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Research Article

COMPARATIVE ANALYSIS OF FRICTION MASSAGE AND CONTRAST BATH VERSUS STRETCHING EXERCISE AND CONTRAST BATH IN PATIENTS WITH PLANTAR HEEL PAIN

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ABSTRACT

Objective: The main objective of this study is to analyze the synergistic effect of friction massage and stretching exercise with contrast bath in a patient with plantar heel pain.

Methods: The procedure to perform friction massage and stretching exercises was performed among 30 patients each separately. Further, all were subjected to a contrast bath for a maximum of 20 min thereby 3 min for warm and 1 min for cold and this procedure was repeated 5 times.

Results: As a result, comparing with friction massage and contrast bath, stretching exercise and contrast bath were effective and the patients felt reduced pain while following the course completely.

Conclusion: By this effective therapeutic intervention, the patients felt satisfaction in reducing pain thereby their activities of daily living improved with self-management.

Keywords: Plantar heel pain, Friction massage, Stretching exercise, Contrast bath.

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INTRODUCTION

Plantar heel pain, previously called plantar fasciitis or fasciopathy observed nearly 15% of all foot-related complaints found among physically active individuals such as athletes, middle-aged women, and obese. The source of this problem is found to be an anatomical abnormality of the foot that leads to biomechanical strain in the joints and its supportive soft tissues, which is mainly due to long-standing or supraphysiological loads [1].

The two major functions of the human foot are absorbing the impact of the body weight during the early part and providing propulsive force during the latter part. This clinical scenario requires the foot to become soft and flexible when the individual is obese, and rigid and tense during push-off. These opposite actions are largely carried out due to more extent by the plantar fascia, which acts as a bind during force absorption and as a rigid beam to provide rigidity during propulsion [2].

Differential diagnoses such as neurological (burning sensation worsened by dorsiflexion and paresthesia in the plantar region); skeletal (common in geriatric and athlete groups, pain in multiple joints along with heel pain); soft tissue (hard landing on heel, posterior calcaneal tenderness, tendon, and retrocalcaneal bursa pain); and insertion mid foot at the arch pain is observed [3].

Various therapeutic interventions are provided for the recovery of plantar fasciitis and are currently applicable for all age groups for the necessitates recovery from many physiological stressors such as musculoskeletal, nervous, and metabolic systems [4]. Non-pharmacological management of plantar fasciitis using contrast bath therapy given using hot and cold water that causes alternate vasodilatation and vasoconstriction helps to reduce pain symptoms [5].

Transverse friction massage is largely involved in increasing the blood circulation, breaking down adhesions, and relaxing the muscles and fascia. Various aspects of therapy including duration, frequency, intensity, and method of massaging are important to get better results [6]. The pain reduction is significantly observed in stretching over calf stretches in the short term thereby the overall pain is managed while doing frequently [7]. Comparatively, a soft-tissue workout in stretching may be helpful to improve the appropriate effectiveness in the overall management of pain related to the plantar heel. By reviewing the data, the objective was to compare the effectiveness of stretching exercise and contrast bath with friction massage and contrast bath.

METHODS

This study was carried out among the patients who were visited for the treatment of plantar heel pain. This is a prospective comparative analysis where oral consent was obtained to do the comparativeness. A total of 60 participants who suffered from heel pain and were further diagnosed clinically plantar heel pain minimum of 6 weeks were enrolled in that study. The participants have signed the informed consent.

The inclusion criteria are clinically diagnosed plantar heel pain for at least 6 weeks, heel pain felt maximally over the plantar aspect of the heel, and early morning 1st step pain in the heel. Patients with clinical disorders including calcaneal fracture, infective foot, metal implant around the ankle, and tumor; dermatitis; impaired circulation; sciatica; and other neurological disorders; arthritis and corticosteroids injection in the heel.

The participants included in this study were randomly distributed into two groups. The 30 participants included in this study were randomly divided into two groups. The group A received stretching exercise and contrast bath whereas group B received friction massage and contrast bath.

The study was conducted for 10 days where each day consisted of 2 sessions and finally 20 sittings were done thereby assessing the pain

reduction. For measuring the pain intensity, the numerical pain rating scale was used. To determine the present pain intensity the values from 0 to 10 were recorded that indicated 0 as no pain and 10 as worse pain. The foot functioning are assessed by pain reduction, free movement, and no pain in the early morning.

The stretching exercise was performed by asking the patients to sit on the high couch with stool support. The therapist held the heel on one hand and the toes were extended against by another hand for 30 s, and this procedure was repeated for 10 times. For effective management, the patients were asked to visit the clinic twice a day for 10 days. The household practice including towel stretch, stair stretch, slant board, wood, and can for stretching.

Friction massage – the trigger point was assessed by pressuring the thumb finger on the patient's pain center with circular motion. The procedure was done for 10 days where each day consisted of 2 sessions and finally 20 sittings. The household practices are toe curls with a towel, toe extension, standing calf and heel stretch, and calf and heel stretch on stairs. All these stretchings were held for 30 s, 2 or 3 times a day.

