which may present with heel pain if compressed proximally (such as in tarsal tunnel syndrome). Baxter's nerve (the first branch of lateral plantar nerve) may be at risk of compression between AH and medial belly of the QP muscle.^{11, 12}

Discomfort in the plantar region of the foot, more notably in the inferior heel & the anteromedial calcaneus typically gets worse with prolonged standing or weight-lifting activities. When the plantar aponeurosis is stiff, as in the morning or after a period of inactivity, pain is felt by stepping on the tips of the toes, forcing the foot & toes dorsiflex & extending the knee.¹³ It is not connected to Paresthesia or nocturnal discomfort.¹⁴

Electrotherapy modalities including contrast baths, cryotherapy, phonophoresis, ultrasound & LASER has been shown in various studies.¹⁵ Different physiotherapy treatment helps in pain relieving, for example, rest, taping, stretching, night brace, heel pads & myofascial release techniques.¹⁶ By applying MFR it low load, prolonged stretch to the myofascial complex with the goal of restoring ideal length, reducing discomfort & enhancing function.¹⁷ Muscle Energy Technique [MET] is an active manual technique, in which the patient is actively participate in producing muscular contractions, used to extend shortened structures, increase range of motion, and resolve trigger points in a variety of musculoskeletal problems including plantar fasciitis¹⁸. There are different passive manual soft tissue techniques are provided by therapist to alleviate the discomforts of PF.

There is an ongoing debate on the effects of different manual therapy techniques on pain and functional disability in patients with plantar fasciitis. Therefore, the purpose of this review is to compare the effects of muscle energy technique with other passive manual therapies on pain and functional status in plantar fasciitis patients.

Methodology

This review was done by following the guidelines of Preferred Reporting Items for Systematic Reviews and Meta-analyses (PRISMA).¹⁹ In the first round, study titles and abstracts were reviewed for recognition whereas, in second round full text of articles were studied for quality assessment and data synthesis.

