COMPARING THE EFFECT OF DRY CUPPING TO THE MANUAL THERAPY FOR PLANTAR FASCIITIS: A RANDOMIZED CONTROLLED TRIAL

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ABSTRACT

Purpose: The purpose of this research was to investigate how dry cupping impacts the pain and functionality of individuals suffering from plantar fasciitis.

Subjects and Methods: Thirty subjects (age 20 to 40 years old, 19 females and 11 males), randomly assigned into the two groups (Manual therapy and dry cupping with manual therapy groups), participated in this study. The study was conducted using a randomized controlled trial design. Treatments were provided to the subjects thrice a week for 3 weeks. Outcome measurements included the Visual Analogue Pain Scale (VAS), the Foot and Ankle Ability Measure (FAAM), the Lower Extremity Functional Scale (LEFS).

Results: The data showed that both manual therapy and dry cupping with manual therapy were effective in reducing pain and improving function in the group studied. Clinical outcomes at baseline and 3 weeks were compared in both groups utilizing Paired Sample t-test. The results suggest that for all the outcomes – VAS (MT = 2.13; DC+MT = 2.80), FAAM (MT = -13.93; DC+MT = -17.40), and LEFS (MT = -15.93; DC+MT = -17.87), the difference was statistically significant across both the groups ($p < 0.05$). (MT = Manual therapy, DC = Dry cupping). There was no significant difference between the dry cupping therapy and dry cupping with manual therapy groups outcome measurements when assessed by independent t- test.

Conclusion: These results support that dry cupping therapy combined with traditional manual therapy could reduce pain and increase function in the population tested as compared to treating the patient with manual therapy only.

Keywords: Planter fasciitis, Dry cupping, Manual therapy

INTRODUCTION

The thick fibrous aponeurosis known as the plantar fascia is made up of three groups of dense connective collagen fibers that attach near the medial calcaneus tuberosity and extend distally to the bases of the proximal toes and the flexor tendon sheath [1]. During weight-bearing activities, this crucial structure transfers force between the heel and forefoot, providing static and dynamic support to the arch. Plantar fasciitis has historically been regarded as an inflammatory process, as the nomenclature for the condition suggests [2]. Recent research, however, suggests that plantar fascia is actually a chronic degeneration that results in calcification, chondroid metaplasia, collagen necrosis, and pronounced thickening and fibrosis of the plantar fascia [3].Cupping therapy recently attracted media and public attention at the Rio Olympics, with the coverage of dark red circles left on the shoulders and backs of Olympians, which are the hallmarks of cupping therapy. Although cupping has historically been practiced in most cultures, this manual is largely considered an ancient form of therapy that has been used primarily in China and other Asian countries for thousands of years [4].In order to encourage circulation, this alternative therapy uses local negative pressure to create a vacuum inside a cup that is applied to the skin. To ascertain whether cupping therapy is beneficial in treating pain, hypertension, and stroke, several systematic reviews of randomized clinical trials (RCTs) have been carried out [5].

To assess efficacy, the total number of RCTs that satisfied the SR inclusion criteria was constrained. The majority of RCTs had poor quality. Cupping has only been demonstrated to work as a pain reliever based on SRs that are currently on the market [6].

Aim of the study

The Aim of the study is to compare the effect of dry cupping to the manual therapy for plantar fasciitis.

METHODOLOGY

The study is carried out on patients who are diagnosed with plantar fasciitis by a physician or finding on the basis of clinical findings. It is randomized controlled trial study. Both male and female (30 subjects) will take part in the study. Personal consent will be taken from each subject. Two groups were allocated with 30 subjects in each. Both groups received same exercise therapy for plantar fasciitis. Dry cupping therapy is given only to the treatment group. The trial will take place for about four weeks.

Inclusion criteria

1. Individuals who are willing to undergo three days of treatment over a 4 weeks period and participate in the study.
2. Patient of heel pain with a current or previous diagnosis of plantar fasciitis from a physician.
3. Age between 20 to 40 years.

