Research Paper

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Effect of Ultrasound Therapy and Myofascial Release on Pain and Function in Patients With Plantar Fascitis

Physiotherapy

KEYWORDS : Plantar fasciitis, Ultrasound therapy, Myofascial release, Stretching exercises, Visual analog scale, Foot function index

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ABSTRACT

Plantar fasciitis is one of the most common conditions that causes of heel pain. The purpose of this study was to evaluate the the effect of ultrasound therapy and myofascial release on pain and function in patients with plantar fasciitis. 20 patients were selected and divided into 2 groups as Group A (n=10) and Group B (n=10). Both groups received plantar fascia and calf stretching exercises, where in addition to exercises Group A received Ultrasound therapy and Myofascial release for plantar fascia. Treatment was given on alternate days for a period of 2 weeks. Pain and function were used as outcome measures. Student't' test was done. Both groups showed significant reduction of pain and improvement of function. Between groups analysis, Group A showed more significant reduction of pain and improvement of function. Ultrasound therapy and Myofascial release is effective on pain and function in patients with plantar fasciitis.

INTRODUCTION:

Plantar fasciitis (PF) is a common painful disorder of the heel and plantar surface of the foot characterized by inflammation, fibrosis or structural deterioration of the plantar fascia of the foot. The plantar fascia is a thick fibrous band of connective tissue that originates from the medial tubercle of the calcaneus (heel bone) and extends along the sole of the foot towards the toes and supports the arch of the foot (Molloy and Orchard 2012). The condition is often caused by overuse of the plantar fascia, increases in physical activity, weight or age. Chronic cases showed more degenerative changes than inflammatory changes and termed as plantar fasciosis (Lemont et al 2003). Abnormal foot biomechanics, calf muscle tightness, tight plantar fascia, weak foot intrinsics, decreased ankle and 1st metatarsophalangeal joint range of motion, limb length discrepancy, obesity, training errors, improper footwear and occupations involving prolonged standing are risk factors of plantar fasciitis. In the presence of these risk factors, excessive tensile forces may cause micro-tears in the plantar fascia. Repetitive trauma to the plantar fascia exceeding the fascia's ability to recover may lead to degenerative changes and an increased risk of injury. Physiotherapy management includes rest, taping, orthosis, stretching, mobilization, myofascial release, electrotherapeutic modalities such as ultrasound therapy, laser. Myofascial release is one of the physiotherapy treatments given in the chronic conditions that cause tightness and restriction in soft tissues. Thus this study was conducted to study the effect of ultrasound therapy and myofascial release on pain and function in patients with plantar fasciitis.

PURPOSE OF THE STUDY:

The purpose of the study is to find out the effect of ultrasound therapy and myofascial release on pain and function in patients with plantar fasciitis.

METHODOLOGY:

This study was a pre test and post test experimental study design. It was conducted at outpatient physiotherapy department, K.G College of Physiotherapy, Saravanampatti, Coimbatore. Based on selection criteria 20 subjects were selected by using simple random sampling method. They were allotted into 2 groups as 10 for each group and named as group A and group B. Both groups received plantar fascia and calf stretching exercises, where in addition to exercises Group A received Ultrasound therapy and Myofascial release for plantar fascia. Treatment was given on alternate days for a period of 2 weeks. Informed consent was obtained from each patient.

Criteria for Selection:

Inclusive criteria

- Age – 30 to 50 years
- Both sexes
- Patients with plantar fasciitis not less than 6 weeks
- Moderate Pain over plantar aspect of heel

Exclusive criteria

- Patients with severe plantar heel pain
- Foot infections
- Metal implants in foot
- Impaired sensation in foot
- Ankle and foot stiffness
- Calcaneal periostitis
- Calcaneal spur
- Calcaneal stress fracture
- Fat pad syndrome
- Diseases such as RA, gout, ankylosing spondylitis, reiter's syndrome
- Plantar fascia rupture

OUTCOME MEASURES:

Pain was measured by Visual analog scale (VAS). Function was measured by Foot function index (FFI). Measurements were taken at the before and after the treatment.

DATA ANALYSIS AND RESULTS:

Student't' test was done to analyze the pre and post test means of group A and B. Paired 't' test showed that both group A and B significant in reducing pain and improving function. For Pain, Group A calculated't' value is 23.4 > table't' value 2.262, Group B calculated't' value is 14.0 > table 't' value 2.262. For function, Group A calculated't' value is 27.0 > table't' value 2.262, Group B calculated't' value is 16.1 > table't' value 2.262. In Unpaired't' test, the pretest mean analysis showed that there is no difference between the groups. Analysis of posttest means showed that there is significant difference between the groups for Pain (calculated't' value is 9.0 > table't' value 2.101), for function (calculated't' value is 17.4 > table't' value 2.101) While considering the mean difference score, there is marked reduction of pain and improvement of function in group A subjects.

