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## A study on clinical profile of patients with chronic plantar fasciitis at a Tertiary care hospital

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### Abstract

The plantar fascia gets attached to a relatively small area on the calcaneal tuberosity proximally, distally it attaches to the base of the proximal phalanges of the toes which fans over a greater area. This arrangement exerts a greater pulling force at its proximal attachment site. Hence the maximum site of pain is at the calcaneum. This force creates a pull on the periosteum of the calcaneum. 100 patients with chronic plantar fasciitis who had failed extensive traditional non-operative treatment were randomized into 2 groups for prospective treatment and evaluation group 1 was treated with freshly prepared autologous PRP, group 2 was injected 40 mg 1 ml of Methylprednisolone. Mean age group was 42.18yrs for PRP group and 49.08yrs for Steroid group, and the total mean age was 45.76yrs. In the study group, mean weight was 66.14 kg for PRP group and 61.41 kg for steroid group.

**Keywords:** chronic plantar fasciitis, calcaneal tuberosity, methylprednisolone

### Introduction

Repetitive tensile overload of the plantar fascia at its attachment to the calcaneum leads to pathological changes similar to that seen in inflammation and degeneration. The pathology passes through a cascade of events including inflammation and degeneration. There may be an association with heel cord contracture. But the real cause for the pain in chronic plantar fasciitis seems to be unclear till date. According to some authors, the primary pathology in this condition is degeneration of the plantar fascia rather than true inflammation seen in acute conditions.

The plantar fascia gets attached to a relatively small area on the calcaneal tuberosity proximally, distally it attaches to the base of the proximal phalanges of the toes which fans over a greater area. This arrangement exerts a greater pulling force at its proximal attachment site. Hence the maximum site of pain is at the calcaneum. This force creates a pull on the periosteum of the calcaneum<sup>[1, 2]</sup>.

Periosteum is a pain sensitive part richly innervated by nerve fibres, explaining the pain of plantar fasciitis. There also exists fibrous continuity of the plantar fascia into the bony matrix of the calcaneum thereby stimulating the over growth of new bone and resulting in the formation of a heel spur. The pathological changes are similar to that for other chronic tendinopathies and include inflammation, collagen degeneration, increase in ground substance and vascularity<sup>[3]</sup>.

The cause of plantar heel pain is complex and multifactorial. Plantar fasciitis is considered to be the most common patho-mechanism of a painful plantar heel. Plantar fasciitis has been related with increased intraosseous pressure of the os calcis and the presence of calcaneal spurs. However, whether inferior calcaneal spurs have a true association with plantar fasciitis has been debated. Chronic plantar pain has most frequently resulted from repetitive microtrauma or compression of neurologic structures. An excessive pronation has been the most common mechanical cause of structural strain resulting in plantar fasciitis. Forman and Green reported that the malfunctioning of intrinsic musculature was the direct cause of biomechanically induced calcaneal spurs<sup>[4]</sup>.

Heel spurs develop as a result of bony outgrowth at the site of attachment of the plantar fascia to the calcaneum. The stress is maximal in the plantar fascia at its calcaneal attachment, their repetitive over pull results in bony overgrowth.

Heel spurs usually occur in middle aged people and in athletes. It can occur at an even younger age group. This is due to the repeated stress on their heels. Abnormal gait will lead to its development. In persons with abnormal gait pattern, the foot strikes the ground regularly in an unusual manner that leads to repeated stress and stretching of the plantar fascia that result in bony overgrowth leading to the development of a heel spur [5, 6].

**Methodology**

100 patients with chronic plantar fasciitis who had failed extensive traditional non-operative treatment were randomized into 2 groups for prospective treatment and evaluation group 1 was treated with freshly prepared autologous PRP, group 2 was injected 40 mg 1 ml of Methylprednisolone (Depomedrol, Pfizer).

All patients gave informed consent for the study and the study was approved by the institutional ethical committee.

All patients were screened with plain X-ray of ankle joint lateral view and with basic investigation like Haemoglobin, Random blood sugar, Lipid profile and Renal Profile to the inclusion criteria.

In this study, 18 cc venous blood sample was obtained from cubital vein of the patient and mixed with 2cc of anticoagulant Acid citrate dextrose solution (ACD), to prevent clotting of the sample and to prevent platelet activation prior to its use. Here used double spin method, soft and hard spin. This sample was then centrifuged at 1500 rpm for 12 minutes using a soft spin technique to minimize mechanical damage to the platelets. And the upper layer and intermediate layer with few RBCs are transferred to sterile container then the hard spin centrifuge done at 3000 rpm for 10 min. the platelet poor plasma was discarded the lower one third plasma and platelet pellets was taken and transferred to injection syringe with 18 gauge needle. It is about 2.5 to 3cc PRP ready for use. This PRP is unbuffered and un activated. With the patient lying in a supine position, the injury zone was peppered in both groups using 2% chlorhexidine gluconate 70% isopropyl alcohol and then a local anaesthetic field block was performed by the same individual in all cases using a 23 gauge needle with a total of 6 cc of 0.5% w/v Bupivacaine. The block was placed medially with 2 cc of 0.5% Bupivacaine injected into the skin, 2 cc into the fascial tissue, and 2 cc into the periosteum of the medial calcaneal tubercle.

