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A study to compare the effectiveness of positional release technique versus calcaneal taping in patients with chronic planter fasciitis: A randomized control trial

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Abstract

Background and purpose: Plantar fasciitis is a repetitive strain injury of the medial arch and heel of the foot. In planter fasciitis typical complain of patient is sharp pain in medial aspect of calcaneal tuberosity. Purpose of this study is to compare the effectiveness of positional release technique versus calcaneal taping in patients with chronic plantar fasciitis.

Methodology: A total of 60 patients with chronic plantar fasciitis were randomly allocated to group A (positional release technique) and group B (calcaneal taping). Therapeutic ultrasound with intensity of 1 W/cm^2 and frequency of 1 MHZ for 5 minute was given to both groups. Visual analogue scale and foot function index were outcome measures that were assessed pre and post interventional.

Result: the study demonstrated statistical significant reduction in pain, in both group (p=0.001). But there is no significant difference in reduction in pain in both the group.

Conclusion: Both calcaneal taping and positional release technique with therapeutic Ultrasound were equally significantly effective in immediate pain relief in patients with Chronic Plantar fasciitis. But there is no significant difference in reduction in pain between 2 groups.

Keywords: plantar fasciitis, positional release technique, calcaneal taping, therapeutic ultrasound

Introduction

The plantar fascia is a thick, relatively inelastic sheet of connective tissue originating from medial heel and then it passes over the superficial musculature of the foot and inserts on to the base of toe [1]. Recent studies have shown that the plantar fasciitis affecting Over 10 % Of General Population. Middle aged persons are predominantly affected and is more common found in women.[2]Risk factor of plantar fasciitis include faulty mechanics of the foot due to Structural abnormalities, Age related degenerative changes, training errors, Overweight, occupations involving prolonged standing; Certain type of exercise like Ballet dancing, long distance running, dance aerobic. Unequal leg length [1].

The etiology of plantar fasciitis is poorly understood and in approximately 85% of cases is unknown [3]. many authors says that planter fasciitis is most commonly caused by overuse activities that place excessive strain on planter fascia or poor biomechanics that cause excessive foot pronation.The excessive pronation result in the load on the planter fascia increasing beyond its anatomical capacity resulting in increased tensile forces and strain of the plantar fascia and causing plantar fasciitis [1].

Medical management of relative rest, NSAIDs and corticosteroid injections are used for plantar fasciitis. Physiotherapy is a preferred which aims at alleviating pain and restoring mechanical function [4]. Recent technique for treatment of plantar fasciitis are flexor digitorumlongus home exercise, the paper grip exercise, planter fascial night brace, planter fascia stretching [5] Orthotic devices, taping, footwear modification- [6] There are various type of taping technique is effective in plantar fasciitis. Taping can improve proprioception, which is believed to play a role in preventing injury and in the evolution of chronic injury [7]. Like low dye taping, kinesio taping, calcaneal taping.

The purpose of use of calcaneal taping is that places the foot in an improved position by repositioning the calcaneal alignment closer to neutral and increasing the medial longitudinal arch height. Thus reducing stress and subsequent injury to the plantar fascia [8, 9].

Positional release technique is focused on to increase Muscle flexibility in which placing the muscle in a shortened position which promote muscle relaxation in contrast to placing the muscle in lengthened or stretched position.[10, 11] In positional release technique placing patient in position of comfort & moving the affected tissue away from the restrictive barrier in to ease [12]. The visual analogue scale (VAS) is a valid reliable measure of chronic as well as acute pain intensity [13]. the foot function index is a clinically useful, self-reported questionnaire [14].

Methodology

- **Population:** People of planter fasciitis
- **Sampling design:** Computerized randomized sampling
- **Research design:** Comparative Study
- **Source of data collection:** The participants will be recruited from Physiotherapy O.P.D at sainath hospital bopal, Ahmedabad
- **Duration of the study:** 1 and half year
- **Outcome measure:** visual analogue scale, foot function index.

