

# A Comparative Study of Efficacy of Local Corticosteroid Injection versus Ultrasound Therapy in the Treatment of Planter Fasciitis.

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## ABSTRACT

**Background:** Planter Fasciitis is a frequent disorder involving the plantar fascia. Usually, syndromes that involve manifestation of the typical heel pain are called plantar fasciitis. Common treatments can be divided into noninvasive and invasive treatments, such as corticosteroid injection (CSI), botulinum toxin injection, platelet-rich plasma (PRP) injection and surgery. **Methods:** Total 80 patients were taken up for the study that completed the follow-up. Patients by random sampling were divided in two groups. Patients were divided in Conservative ultrasound therapy and Local Steroid Injections group of 40 patients each. **Results:** Treatment outcome was found almost similar in both treatment group, the betterment was found better with ultrasound with more duration of treatment but this is not statistically significant. **Conclusion:** Findings of our study suggest that As both treatment modalities are at par on comparison of their treatment outcome it is better to go for conservative approach.

**Keywords:** Planter Fasciitis, Corticosteroid injection, ultrasound, Efficacy, conservative treatment.

## INTRODUCTION

Planter Fasciitis is a frequent disorder involving the plantar fascia. It has a bimodal distribution and occurs in both athletes and sedentary subjects. Usually, syndromes that involve manifestation of the typical heel pain are called plantar fasciitis, but that term is not correct, because no histological evidence of inflammation is present in this condition; the terms “fasciosis” or “fasciopathy” are most appropriate terms to define heel pain associated with degeneration of the plantar fascia and atrophy of the abductor digiti minimi muscle.<sup>[1,2]</sup>

Even though the exact etiology is unknown, collagen degeneration at the origin of the plantar fascia, caused by repetitive micro tears, appears to be the basis of the pain.<sup>[3]</sup>

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Although the cause of plantar fasciitis can be multifactorial, the most common etiology is biomechanical stress of the plantar fascia at its entheses of the calcaneal tuberosity. Prolonged weight bearing, obesity, limited ankle joint dorsiflexion, posterior muscle group tightness and maladaptive patterns of walking or running can produce biomechanical stress of the plantar fascia.<sup>[4]</sup> There are various treatments for plantar fasciitis. Common treatments can be divided into non-invasive treatments, such as physical therapy (PT),<sup>[4-6]</sup> orthosis,<sup>[7,8]</sup> oral non-steroidal anti-inflammatory drugs (NSAIDs),<sup>[9]</sup> radiation therapy (RT),<sup>[10]</sup> and shock wave (SW),<sup>[11]</sup> and invasive treatments, such as corticosteroid injection (CSI),<sup>[12,13]</sup> botulinum toxin injection,<sup>[14]</sup> platelet-rich plasma (PRP) injection and surgery.<sup>[1,15]</sup> For plantar fascia comprises stretching exercises and mobilization to improve lower extremity joint mobility and flexibility of the plantar fascia.<sup>[5]</sup>

Therapeutic ultrasound, a type of PT modality, is applied to the posterior heel to increase tissue circulation and metabolism, and to soften the plantar fascia.<sup>[6]</sup> Orthosis includes splinting, enhancing the mechanical control of the foot and ankle or

providing insoles for shock absorption along the inferior foot.<sup>[7,8]</sup> Oral NSAIDs are known to inhibit cyclooxygenase-2, thereby exerting an anti-inflammatory effect on the plantar fascia to relieve pain.<sup>[9]</sup> RT treatments expose the heel area to radiation to reduce inflammation over the treated area.<sup>[10]</sup> SW treatment applies high pulse SW energy to the insertion zone of the plantar fascia, potentially healing the degenerative tissue of the plantar fascia.<sup>[11]</sup>

Ultrasound therapy is an effective form of treatment for heel pain. It sends sound waves to the injured, painful area. These waves move at a frequency of one million vibrations per second. They can penetrate over 2 inches into the body providing the targeted relief you are looking for. The penetrations from ultrasound therapy reach deep enough to affect the plantar fascia. This area is often inflamed and one of the reasons so many people suffer from foot pain. Through ultrasound therapy, the fascia tendons and surrounding tissue can be soothed. In addition, there is an increase in tissue relaxation of the muscles and ligaments. This helps stimulate blood flow and reduces swelling. Because of the increased blood flow, the tissues receive more oxygen and nutrients. In addition, waste in the tissue is removed, helping to heal the area.

Ultrasound is a high frequency sound wave with an affinity for tendons and ligaments (highly organized, without high water content).<sup>16</sup> Ultrasound heats these tissues and the tissues absorb the energy, resulting in an increase in tissue temperature and metabolism, tissue softening, and an increase in circulation.<sup>[16]</sup> Ultrasound has also been purported to increase chemical activity in tissues, increase cell membrane permeability, deform molecular structures, and alter diffusion and protein synthesis rates, all potentially affecting the speed of tissue repair.<sup>[16]</sup>

## MATERIALS AND METHODS

A prospective study was done at Jawaharlal Nehru Medical College, Bhagalpur within a period of one year. Total 80 patients were taken up for the study that completed the follow-up. Patients by random sampling were divided in two groups.

Group A: Conservative ultrasound therapy (n=40)

Group B: Local Steroid Injections group, (n=40)

After taking proper consent from all the patients, they were included in the study.