Exclusion criteria

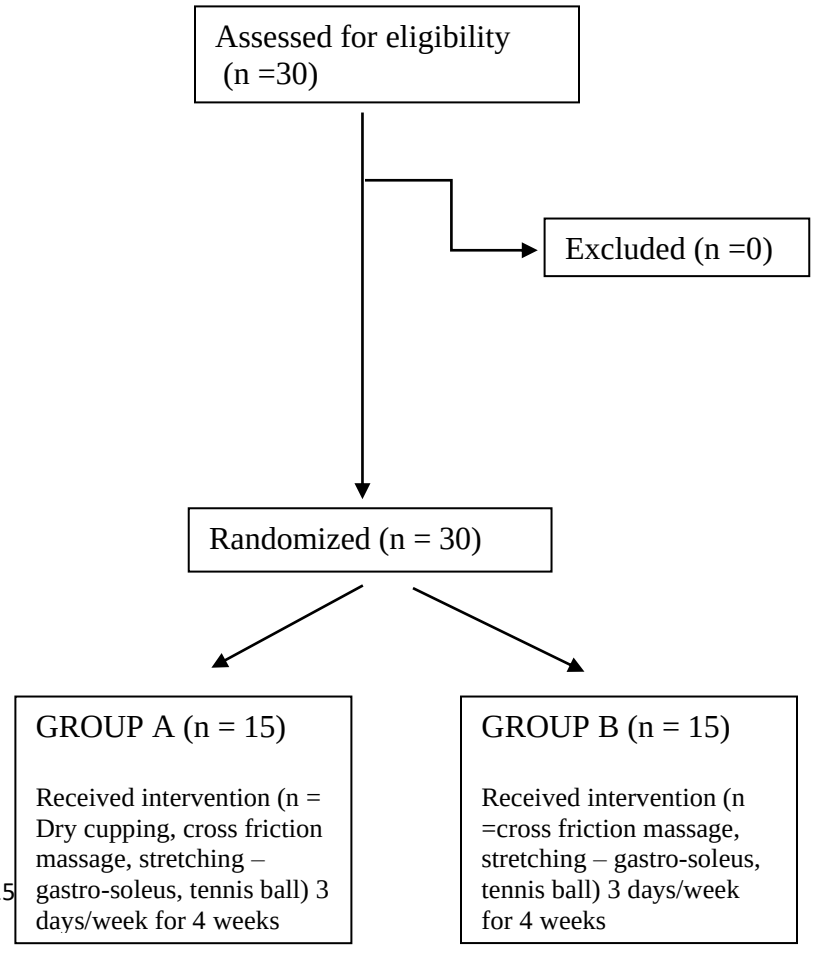
1. Patient with contraindications to manual therapy including tumors, recent fractures (<6 months) etc.
2. Prolonged history of steroid use.
3. Rheumatoid Arthritis
4. Severe vascular disease or open wounds
5. Recent surgery to ankle joint or rear foot region (<6 months)