Following aseptic preparation of the skin, injection given either with PRP obtained from preparation with said procedure or with Depo Medrol obtained from pharmacy infiltrated into the lesion, later patients were placed into a Walker brace, CAM boot or MCR footwear for 2 weeks and allowed to return to activities as tolerated along with a daily home eccentric exercise and calf stretching regimen in both the groups.

Nonsteroidal anti-inflammatory drugs use was not permitted during the first 2 weeks after treatment and was discouraged throughout the entire study period in particularly with PRP group. No other treatment modalities were used during the study except exercises and footwear.

Interval AOFAS hindfoot scoring data, VAS and RM scoring done and physical examinations were conducted with clinical symptoms and pain status assessed and compared with pre

injection status. Pre and post injection status assessed. Periodically at 2<sup>nd</sup>week, 4<sup>th</sup>week, 12<sup>th</sup>week, and 24<sup>th</sup>week after treatment with said scores.

**Inclusion criteria**

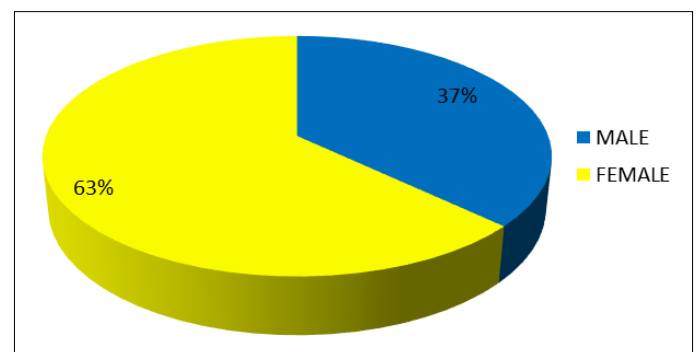
The patients included in our study are between 18-60 years old, have pain and tenderness centered on the medial tubercle of the calcaneum on weight bearing after rest which resolved either partly or fully after activity, Patient using orthoses, insoles, pads were also included in our study.

**Exclusion criteria**

- Those who received local steroid Injection within last 6 months, non-steroidal anti-inflammatory therapy within one week prior to therapy.
- Who are having significant cardiovascular disease, renal or hepatic disease, local malignancy and anemia?
- Those who have undergone previous surgery for plantar fasciitis.
- Patients who are having diabetes, vascular insufficiency or neuropathy.

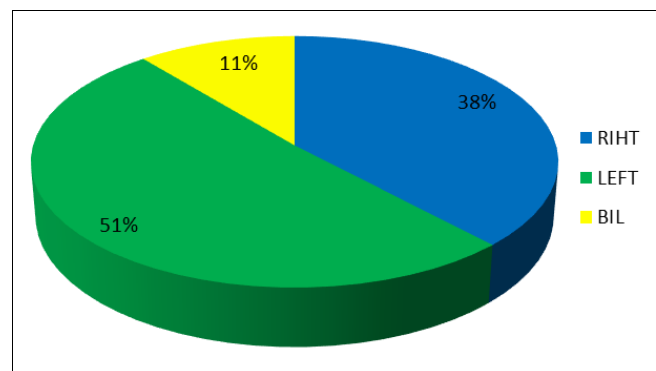
**Results**

Gender prevalence of Plantar fasciitis, in the study group 63% were females and 37% were males suggests that females are more prone to have the plantar fasciitis.



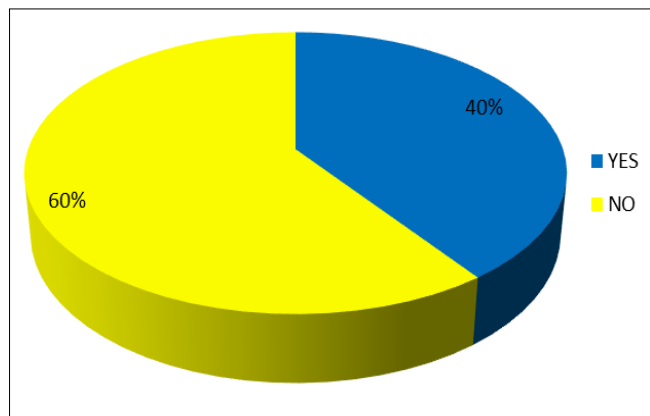
**Graph 1: Gender**

In the study group of 100, 51 were left side, 38 were right foot and 11 were bilateral affections.



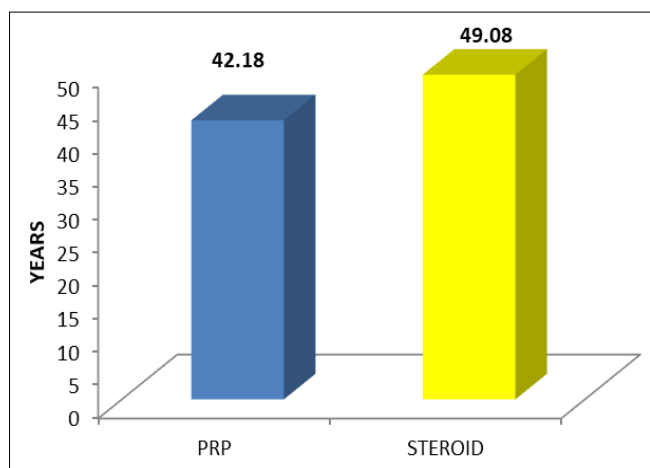
**Graph 2: Side affected**

In the study group 40 percent were associated with calcaneal spur.



