

Effects of Dry Cupping versus Positional Release Technique in Plantar Fasciitis - A Comparative Study

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Abstract: *Background:* The plantar fascia is a thick fibrous aponeurosis that attach proximally to the medial calcaneal tuberosity and fans distally to the flexor tendon sheaths and the base of the proximal phalanges. Plantar fasciitis occurs as a result of inflammation of plantar aponeurosis at its attachment on the tuberosity of the calcaneum. To find effectiveness of dry cupping therapy and PRT (positional release technique) in improving pain and functions of Patients with Plantar Fasciitis. *Methods:* The 30 subjects with plantar fasciitis were taken for the study. The subjects were divided into two groups. Group A (n=15) treated with dry cupping therapy, group B (n=15) treated with positional release technique to reduce pain and improve function. Patients were evaluated pre and post intervention for pain and functional limitation using visual analogue scale and foot function index scale. A three weeks intervention program was given to the patients. *Materials used are pen, consent form, gloves and cupping kit. Results:* study shows pre value of Foot Functional Index (117.6667) and Visual Analog Scale (8.3333) and posts value of Foot Functional Index (36.1333) and Visual Analog Scale (2.8000) of Group A (cupping therapy). The pre mean of Foot Functional Index (119.4000) and Visual Analog Scale (9.0000) and post mean of Foot Functional Index (75.5333) and Visual Analog Scale (6.2000) of Group B (Positional release technique). *Conclusion:* Our study concluded that both the techniques significantly reduce pain and improve function in patients with plantar fasciitis, but dry cupping therapy found to be more effective as compare to positional release technique.

Keywords: Plantar fasciitis, Pain, Visual analogue scale, Foot function index, Dry cupping technique, Positional release technique.

1. Introduction

The plantar fascia is a thick fibrous aponeurosis which lies on the bottom of the foot. ⁽¹⁾ It associates dense connective collagen fibres that attach proximally to the medial calcaneal tuberosity and fans distally to the flexor tendon sheaths and the base of the proximal phalanges. ⁽²⁾ Plantar fasciitis occurs as a result of inflammation of plantar aponeurosis at its attachment on the tuberosity of the calcaneum. ⁽¹⁾ It also called as 'heel pain', 'plantar fasciodesis'. ⁽³⁾ It causes are calf muscle tightness, obesity, extended weight-bearing from prolong standing job, sudden increases in activity, hard surfaces, unsuitable footwear, Achilles tendon tightness, ageing and excessive foot pronation. ⁽⁴⁾ The nature of this pain is described as throbbing, shooting and sharp; ⁽³⁾ most of the patient experience pain and tightness when taking their initial steps in the morning immediately after standing up from bed or after a long period of rest such as sitting during the day. ⁽²⁾



Figure 1: Difference between healthy foot and plantar fasciitis

Around 8 - 10% of population complains from heel pain. It commonly affects between 20 - 50 years with an equal prevalence in males and females. ⁽⁵⁾ People involved in occupations that require continuous standing or walking such as waiters, maids, kitchen workers, athletics, salon workers, and military personnel are at high risk of developing plantar fasciitis. ⁽⁴⁾ Plantar fasciitis affects both sedentary and athletics people and is thought to result from chronic overload either from lifestyle or exercise. ⁽⁶⁾ Diagnosis of plantar fasciitis is based on patient history, risk factor and physical examination findings. ⁽⁷⁾ Physical examination findings often include discomfort with passive dorsiflexion of the first toe and tenderness to palpation on the medial calcaneal tubercle. ⁽⁶⁾

Conventional therapy adopted in the management of plantar fasciitis includes stretching and strengthening exercises which should be performed every single day. Toe stretch is done by stretching the great toe up and holding it up a few seconds. Towel stretch comes into these everyday exercises. Rolling the foot over a ball or a cold metal can apply. In addition to these, gastrocnemius and soleus stretch are other important exercises which take care of these strong muscles originating from above and below the knee respectively. For Gastrocnemius stretch, patient is asked to lean forwards with leg to be stretched placed behind keeping heel on the ground all the time. Stretch and hold for 30 seconds and repeat them in a 3 sets. Soleus is stretched by repeating the above manoeuvre but bending the back leg with heel again touching the ground at all times. Weight bearing on the toes with the heel off the stairs is also an effective way to stretch the plantar fascia. Strengthening exercises include crunching up a sheet or preferably a towel with the toes and picking up marbles/small ball/pencil to strengthen the plantar fascia. ⁽⁸⁾