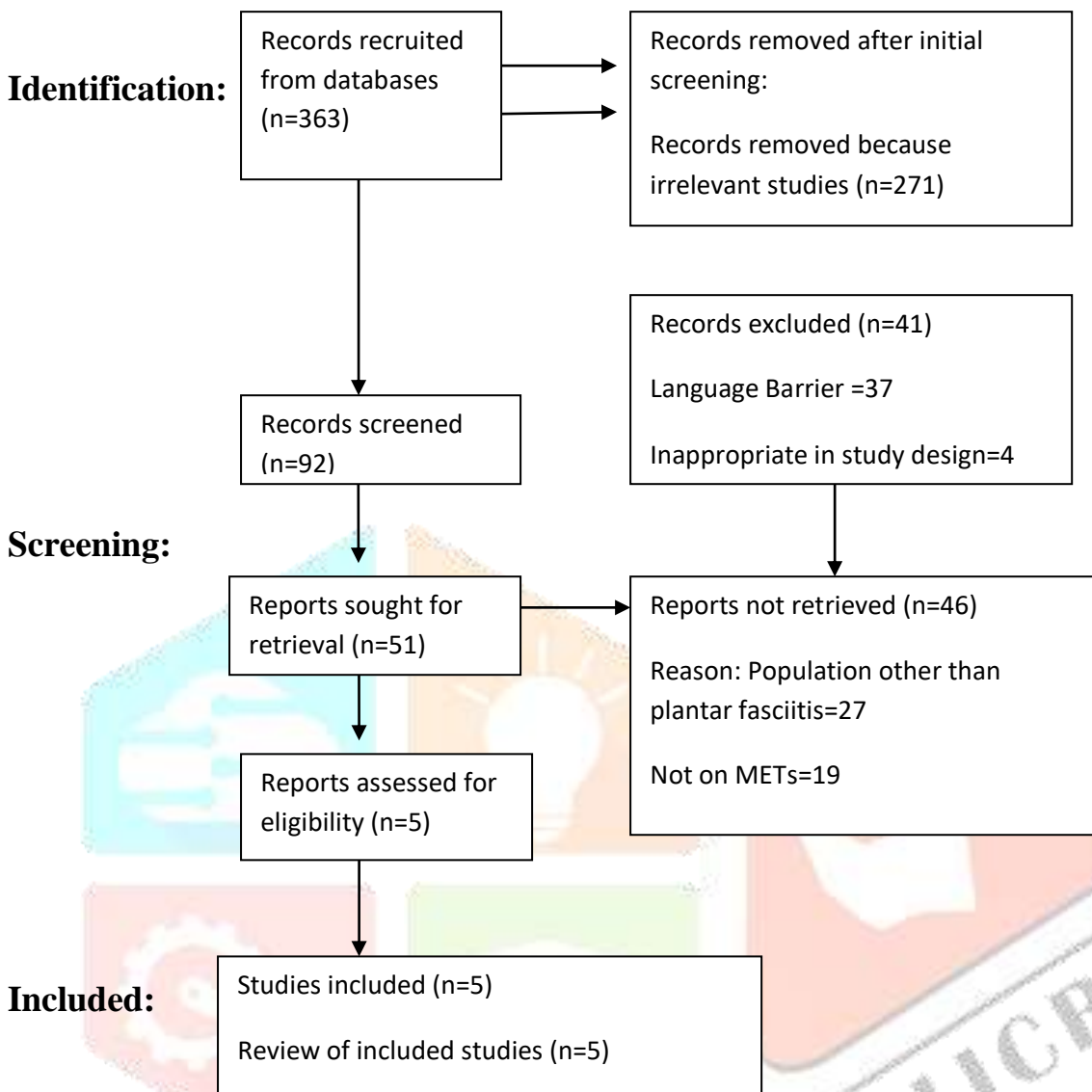
The inclusion criteria were made using the PICO model. Only Randomized controlled trials published in English language from 2014-2022, conducted on patients with plantar fasciitis in which METs and any other passive manual soft tissue therapy, having at least one outcome variable of pain and functional status reported were included in the review. Studies which have used Visual Analogue Scale (VAS) for pain assessment, Foot And Ankle Ability Measures (FAAM) for assessing functional status were used for the systematic review.²⁰ Older studies other than randomized controlled trials [RCTs] in Non-English language, with non-validate outcome measures were excluded. Quality assessment of RCTs was done with Modified Downs and Black checklist, Cochrane Risk of Bias Tool, PEDro scale and Critical Appraisal Skill Program (CASP). The Modified Downs and Black checklist was used for determining external validity of included studies.²¹ Critical Appraisal Skills Programmer (CASP) was used to make a sense of randomized controlled trail (RCT).²² PEDro scale determines the methodological quality of RCTs.²³ The Cochrane risk of bias tool evaluates for risk of bias as low, unclear or high risk.²⁴ The data was extracted separately using a data extraction form adapted from the Cochrane Collaboration.

Results

According to the accumulated articles, total 363 articles based on the effects of METs with other passive manual soft tissue therapies on planter fasciitis patients were identified in the search strategy in the databases. Applying the inclusion and exclusion criteria, around 92 articles were investigated and 41 articles were excluded because the study design was inappropriate. After reading the abstract 56 articles, only 46 were consider as a primary studied. When reading the full text articles only five studied are up to the inclusion criteria and they all were randomized control trails (RCTs) which were consider as the best evidence which were included in the systematic review.