Contrast bath – alternate immersion of warm (40–45°C) and cold water (15–20°C) for 3 min and 1 min, respectively. This procedure was repeated 4–5 times and ended with warm water for 10 days. All the data were analyzed descriptively, and further mean, standard deviation, and coefficient of variance were calculated, thereby $p<0.05$ was considered statistically significant.

RESULTS

In this study, the patients who have plantar heel pain were assessed clinically and suggested to have the methods of exercises and massages as mentioned in the methodology. The age- and gender-wise analysis of the patients is shown in Table 1.

While analyzing the physical parameters of the patients included, it was noted the maximum of 160 cm and the lowest of 155 cm; whereas weight showed a range from 70 to 87 kg. The body mass index (BMI) calculation depicted a range between 29.1 and 34. The $p<0.05$ is considered statistically significant. The detailed description related to the height, weight, and BMI is interpreted in Table 2.

Interestingly, when comparing the blood group with plantar heel pain, O group dominated with 30 (50%) followed by B group with 14 (23.3%) and A group with 11 (18.35%). Meagerly AB group showed lesser numbers with 5 (8.35%) (Fig. 1). The location and their activities also play a vital role in the active state of neuromuscular regions; thereby in this study, maximum participants were from the rural background (Fig. 2).

Table 1: Age- and gender-wise descriptions

Age groups (in years)	Gender wise analysis	
	Males (n=14)	Females (n=46)
30–35	4 (28.6)	24 (52.2)
36–40	8 (57.1)	17 (36.9)
Above 40	2 (14.3)	5 (10.9)
Total	n=60	
Mean (Age)±SD	36.52±2.81	
CV	7.89	
p value	0.002* (p value is significant)	

Table 2: Analysis of physical parameters (n=60)

S. No	Descriptions	Mean±SD	CV	p-value
1	Height in cm	159.58±2.46	1.54	0.003*
2	Weight in kg	75.85±3.18	4.2	0.001*
3	BMI kg/m^2	29.9±2.06	4.8	0.002*

(*p value is significant); BMI: Body mass index

Table 3: Economic status of the patients (n=60)

Parameters	Number	Percentage
Lower class	12	20
Lower middle class	15	25
Middle class	16	26.7
Upper class	17	28.3

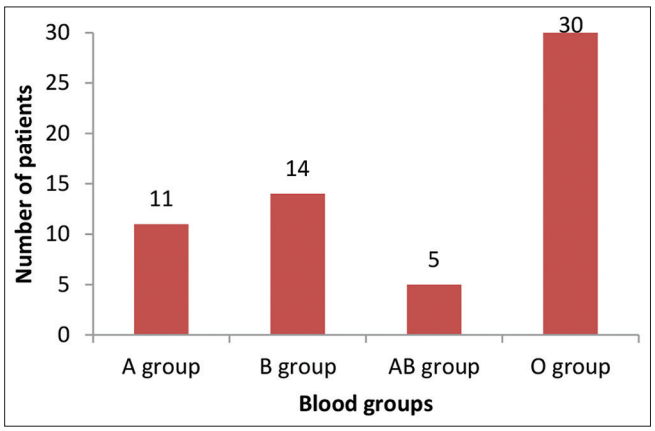

Fig. 1: Comparison of blood group of plantar heel pain

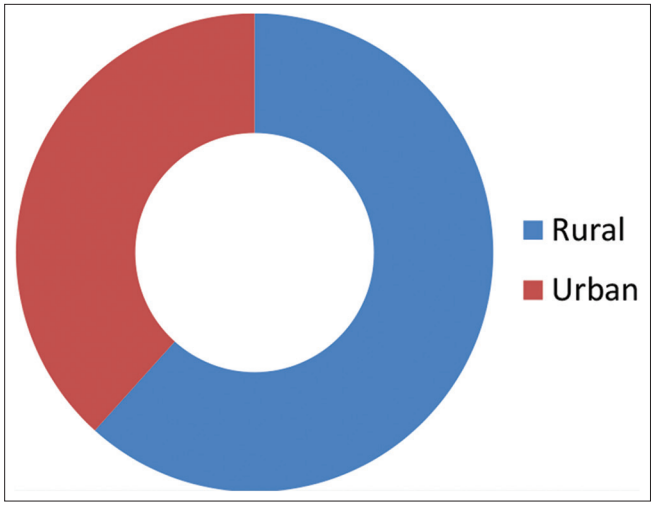

Fig. 2: Locality of the patients included in this study

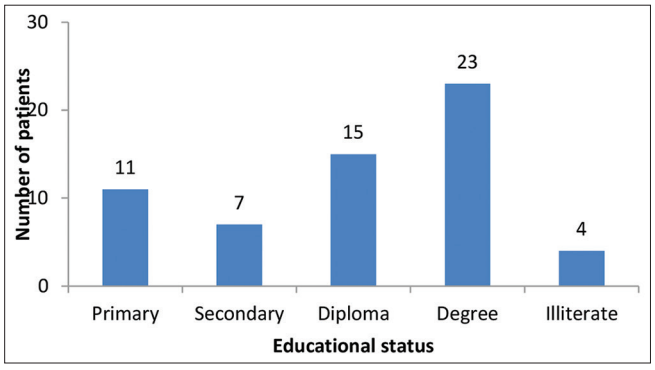

Fig. 3: Educational background

Table 4: Pain relieving effect of stretching exercise versus friction massage in plantar heel patients