Cupping therapy is a Traditional Chinese Medicine (TCM) healing modality that has been used to treat pain for more than 2,000 years. Positional release therapy is a therapeutic technique that uses static ischemic compression, a position of comfort and fine tune on reflexogenic trigger points to resolve the associated dysfunction. It also called as strain-counter-strain technique. ⁽¹⁰⁾ Positional release therapy is an extraordinary means of reducing hyper tonicity in protective muscle spasm. ⁽⁵⁾

Aim

To find effectiveness of dry cupping therapy and positional release technique in improving pain and functions of Patients with Plantar Fasciitis.

Objectives

- 1) To determine the effects of PRT with conventional exercise on plantar fascia using FFI and VAS in plantar fasciitis.
- 2) To determine the effects of dry cupping therapy with conventional exercise on plantar fascia using FFI and VAS in plantar fasciitis.
- 3) To compare the effects of two different techniques along with conventional exercise on plantar fascia using FFI and VAS in plantar fasciitis.

- 4) Dry cupping therapy and Positional release technique will be equally effective in improving functional activities in PF.

2. Methodology

Study design: An Experimental Study

Study setting: Various physiotherapy centre in Surat

Sample size: 30

Target population: General population (20 – 50 years)

Sampling method: Purposive Sampling

Outcome Measure:

VAS (Visual Analogue Scale)

FFI (Foot Function Index)

Inclusion Criteria:

- Younger individuals between the age group of 20 - 50 years.
- Both gender included male and female.
- Individuals with clinical diagnosis of plantar fasciitis.
- Individuals with foot deformity like high arch foot and flat foot.
- Individuals with pain on palpation of the medial calcaneal tubercle or the proximal plantar fascia.
- Individuals with unilateral foot pain. (left or right)
- Person having complaints of severe pain after prolonged standing or walking and severe morning pain.

Exclusion Criteria:

- An individual with inflammatory arthritis in the feet and ankle, is not allowed to participate in examination.
- Patient diagnosed with Calcaneal spur.
- Individuals who are diagnosed with diabetes.
- Subjects are not included with foot surgery and any Lower Limb fractures. (Past 1 year)
- Female patient with Pregnancy.
- Person who had not taken any corticosteroid injection to treat plantar fasciitis and Calcaneal spur in the past 12 weeks.
- Neurological pain like sciatica.

3. Procedure

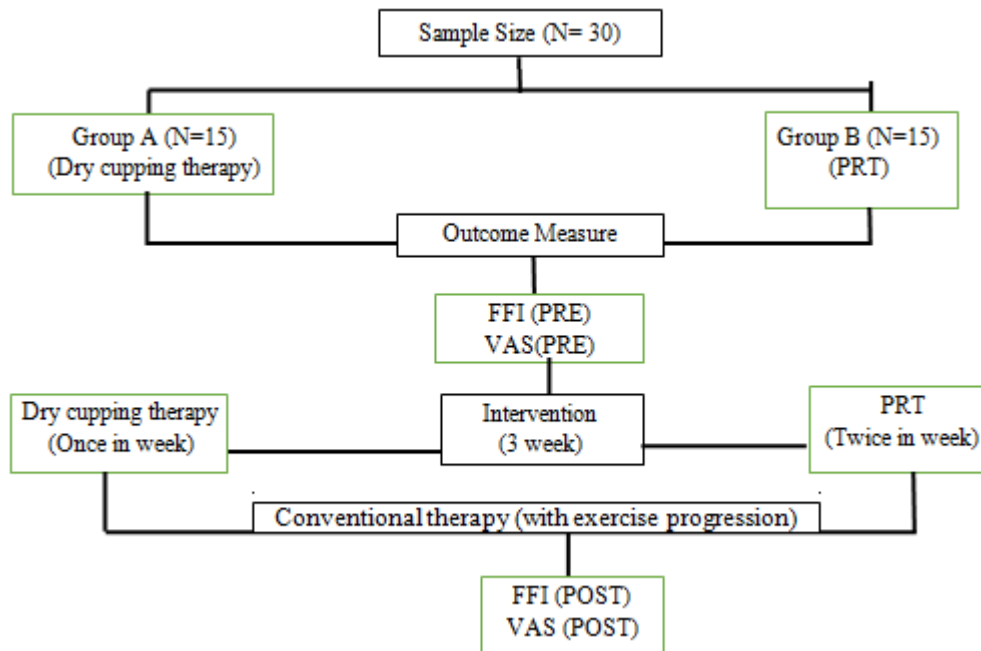


Figure 2: Procedure

4. Intervention

Dry cupping therapy:

During the dry cupping therapy all participants was lied prone with their plantar fascia expose. Before the cups were placed on the participants, they were informed that if the cups became too uncomfortable they need to inform the therapist. Their ankles were dorsiflexed to a comfortable position and where hanged off the edge of the treatment table. Each cup was place over the most painful site of the plantar fascia with one cup above and below the, main source of pain. The cups were all the same size and two pumps were applied in each cup. The cup was applied with a manual hand pump and was left on for ten minutes (time was depending on patient tolerance or colour of the patches). The patient was seen once a week for 3 weeks.

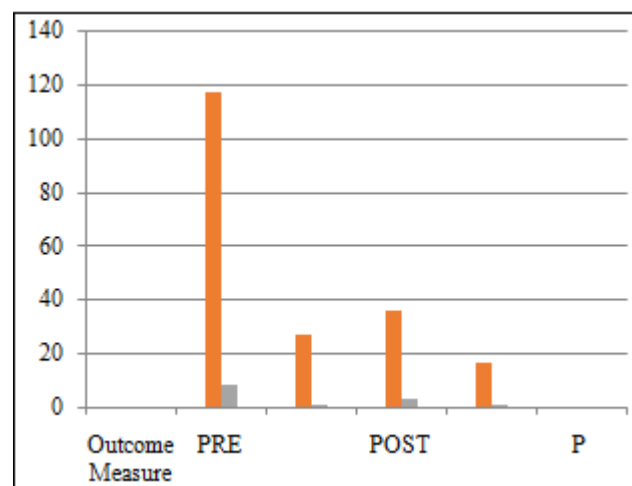
Positional Release Technique:

Patient was placed in a prone position with the knee flex to the approximately 90 degree and foot resting on the leg of the therapist who was standing by the side of the patient. The patient was then asked to dorsiflex the foot to palpate the fibres of the plantar apponeurosis. The location of any trigger point, particularly at its origin at the calcaneus was noted. Once the most dominance trigger point was determined the therapist then used his right hand to apply light pressure with the point of the finger at the location of the trigger point and maintain the pressure for 2 minutes or until pain was decreased. The duration of each treatment session lasted for 15 minutes and the patient was seen twice a week for 3 weeks.

5. Result

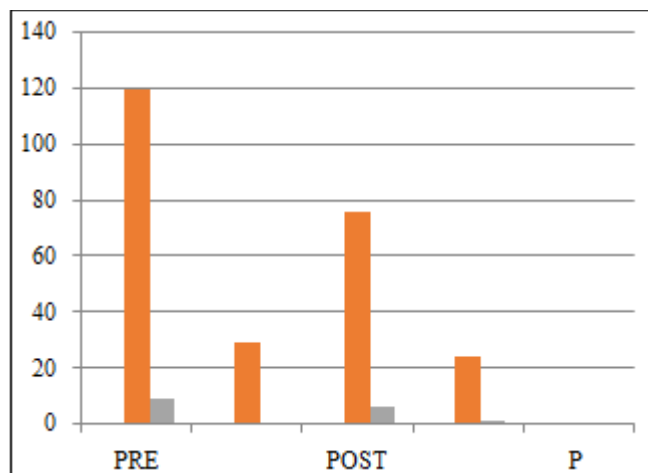
A total number of 30 subjects were included in this study (15 in each group A and group B).

Within group analysis Group A (CUPPING)



Graph 2: Comparison of pre and post FFI and VAS scores in dry cupping therapy.

Within group analysis Group B (PRT)



Graph 3: Comparison of pre and post FFI and VAS scores in PRT.