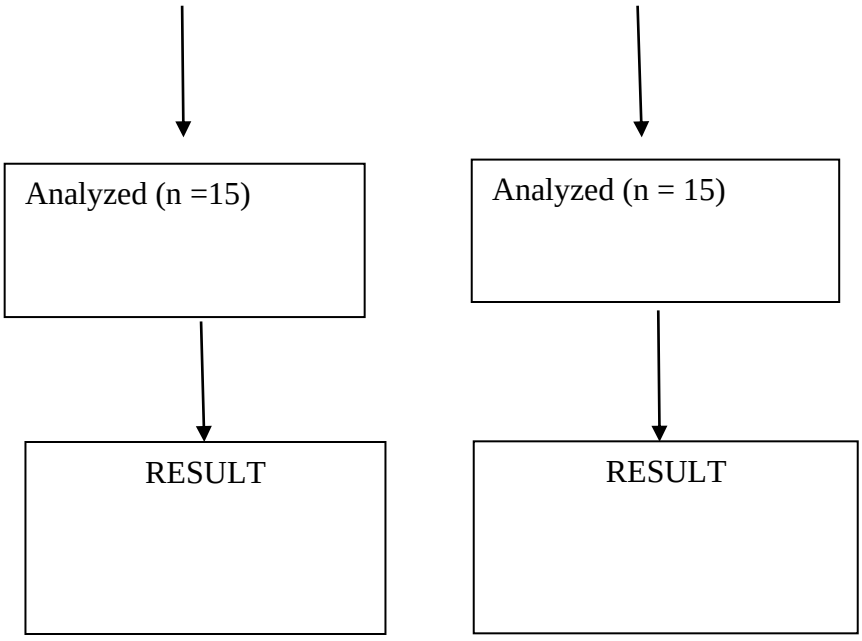
Instrument required

- **Kangzhu 6-Cup Biomagnetic Chinese Cupping Therapy -** Kangzhu series cupping devices are recognized by the Chinese Medical Association and have also received FDA, ISO9001 and ISO13485 certifications. Wind therapy is a type of complementary medicine in which cups are used to create local suction on the skin. There are various sizes for plastic cups [7].

- **Tennis ball -** Tennis balls are filled with air and are surfaced by a uniform felt-covered rubber compound [8].

PROTOCOL





PROCEDURE

Cupping therapy

All subjects were treated three times a week for 4weeks. In the treatment group, a plastic cupping bell is placed on the painful area for 10 minutes at each treatment session. A manual hand pump is used to create a vacuum for suction. The intensity of the vacuum is based on the tolerance of the target [9].

Manual therapy

- **Cross friction massage -** Participants in this procedure are laid out in a supine position. Here, lubricant is not used to allow the massage finger (usually one, but occasionally two) to pull the skin together instead of gliding over it, transferring the force to the deep tissue that needs to be addressed. The foot is in dorsiflexion

to allow the plantar fascia to stretch, and this is where the most painful part of the fascia is. Next, a reinforced index finger is used to apply deep friction massage at the plantar fascia's insertion point. The fabric's grain is moved back and forth by around an inch. Five minutes are spent on the rubbing massage [10].The pressure applied to the technique and the time spent on it is uniform in all groups and for each treatment [11].

Stretching protocols

- **Gastrocnemius muscle stretch**- Leaning against the wall with both hands shoulder-width apart is the requested position for the participant. The damaged leg retracts and the uninjured leg advances. The rear leg's knee is kept extended while the front leg's knee is bent. During the stretch, both feet's heels remained on the ground. Subsequently, the individual bowed forward until the leg region experienced the greatest amount of stretch. The protocol for each participant is to stretch for 30 seconds twice a day for two weeks [12].
- **Soleus muscle stretching** - Leaning against the wall with both hands shoulder-width apart is the requested position for the participant. Both the affected leg and the unaffected leg are brought forward and back. Both legs' knees were bending slightly. During the stretch, both feet's heels remained on the ground. The person then bowed forward until they could feel their legs as far as possible. Each participant will follow a regimen of three daily sessions of 30 seconds of stretching for three weeks. Each member of groups 2 and 3 will receive thorough instructions and an explanation of this protocol [13].

- **Tennis ball -** Participants were asked to place a tennis ball on the ground and gently roll it under their feet for 5 minutes twice a day for two weeks. They said there is enough pressure on the ball to get a deep massage. The patient may feel pain, but the pain subsides [8].

Clinical Outcomes

It includes:

- **The Visual Analogue Pain Scale (VAS)**

  (Resting, starting in the morning, and engaging in activities)

  A reliable subjective tool for measuring both acute and chronic pain is the visual analog scale (VAS). Scores are recorded using a handwritten mark on a 10-cm line that represents a continuum between "no pain" and "worst pain."

- **The Foot and Ankle Ability Measure (FAAM)**

  On a 5-point Likert scale (4 to 0), each item is rated from "no difficulty at all" to "unable to do." The sums of the item scores were translated into percentage scores. The range of the ADL subscale is 0 to 84, whereas the range of the Sports subscale is 0 to 32.