Total 60 patients who were clinically diagnosed with planter fasciitis were selected & given consent form. Accordingly they were randomly placed in 2 groups. Subjects were included are Age between 20 to 40 year, both male & female,

Unilateral pain in heel, Patient having pain ≥ 6 Weeks. subjects were excluded are Any history of lower limb fracture, Any foot deformity, Any surgery in 6 month & during study period, Any vascular, neurological, cardio- respiratory condition. Any degenerative changes in ankle & knee

In group A 30 patients received positional release technique. In group B 30 patients received calcaneal taping. Therapeutic ultrasound with intensity of 1 W/ cm 2 and frequency of 1 MHz for 5 minute was given to both the groups [15].

In group A 30 patients received positional release technique in which Apply brief pressure on the tender point by using one fingertip to determine tenderness. Position of foot is in planter flexion then gentle fine-tuned by rotation, until the pain is reduced to at least 70%.This position was held for 90 sec. Then returned to neutral position. Total 3 sessions were given per week for 2 weeks [12]

In group B 30 patients received calcaneal taping once the cover – roll applied. (A) For taping, used the leukotape. Then piece 1 was applied just distal to the lateral malleolus, pulling the calcaneus medially then attached to the medial aspect of foot just distal to medial malleolus.(B) Piece 2 and 3 followed same pattern with overlap one third part of the tape width, moving in the distal direction.(C)(D) Piece 4 went around the back of the heel, start from distal to the lateral malleolus, wrapping the posterior aspect of the calcaneus.(E) Piece 4 served as an anchor for the 1st 3 piece. Total 3 sessions were given per week for 2 weeks. Visual analogue scale and foot function index were assessed after two week of intervention. [8]

Result and Stastical Analysis

Table 1: Age and gender distribution in PRT and CT group

	Group A	Group B
Male	8	15
Female	22	15
Total	30	30
Mean age	31	33

Table 2: Mean values of PRT group

		Mean	N	Std. Deviation	Std. Error Mean	t -test	p –value
Pair 1	VAS PRE	7.5667	30	1.27802	.23333		
	VAS POST	4.2000	30	1.18613	.21656	15.149	.001
Pair 2	FFI PRE	35.9333	30	8.12800	1.48396		
	FFI POST	24.4667	30	8.22416	1.50152	12.037	.001

Table 3: Mean Value of CT Group

		Mean	N	Std. Deviation	Std. Error Mean	T test	P value
Pair 1	VAS PRE	7.1333	30	1.33218	.24322		
	VASPOST	4.7000	30	1.36836	.24983	9.646	.001
Pair 2	FFI PRE	38.0667	30	8.66596	1.58218		
	FFI POST	31.4333	30	9.52920	1.73979	7.826	.001

Table 4: Shows Difference between Two Group

		Mean	Std. Deviation	Std. Error Mean	T test	P value
Pair 1	CT VAS- PRE PRT VAS-PRE	-.43333	1.52414	.27827	1.557	.130
Pair 2	CT FFI- PRE PRT FFI-PRE	2.13333	12.27201	2.24055	.952	.349
Pair 3	CT VAS-POST PRT VAS- POST	.50000	1.75676	.32074	1.559	.130
Pair 4	CT FFI -POST PRT FFI –POST	6.96667	12.61221	2.30266	3.025	.005