Between group analysis (dry cupping therapy and PRT)

	Mean		P value
	Pre	Post	
Group - A Cupping therapy			
FFI	117.6667	36.1333	.002
VAS	8.3333	2.8000	.176
Group - B PRT			
FFI	119.4000	75.5333	.001
VAS	9.0000	6.2000	.012

Interpretation:

Table no.4 shows that there was more significant difference in dry cupping therapy group as compare to positional release therapy group on VAS and FFI score. (Dry cupping >PRT). So study shows pre value of FFI (117.6667) and VAS (8.3333) and posts value of FFI (36.1333) and VAS (2.8000) of Group A (cupping therapy). The pre mean of FFI (119.4000) and VAS (9.0000) and post mean of FFI (75.5333) and VAS (6.2000) of Group B (Positional release technique).

6. Discussion

In our study out of 30 patients 25 were females and 5 were males and 20 - to - 50 - year age group were selected. They were allocated in to 2 groups and 15 patients were included in each group. Comparison of dry cupping therapy and positional release therapy for the release of trigger points in plantar fasciitis by assessing the FFI and VAS score was done.

In our study, we found that around 8 - 10% of population complains from heel pain. It commonly affects between 20 - 50 years with an equal prevalence in males and females. Due to several activities in general population there might be more risk than the physician. The possible reason for the lower risk of plantar fasciitis among physicians than that among the general population and nurses is that physicians may have better medical knowledge, which protects them suffering from the disease. In our study, we assessed pain and functional ability with the help of using the visual analogue scale and foot function index.

Cupping therapy causes a negative pressure in the tank through the exhaust, while the edge of the cup is tightly attached to the surface of the skin, pulling the nerves, muscles, blood vessels and subcutaneous glands that cause a series of neuroendocrine reactions regulate vasodilation and contraction functions, as well as vascular permeability to improve the local blood circulation. There is more effect in positional release therapy group due to the following studies done by Kerry J. D. Ambrogio. et al. The rupturing of the sarcoplasmic reticulum. The ensuing flood of calcium ions into the interstitial compartment leads to uncontrolled actin and myosin interaction and the development of the palpable taut bands of muscle associated with myofascial involvement. The result of these traumatic events is hyper tonicity, inflammation, ischemia, and an increased concentration. This study is also supported by George B. Roth et al. studied that the effects of positional release therapy that include, normalization of muscle hyper tonicity, normalization of facial tension, reduction of joint

hypermobility, increased circulation and reduced swelling, decreased pain and increased strength. Daniel et al in his study of risk factors for plantar fasciitis shows when a patient has a low foot arch (flatty foot) causes excessive pronation of foot increases tensile loads on plantar aponeurosis foot ligaments are loose and the supporting force to the foot arch is weak.

Dry cupping therapy and PRT along with conventional treatment for plantar fasciitis patient showed improvement in following 3 weeks of treatment as per significant decrease in pain (VAS) and improve function (FFI). And along with cupping and PRT, patient followed the conventional physiotherapy protocol for plantar fasciitis. Along with conventional treatment, we taught a patient calf stretch with towel and toe - heel raise in the first week. Calf stretch was taught because one of the factors of plantar fasciitis is calf muscle tightness and pain. In the second week, we progressed our exercise protocol with soleus stretch, gastrocnemius stretch and ball rolling. In the last week, we used to progress by toe curl and small ball holding strengthening. We show that along with both techniques and exercise therapy was more effective in reducing pain level and functional outcomes compared with only cupping therapy or positional release technique in one long term follow - up trial. As a result of stretching exercise for calf muscle and plantar fascia, it was likely to be related with the increased muscle strength of all testing muscles.

To our knowledge, this is the first study on the effectiveness of dry cupping therapy on the pain and function of patients with plantar fasciitis compared to positional release technique. In addition, cupping therapy has been used in treating various painful disorders, including low back pain, neck and shoulder pain, fibromyalgia, knee osteoarthritis, and carpal tunnel syndrome. The result from this study adds plantar fasciitis to the list. There are effects in positional release therapy group due to the following studies done by Dan Azumi MS, Bello B et. al the positional release therapy is effective in the management of plantar fasciitis. PRT should be included in the rehabilitation protocol of patient with heel pain.

7. Conclusion

As per the study, we concluded that both the techniques significantly reduce pain and improve function in patients with plantar fasciitis, but dry cupping therapy found to be more effective as compare to positional release technique.

8. Limitations

- 1) The main limitation of the study was that it was performed on a small sample size.
- 2) Unequal ratio of Gender.
- 3) Site of dominance in patients not specified. (left or right)
- 4) In this study, blinding was not done.

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