- **The Lower Extremity Functional Scale (LEFS)**

  The Lower Extremity Functional Scale consists of twenty questions regarding an individual's ability to perform daily tasks (LEFS). The LEFS can be used by clinicians to set functional goals and assess patients' baseline function, follow-up progress, and outcomes.

STATISTICAL ANALYSIS

Software called SPSS version 24 was used for all of the analyses. The paired and unpaired t tests, which are parametric tests, were used to evaluate the data's normality. The chi square test is used to analyze gender.

RESULT

Table 1: Descriptive and frequencies by group

Variables	Manual Therapy	Dry cupping + Manual Therapy	p-value
Age	Mean = 30.40 Std. Deviation = 5.33	Mean = 30.73 Std. Deviation = 5.42	0.866
Gender	Female N (%) = 9 (60.0) Male N (%) = 6 (40.0)	Female N (%) = 10 (66.7) Male N (%) = 5 (33.3)	0.705

- Age was examined in both the groups using Independent Sample t-test (Table 1). The findings suggest that age was insignificantly distributed in both groups A and B ($p > 0.05$).

- Gender was examined through Chi-square test in both groups (Table 1). The result reveals that gender had an insignificant association with group ($p > 0.05$).

Table 2: Comparison of VAS, FAAM, and LEFS scores at baseline by group

Outcomes	Manual Therapy		Dry cupping + Manual Therapy		p-value
	Mean	SD	Mean	SD	
VAS score	7.07	1.16	7.47	0.92	0.304
FAAM score	50.00	8.67	47.87	7.68	0.481
LEFS score	46.20	9.03	42.80	6.90	0.256

- Clinical outcomes were compared in both groups at the baseline level utilizing Independent Sample t-test (Table 2). The findings suggest that the clinical outcomes showed no difference in groups. In other words, the change that occurred Dry cupping + Manual Therapy Group was in significant ($p > 0.05$).

Table 3: Comparison of VAS, FAAM, and LEFS scores after 4 weeks by group

Outcomes	Manual Therapy		Dry cupping + Manual Therapy		p-value
	Mean	SD	Mean	SD	
VAS score	4.93	1.03	4.67	1.40	0.539
FAAM score	63.93	6.02	65.27	8.34	0.619
LEFS score	61.53	6.15	60.67	7.95	0.741

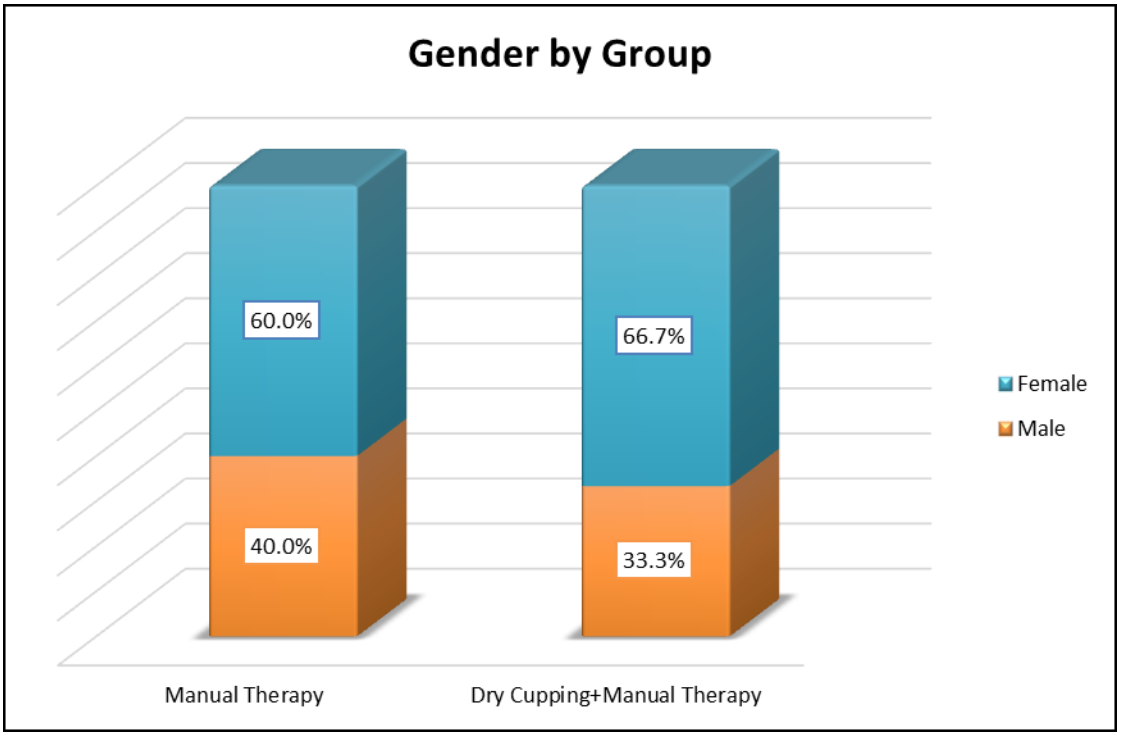
- Clinical outcomes were compared in both groups at 4 weeks utilizing Mann-Whitney U test and Independent Sample t-test (Table 3). The choice of the either test is dependent on the assumption of normality. The clinical outcomes were tested for their normality in both groups. The findings suggest that the clinical outcomes showed no difference in groups. In other words, the change that occurred in Dry cupping + Manual Therapy Group from Manual Therapy Group was insignificant ($p > 0.05$).