For the diagnosis, scientific guidelines as given in "Apley's text book of Orthopedics" were followed which state that diagnosis of planter fasciitis is based on the patients history and on results of the physical examination.

In history there is pain and tenderness in the sole of the foot, mostly under the heel, with standing or walking. The condition usually comes on gradually, without any clear incident or injury but sometimes

there is a history of sudden increase in sporting activity, or a change of footwear, sports shoes or running surface. Pain is often worst when first getting up in the morning, or when first getting up from period of sitting- the typical start up pain and stiffness.

On examination tenderness in the heel on weightbearing and firm pressure with thumb by palpation especially at the medial side of heel were two main criteria for the diagnosis of plantar fasciitis.

### Inclusion Criteria

Patients in the age group of 18 to 65 y who fulfilled the above diagnostic criteria were taken up for study.

### Exclusion criteria

Patients of plantar fasciitis in presence of other systemic disease like diabetes mellitus, rheumatoid arthritis, gout etc were excluded from study. Patients with history of trauma, Stress fracture calcaneum, and acute planter fascias rupture cases, patients with neurological pathology, Haglund's deformity cases and flat feet cases. Pregnant women, patient's less than 18 y, and those with history of bleeding disorder or on anti coagulant therapy and cases of bilateral planter fasciitis were also excluded.

## RESULTS

**Table 1: Showing distribution of patients according to their age groups**

S.N.	age groups	n (%)
1.	18-24 yrs.	4(5)
2.	25-35 yrs.	15 (18.75)
3.	36-45 yrs.	40 (50)
4.	46-55 yrs.	15 (18.75)
5.	56-65 yrs.	6 (7.5)

Majority of the patients were found in the age groups of 36 to 45 years of age.

**Table 2: Comparison of treatment outcome at four weeks between Group A and Group B The difference in the distribution of subjects belonging to either of the treatment modalities regarding the treatment outcome at 4 weeks was found to be statistically insignificant**

Treatment	Treatment outcome at 4 weeks			P-value (chi sq test)
	Excellent n (%)	Good n (%)	Fair n (%)	
Ultrasound treatment	25	10	5	0.67
Local Steroid Injections	27	8	5	

Group A-ultrasound comprised ultrasound for eight minutes at an intensity of 0.5w/cm<sup>2</sup>, 3MHz, and pulsed 1:4, twice weekly for four weeks.

Group B- Patients were given local steroid injection in the form of 40 mg methyl prednisone mixed with 1ml of 2% lignocaine at weekly intervals up to three injections after subcutaneous sensitivity test of lignocaine in a sterile atmosphere i.e. minor OT after part preparation.

Both groups followed for 8 weeks. Every 4 weeks.

**Table 3: Comparison of treatment outcome at eight weeks between Group A and Group B The difference in the distribution of subjects belonging to either of the treatment modalities regarding the treatment outcome at 8 weeks was found to be statistically insignificant**

Treatment	Treatment Outcome At 8 Weeks			P-Value (Chi Sq Test)
	Excellent N (%)	Good N (%)	Fair N (%)	
Ultrasound treatment	25	11	4	0.59
Local Steroid Injections	26	13	2	

### Data Analysis

The data was analysed by using SPSS for Windows(version 10.0) by applying the Chi-Square test and p-values of 0.05 and less were considered as significant.

## DISCUSSION

Ultrasound is a high frequency sound wave with an affinity for tendons

and ligaments. Ultrasound heats these tissues and the tissues absorb the energy, resulting in an increase in tissue temperature and metabolism, tissue softening, and increase in circulation. Ultrasound has also been purported to increase chemical activity in tissues, increase cell membrane permeability, deform molecular structures, and alter diffusion and protein synthesis rates, all potentially affecting the speed of tissue repair.<sup>[17]</sup> We had to convince our patients that this modality is compulsory and for this reason they underwent this procedure but their constraint was to visit hospital daily.

Although Steroid injection is the mainstay for the management of many hyper inflammatory disorders, there is little known about steroid affect at the cellular level and, consequently, little about the etiology of the risks of connective tissue rupture after the same.<sup>[18]</sup> A number of complications were noted including planter fascial rupture, planter fat pad atrophy, lateral planter nerve injury secondary to injection, and calcaneal osteomyelitis.

Fascial rupture and fat pad atrophy are especially serious complications. Fascial rupture interrupts the intrinsic windlass mechanism of the foot and can promote further inflammation in the surrounding tissue, thus promoting pain. In addition planter fat pad atrophy diminish hessubcalcaneum cushioning, availing the planter fascia to further insult and, hence, more pain. Because of the recent availability and facility of ultrasound to improve needle placement accuracy in clinical practice, enhanced therapeutic response rates have been reflected in some of the studies. Further limiting the number and frequency of steroid injections and educating patients on reduction of aggressive physical activity during a 2-wk post injection period has been suggested.<sup>[19]</sup> In our patients apprehension was noted for the adverse

effects and also for further increase in pain after local steroid injections. The limitation of our study is that we have a short term outcome results. Long term benefits, are to be still explored.

## CONCLUSION

As both treatment modalities are at par on comparison of their treatment outcome it is better to go for conservative approach because this can save the patients from the complications of steroid therapy.

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