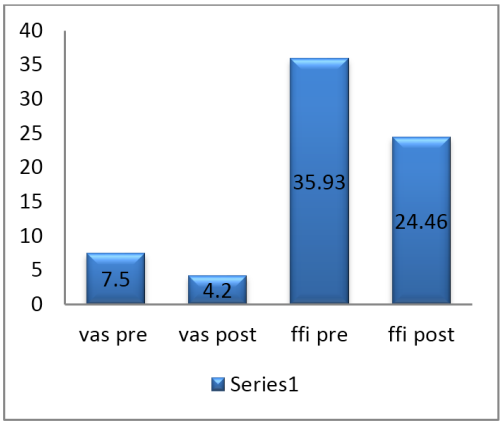

Fig 1: Mean Values of PRT Group

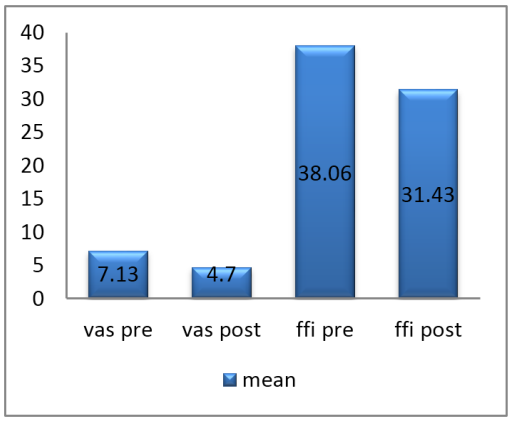

Fig 2: Mean Value of CT group

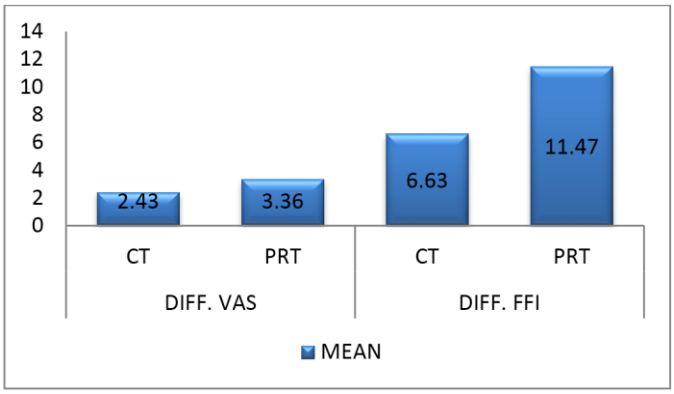

Fig 3: Differences between two groups

The data were normally distributed. The parametric test was used in statistical analysis Demographic values were compared within and between groups using paired T test. Statistical significance was set at $p<0.05$.

T test – a parametric test was used to find difference within and between the groups. As shown in result was statistically significant reduction in pain for PRT group and CT group ($p=0.001$) but there is no significant difference in reduction in pain in PRT group and CT group.

Discussion

This study was conducted to evaluate and compare the immediate effectiveness of positional release technique versus calcaneal taping on pain in subjects with chronic plantar fasciitis.Sonal subhash agrawal found that calcaneal taping is shown to be more effective tool for pain relief of plantar heel pain than sham taping in patient with chronic plantar fasciitis [16]. amruta j. sankhe at el found that low dye taping is significantly more effective than calcaneal taping in reducing pain and increasing the foot function in patients with plantar fasciitis [15].

Renu b. pattanshetty at el found that passive stretching demonstrated significant improvement as compared to positional release technique [2]. Wynne MM *et al.* demonstrated reduction in pain and improvement in functional ability using positional release therapy results of which are similar to the present study [17]. This study examined that both the technique were equally effective in reducing the pain intensity after 2 week of intervention. There was no significant difference between two groups in reduction in pain with patients in chronic plantar fasciitis.

In positional release technique pain relief may occur due to decrease in intrafusal and extrafusal fiber disparity and reset the inappropriate proprioceptive activity [18]. Placing tissue in a relaxed shortened state, for a period of time 90 sec. to decrease gamma gain in order to facilitate restoration of normal tissue length and tension [19, 20].

Davis *et al.* found that 89% of patients had some relief of plantar heel pain in one yr but the calcaneal taping technique create immediate pain relief [21]. The taping technique described in this study with only 4 piece of tape it is easier and faster for a therapist to apply, it also less expensive than technique using larger quantities of tape [22, 23]. Gross *et al.* found that the technique is an ideal precursor to orthotics, which is to be long-term option to relieve symptoms of plantar heel pain [24].

There was no adverse reaction found throught the study duration on any participants. All the participants enrolled in this study were followed up at each session

Limitation and further recommendations

However some limitation in this study is this study was done on a small sample size, Study was conducted over a short period of time, and there was no long-term follow up. Future scope of study are Study involving long-term follow up should be undertaken to determine continued effect of Positional release technique and calcaneal taping. Calcaneal taping should be compared with other methods of taping to explore the added advantage of calcaneal taping if any. This study can be done with a control group in which only ultrasound given to the patients. This study can be done in both the group along with some exercises.

Conclusion

Both calcaneal taping and positional release technique with therapeutic ultrasound were effective in immediate pain relief in patients with chronic plantar fasciitis. But there was no significant difference in reduction in pain between 2 groups. So it can be concluded that both the techniques are equally effective in pain reduction in patients with chronic planter fasciitis.

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