Table 4: Comparison of VAS, FAAM, and LEFS scores at baseline and after 4 weeks by group

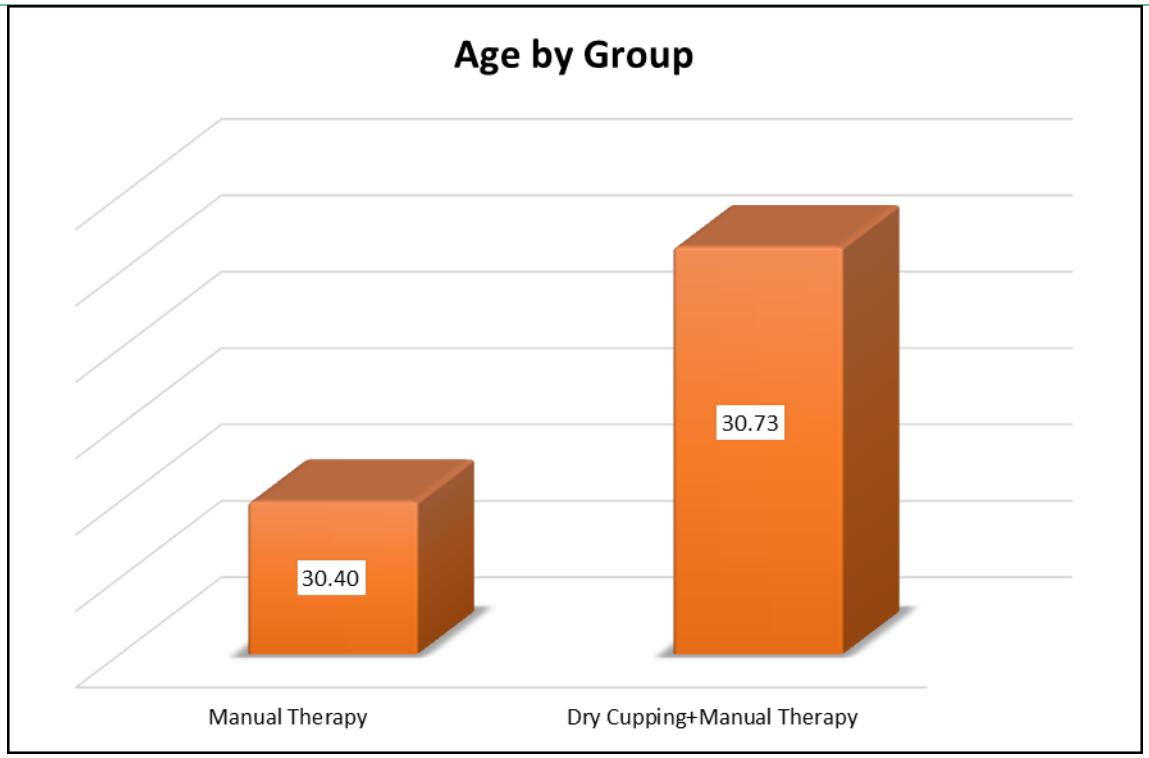
Outcomes	Manual Therapy		Dry cupping + Manual Therapy	
	Mean (SD)	Difference (p-value)	Mean (SD)	Difference (p-value)
VAS score				
Baseline	7.07 (1.16)	2.13* (0.000)	7.47 (0.92)	2.80* (0.000)
After 4 weeks	4.93 (1.03)		4.67 (1.40)	
FAAM score				
Baseline	50.00 (8.67)	-13.93* (0.000)	47.87 (7.68)	-17.40* (0.000)
After 4 weeks	63.93 (6.02)		65.27 (8.34)	
LEFS score				
Baseline	46.20 (9.03)	-15.33* (0.000)	42.80 (6.90)	-17.87* (0.000)
After 4 weeks	61.53 (6.15)		60.67 (7.95)	