**Graph 3:** Calcaneal spur

Mean age group was 42.18yrs for PRP group and 49.08yrs for Steroid group, and the total mean age was 45.76yrs.

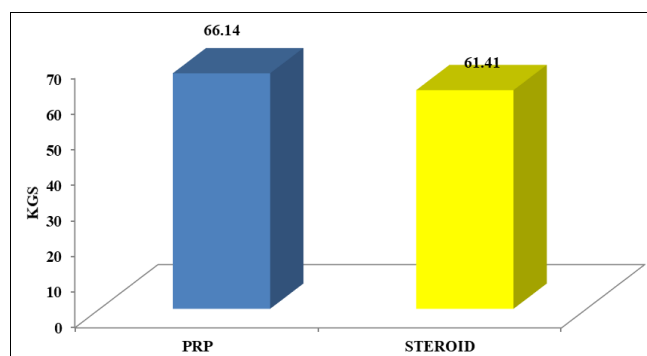


**Graph 4:** Mean Age

**Table 1:** Mean Age Pattern

	PRP	STEROID	Total
	Mean (SD)	Mean (SD)	Mean (SD)
AGE	42.18 (9.57)	49.08 (8.49)	45.56 (9.65)
WT(KGS)	66.14 (10.05)	61.41 (10.37)	63.82 (10.43)

In the study group, mean weight was 66.14 kg for PRP group and 61.41 kg for steroid group.



**Graph 5:** Mean weight

**Discussion**

In our prospective randomized, longitudinal case series, the use of local PRP injection proved more successfully than

Cortisone injection in the long-term management of severe chronic plantar fasciitis in cases where prolonged traditional non operative treatment had failed. The likely mechanism of this effect is the release of growth factors and chemo attractants from the highly concentrated platelets in the plantar fascial injury zone. These platelet nests may act as rally points for the local recruitment of macrophages and fibroblasts to gradually repair the damaged collagen of the tendon following platelet activation. This can lead to modulation of angiogenesis and local blood flow to assist correction of a failed healing response. Collagen processing is improved with the in-migration of fibroblasts [7]. The finding that the more improvement seen in our patients occurred in the first month following the PRP injection suggests an early anti-inflammatory effect possibly due to the inhibition of cyclo-oxygenase-2 (COX-2) enzymes by the cytokines in PRP. The long-term excellent durability of clinical success in the PRP group in this 1-year study may be the result of improved collagen up regulation and neovascularization. In contrast to the encouraging results demonstrated in the PRP group in this study, the cortisone group long-term results were less satisfied. Although initial results initial days of post injection were encouraging, subsequent clinical scoring later not sustained. The strengths of this study are its randomized and prospective longitudinal nature, the long length of follow-up, and its high subject retention rate. Since similar injection techniques were used in both groups, it is unlikely that the long-term clinical success of PRP treatment over cortisone in this study was due to any mechanical effects as described in dry needling or brisement procedures [8]. The accelerated healing and recovery seen in the use of PRP in plantar fasciitis has also been seen in studies focusing on utilizing PRP to augment. Future research will focus on optimization of the growth factor concentration in PRP, the effects of white blood cells, and the systemic results of PRP treatment. Despite the long-term success of PRP in treating these cases of chronic severe plantar fasciitis, the fundamental treatment paradigm of rest, ice, ankle exercise, activity modification, and selective immobilization is still successful in the majority of patients with mild to moderate disease and should not be abandoned. Based on the findings in this report, cortisone injection can be expected to provide only temporary relief from the symptoms of plantar fasciitis and is unlikely to improve long term clinical results in the treatment of this condition.

Kawshik Jain *et al.* [9] reported the age range of patients in his study was 31-79 years The mean age was 55.6 years.

In our study the age range is 25-59 years (18-60 years inclusion criteria) the mean age for PRP 42.18years and for steroid is 49.08 years this is comparable to the above said study.

In the same study among 60 patients categorized male female ratio to be 1:2.

In our study female constitutes 63% and male to be 37%. So relating the same sex ratio.

Side affected in our study in both the groups 51% are left side involved. 38% are right side involvement and bilateral in 11% patients.

According to R Kevin L *et al.* [10] Indian population with heel pain found to be associated with calcaneal spur in 59%. In my study among 100 patients 40% had a calcaneal spur and 60% are without spur.

**Conclusion**

- Mean age group is 42.16 for PRP 49.08 for steroid group

total mean 45.76 Gender preponderance 63 female and 37 males.

- Side involvement is left 51 and right 38 bilateral 11.
- Mean weight 63.75.
- Calcaneal spur in 40% of the plantar fasciitis patients.

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