TABLE NO.1 SHOWING STUDENT 't' TEST FOR PAIN :

Statistical test	Groups / test scores	Mean	Standard deviation	't' value	Table 't' value
Paired 't' test – Group A	Pretest	6.47	0.39	23.4	2.262
	Posttest	3.05	0.52		
Paired 't' test – Group B	Pretest	6.31	0.45	14.0	2.262
	Posttest	4.94	0.40		

Unparied 't' test - Pretest	Group A	6.47	0.39	0.85	2.101
	Group B	6.31	0.45		
Unpaired 't' test -Posttest	Group A	3.05	0.52	9.0	2.101
	Group B	4.94	0.40		

TABLE NO.2 SHOWING STUDENT 't' TEST FOR FUNCTION :

Statistical test	Groups / test scores	Mean	Standard deviation	't' value	Table 't' value
Paired 't' test – Group A	Pretest	53.98	1.02	27.0	2.262
	Posttest	28.63	2.33		
Paired 't' test – Group B	Pretest	53.24	1.74	16.1	2.262
	Posttest	42.53	0.95		
Unparied 't' test - pretest	Group A	53.98	1.02	1.16	2.101
	Group B	53.24	1.74		
Unpaired 't' test	Group A	28.63	2.33	17.4	2.101
	Group B	42.53	0.95		

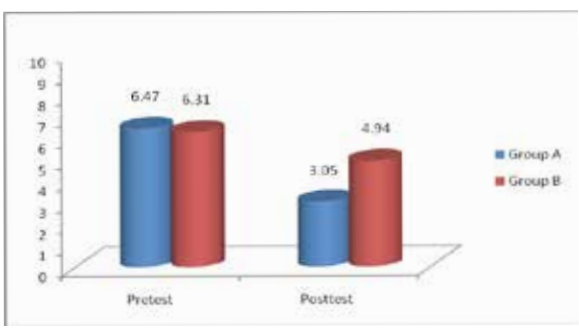

FIGURE NO. 1 SHOWING VAS VALUES FOR PAIN

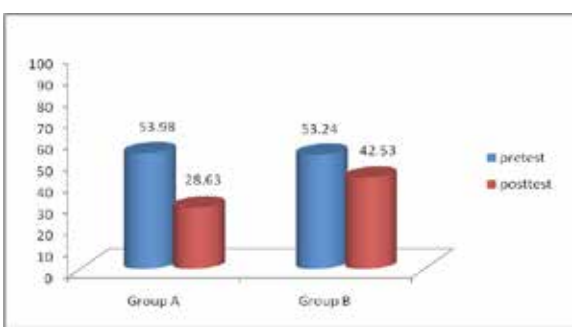

FIGURE NO. 2 SHOWING FFI VALUES FOR FUNCTION

DISCUSSION

In plantar fascitis, pain is usually caused by collagen degeneration which features loss of collagen continuity, increases in ground substance (matrix of connective tissue) and vascularity, and the presence of fibroblasts rather than the inflammatory cells usually seen with the acute inflammation of tendonitis (Khan 2000). Stretching exercises increases the flexibility of calf muscles and plantar fascia. Calf muscle stretching provided a small and statistically significant increase in ankle dorsiflexion **(**Radford et al 2006).

Tissue-specific plantar fascia-stretching exercises demonstrated a marked decrease in pain and functional limitations and a high rate of satisfaction **(**Digiovanni et al 2006).

Ultrasound group had the highest average pain reduction of 3.97 after treatment and the highest number of patients who had pain relief after treatment at 81% or 21/25 (Gerald 2011). By myofascial release, there is a change in the viscosity of the ground substance to a more fluid state which eliminates the fascia's excessive pressure on the pain sensitive structure and restores proper alignment. (Travell, Simons 1983). Myofascial release techniques are claimed to cause vasomotor response, increase blood flow to affected areas, increase lymphatic drainage of toxic metabolites, realign fascia1 planes, influence the proprioception of affected soft tissue (Barnes 1987), alleviate musculoskeletal pain and dysfunction (Travell, Simons 1983) and restore functional range of motion in areas of painful restriction (Barnes 1987).

Myofascial release is used to ease pressure in the fibrous bands of the connective tissue, or fascia. Gentle and sustained stretching of myofascial release is believed to free adhesions and softens and lengthens the fascia. Myofascial release is an effective therapeutic option in the treatment of plantar fasciitis. (Kuhar 2007).

CONCLUSION:

This study conluded that ultrasound therapy and myofascial release is effective in reduction of pain and improvement of function in patients with plantar fasciitis. Some limitations have been found such as small sample size, especially done in general population. Future studies need to be done with large sample size, athletic population, other pain scales and foot and ankle ability measure.

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