- Clinical outcomes at baseline and 4 weeks were compared in both groups utilizing Paired Sample t-test (Table 4). The results suggest that for all the outcomes – VAS ($Diff_{MT}$ = 2.13; $Diff_{DC+MT}$ = 2.80), FAAM ($Diff_{MT}$ = -13.93; $Diff_{DC+MT}$ = -

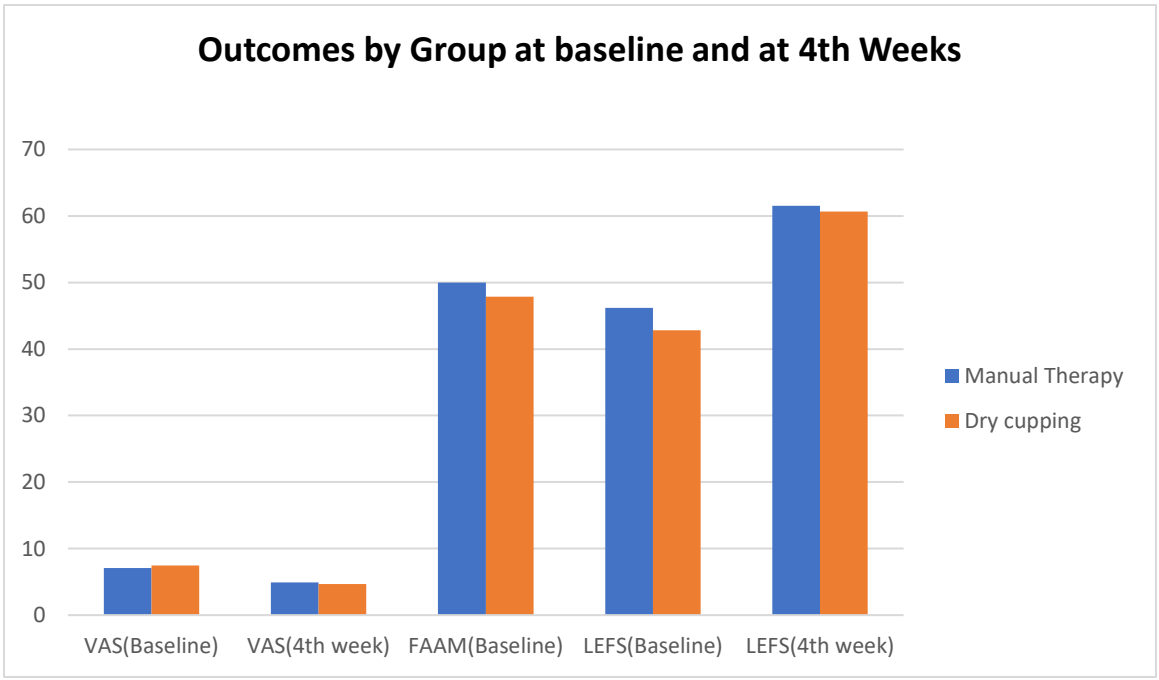
17.40), and LEFS ($Diff_{MT}$= -15.93; $Diff_{DC+MT}$ = -17.87), the difference was statistically significant across both the groups ($p < 0.05$).