Pre- and post-pain scale	Number of patients (n=30)	Pre- and post-pain scale	Number of patients (n=30)
Stretching exercise with contrast bath		**Friction massage with contrast bath**	
10–3	4 (13.3)	10–7	2 (6.7)
9–1	3 (10)	9–5	1 (3.3)
9–0	6 (20)	9–3	6 (20)
8–3	1 (3.4)	9–2	6 (20)
8–2	5 (16.6)	8–4	6 (20)
8–1	6 (20)	8–5	3 (10)
8–0	4 (13.3)	8–3	3 (10)
7–2	1 (3.4)	7–5	3 (10)

(Figure in parenthesis denoted percentage)

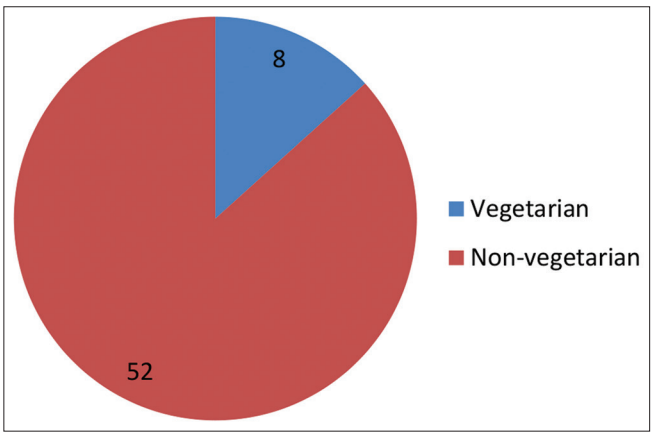

Fig. 4: Diet status of the patients

The educational background of the participants included in this study showed maximum from degree background followed by a diploma. Whether the educational background has any influence on the severity of the disease? Find out the answer for this scenario is the biggest challenge. Fig. 3 highlights educational background of the study participants. The economic status also has some sort of influencing mode in the severity of the disease due to the poor economy or investment for other important expenses (Table 3). The diet of the patients is also determined thereby 13.3% were vegetarians (Fig. 4).

While evaluating the effect of the two experimental tests, stretching exercise with contrast bath showed high effectiveness compared to friction massage with contrast bath. The pain scale was considered the major tool to evaluate this effectiveness. The pre- and post-experimental analysis showed improvements in both the techniques, but comparatively stretching exercise with contrast bath is effective in plantar heel pain relieving. Table 4 shows the pre- and post-experimentation of the techniques by understanding the reduction in pain. Comparatively, the stretching exercise with contrast bath was found better than friction massage with contrast bath.

DISCUSSION

Plantar heel pain is treated effectively by physiotherapy techniques. Formulating a standard operating procedure for the treatment of this pain which is observed in the inferior aspect of the foot is highly difficult due to pain scale variations and the origin of disease [3,8]. Very few studies are observed and compared the effectiveness of the physiotherapeutic approaches; but the effectiveness of heel pads with hot fomentation and stretching exercises was documented [9-11].

In this study, the age group of the patients included was between 30 and 65 years. In general, the majority of patients affected with plantar heel pain are 40–60 years of age, although the range has been reported to be 8–80 years of age [8,12]. Furthermore, female patients are having this issue more compared with males supported by many studies [11]. Furthermore, reported that subcalcaneal pain is a common orthopedic observation that generally occurs in person between 30 and 70 years.

In this study, stretching exercise with contrast bath was found to be the most effective therapy for plantar heel pain, other studies also documented 89% of patients were shown to improve significantly with non-operative treatment which included rest, NSAIDs, Achilles tendon, and plantar fascia stretching exercises and heel cushions [11,13,14].

The major complaints reported were difficulty in prolonged standing and severe morning pain making unable to stand. Patients reported considerable pain relief after the combination of stretching exercises and contrast baths. Thus, all patients who are suffering from plantar heel pain are treated with physiotherapy procedures for a better prognosis.

CONCLUSION

By observing the two experimental procedures (stretching exercise vs. contrast bath and friction massage vs. contrast bath), planter heel pain is reduced effectively while doing stretching exercise vs. contrast bath resulted in the most significant improvement.

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CONFLICT OF INTEREST OF AUTHORS

There are no conflicts of interest.

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Nil

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