Identification of Included Studies



PRISMA flow diagram for identifying the steps of included studies

The total numbers of participants consisting in five studies 175 patients. Out of 175 patients 60 patients are suffering from unilateral planter fasciitis and 115 patients are suffering from bilateral planter fasciitis and they all are clinically diagnosed case of planter fasciitis. The females are more as compare to the males, 99 patients are females whereas 76 are males which means females suffering more with planter fasciitis than males. It presents 57% all over population, approximately two to one. The mean age of participants ranged from 20 years old.^{18, 25, 26} to 70 years old.²⁶ Participants who had no history of fracture, congenital foot deformity and pervious surgery of planter fasciitis are included. The types of techniques used in the studies: muscle energy technique^{18,25,26,27,28} and other passive manual therapy are ischemic compression²⁶, static stretching²⁸, myofascial trigger point release¹⁸, Cyriax transverse frictional massage²⁷ and myofascial release²⁵.

In the included studies, only one concluded that muscle energy technique was more effective than the static stretching with $p < 0.0520$ and two studies concluded that muscle energy technique, ischemic compression ($p > 0.05$) and myofascial release ($p > 0.0001$) are equally

effective on plantar fasciitis.^{25,26} Two studies including comparison of METs with that of Cyriax technique¹⁸ and myofascial trigger point release therapy²⁷ provided that Cyriax technique had statistically significant better effects on clinical outcomes over METs ($p < 0.05$), whereas myofascial trigger point release therapy produce significant reduction in pain, but not in functional status ($p > 0.05$).

Discussion

Patients suffering from planter fasciitis had complain of pain and difficulty in walking that affects their functional performance; impairing personal and social life. The aim of this review was to explore the comparative effects of different active and passive manual therapy techniques on planter fasciitis. A number of RCTs undergoing muscle energy technique on patients with plantar fasciitis were compare with passive interventions like ischemic compression, static stretching, trigger point release, Cyriax (transverse frictional massage) and myofascial release therapy. Using rigorous recruitment methods, five selected RCTs based on study selection's criteria were investigated. The studies which were included in this review were of good quality range from "moderate to high" on quality assessment. Moreover, the recent studies on planter fasciitis, who meet the inclusion and exclusion criteria, based on the extensive literature search were the part of this review. All the findings, its reliability and treatment parameters like duration of intervention, frequency and intensities were observed. The results of these studies were compared on the basis of outcome variables, treatment session and follow-up period; reported that the passive manual therapies produce overall better outcomes than the muscle energy technique. Blinding greatly benefits the controlled trails and eliminates the chances of bias in the studies. Though, only in one study, double binding have been done in which patient, and assessor were blind.¹⁸ In the remaining four studies, researcher was unable to determine whether the blinding has been done or not.^{22,25,27,28} Out of five studies, one study resulted that muscle energy technique was more effective in reducing pain, increasing range of motion and improving functional activity of foot in planter fasciitis than the static stretching ($p < 0.05$)²⁸. The other two studies presented no significant difference between muscle energy technique, ischemic compression ($p > 0.05$) and myofascial release ($p > 0.0001$), and all three techniques had yields equal improvement in pain, functional activity, flexibility and strength in patients with plantar fasciitis.^{25,26} Studies on Cyriax technique and myofascial trigger point release therapy showed significant improvement in outcomes of patients with chronic PF than the METs with ($p < 0.0001$) and ($p < 0.05$) respectively.^{18,27} There are specific guidelines or protocol for rehabilitation of plantar fasciitis.

The findings in this review suggested that other passive therapy combined with routine physical therapy is most efficient intervention used for rehabilitation of plantar fasciitis and it should be applied from the very first session to gain maximum benefits on clinical outcomes. This study addresses only a limited number of treatment outcomes, which is one of the limitations of this review. But to the researcher's knowledge, a very less studies found with desired outcome variable of interest, that were published during 2014 to 2022, like only one study was found on ankle ROM.²⁸ Further research is recommended on the other outcomes like quality of life and satisfaction level towards treatment approach and effectiveness of other manual therapy techniques in patients with plantar fasciitis.

Conclusion

This review provides evidence that overall passive manual soft tissue techniques are more effective in decreasing pain, improving range of motion, flexibility of muscles and functional status than the muscle energy technique in plantar fasciitis patients.

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