Graph 1: Comparison of presence of males and females in both groups



Graph 2: Comparison of age in both groups



Graph 3: Graph shows outcome at baseline and at 4 weeks in both groups

DISCUSSION

In our study, 19 of the 30 patients were women and 11 were men, and the age range was 20-40 years. They were divided into 2 groups and there were 15 patients in each group. Heel pain is a common cause of leg pain and discomfort that affects the health and quality of life of patients, and has a high tendency to recur. [14]

To the best of our knowledge, this is the first research comparing the effects of dry cupping therapy on plantar fasciitis patients' pain and function. Patients with chronic neck pain or chronic low back pain may find relief from pain and disability with cupping in addition to acupuncture and acupressure, according to a recent systematic review of traditional Chinese medicine (TCM) [15].

Furthermore, cupping therapy has been applied to the treatment of a number of painful conditions [16]. By pulling on blood vessels, muscles, nerves, and subcutaneous glands, the edge of the cup firmly adheres to the skin's surface during cupping therapy, creating negative pressure in the vessel through the exit tube and triggering a cascade of neuro endocrine reactions that regulate the functions of vasodilatation and constriction and vascular permeability to improve local circulation. Next Kerry J.D. Ambrogio's study has a greater effect in the positional release therapy group. et al. Sarcoplasmic reticulum rupture. The resulting influx of calcium ions into the interstitial compartment leads to uncontrolled actin-myosin interactions and the formation of tension zones associated with muscle contacts associated with muscle tension. These traumatic events cause hypertonicity, inflammation, ischemia and increased concentration. George B. also supports this research. According to research by Roth et al., postural release therapy can

decrease joint hypermobility, normalize facial tension, normalize muscle hypertonicity, reduce swelling and circulation, lessen pain, and increase strength. Daniel et al.'study on the risk factors for plantar fasciitis demonstrates that patients with low arches, or flat feet, have excessive foot pronation, increased stress on the plantar aponeurosis, and damaged, weakened, and loose foot ligaments that support the arch.

Limitation

The study project is limited by convenience sampling and a small sample size that is dictated by our available resources. The results' ability to be generalized is greatly impacted by convenience sampling. The majority of the subjects were young volunteers, and the samples lacked variety. Furthermore, investigator bias could not be minimized by double blinding. Future physiotherapy patient research is expected to be heavily researched.

Future Scope

More research with a larger sample size is required on this. Gender homogeneity refers to the presence of an equal number of male and female individuals. It is possible to raise the upper bound on the age group range.

Studies that look at how dry cupping affects functional testing or athletic performance are rare. Future research would benefit from including functional testing to ascertain whether dry cupping is effective at increasing function, as the majority of cupping studies measure function based on subjective measures. Additionally, there is a dearth of cupping research on athletes. Future studies should look into the mechanisms underlying the effectiveness of cupping therapy.

CONCLUSION

I had compared the effect of dry cupping to the manual therapy for planter fasciitis by randomized controlled trial method. 30 Patents were split into two groups, with 15 patents in each. Group A is treated with dry cupping and traditional manual therapy and Group B is treated only with manual therapy. It is found that the outcomes measures of patient in each group were good but Group A has shown better results than patient of Group B.

Conflict Of Interest: NONE

Acknowledgment: We would like to acknowledge all the participants and their family members for their kind co-operation throughout the study.

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