

## A prospective comparative study of platelet rich plasma vs. Steroid injection in plantar fasciitis

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### Abstract

**Background:** Plantar Fasciitis is one of the commonest causes of heel pain and can be very challenging for clinicians to treat it successfully in the long run. The results of using autologous platelet-rich plasma (PRP) to treat chronic plantar fasciitis have been very encouraging. The aim of study was to assess the effectiveness of PRP vs. steroid infiltration on functional activity and pain in patients with Planter fasciitis.

**Method:** A hospital based prospective, interventional study was conducted on 50 patients from December 2020 to April 2022. The study was done at our tertiary care Centre in the department of Orthopaedics, Gandhi medical college (GMC), Hamidia Hospital, Bhopal (MP) attending OPD/IPD. Permission from Institutional Ethics Committee and Review Board was taken. Improvement in both corticosteroid and PRP groups in terms of AOFAS and VAS scores was observed at 6 weeks, 12 weeks and 6 months from the baseline.

**Result:** Post injection, there was significant improvement of visual analog score, AOFAS ankle-hind foot score in both the groups. However, with the numbers available, no significant difference in improvement could be detected between the above-mentioned variables in the 2 groups.

**Conclusion:** We found that the treatment of plantar fasciitis with steroid or PRP injection was equally effective.

**Keywords:** planter fasciitis, PRP therapy, corticosteroid

### Introduction

Plantar fasciitis is one of the most common causes of heel pain that an orthopedician faces in the outpatient department.[1] The pathophysiology remains poorly understood, but appears similar to Achilles tendinopathy with microscopic degenerative injury and local disruption of the collagen matrix and microtears, rather than a failed healing response[2]. Plantar fasciitis causes pain which may be acute or chronic, in the inferior aspect of the heel at the attachment of the plantar fascia's medial band to the medial calcaneal tubercle[3]. Incidence of plantar fasciitis occurs between 40 and 60 years of age in both genders. Pain is sharp and gradual in onset along the medial aspect of the heel which intensifies with the steps taken freshly out of bed in the morning while the pain abates as the person takes rest[4]. This condition is

diagnosed mainly based on clinical symptoms comprising of pain and tightness over the heel, so the diagnostic imaging is not routinely needed[3]. Rest, ice, stretching, orthoses, non-steroidal anti-inflammatory drugs, extracorporeal shock wave therapy, injections (of corticosteroids, botulinum toxin, dextrose, platelet-rich plasma) and surgery are commonly used in the treatment modalities. Almost 90% of patients get better with non-surgical treatment[5]. PRP, derived by centrifuging whole blood, has a platelet concentration higher than that of whole blood, and is thought to stimulate the natural healing process through growth factors contained in the platelets such as platelet derived growth factor, transforming growth factor beta, fibroblast growth factor and insulin like growth factor, initiating and accelerating the natural physiological tissue healing process[2]. The aim of study was to assess the effectiveness of PRP vs. steroid infiltration on functional activity and pain in patients with Planter fasciitis.

### Methodology

A hospital based prospective, interventional study was conducted on 50 patients from December 2020 to April 2022 to assess the effectiveness of platelet-rich plasma (PRP) vs. steroid infiltration on functional activity and pain in patients with planter fasciitis. All Patients with plantar fasciitis diagnosed clinically were included as per inclusion and exclusion criteria. The patients were selected randomly and were divided in the following two groups of 25 patients each ( PRP 25 patients) and (Steroid 25 patients). The study was done at our tertiary care Centre in the department of Orthopaedics, Gandhi medical college (GMC), Hamidia Hospital, Bhopal (MP) attending OPD/IPD. Permission from Institutional Ethics Committee and Review Board was taken.

After approval from the Institutional Ethics Committee a valid informed consent was taken. Once the patients were enrolled for the study, a thorough history and physical examination was done. **Material used for Assessment:**

- American Orthopaedic Foot and Ankle Society Scale (AOFAS)
- Visual analogue scale (VAS)

**Procedure for PRP:** During the actual procedure, the preparation (Platelet rich plasma (PRP)) can be performed in the minor operating theatre and takes about 20 minutes. 20 ml of blood was withdrawn from the antecubital vein under all aseptic precautions and was transferred to the EDTA-coated test tube. Using 20 ml of venous autologous blood, this is a standard double spin process. Then, 5 mL of blood was transferred to 4 EDTA tubes and “centrifuged” for 10 minutes at 1200 rpm. Subsequently transferring the upper buffy layer in plane tubes and further re-centrifuged for 10 minutes at 2000 rpm which separates PRP and WBC as PRP settles down and then extracting 2-4ml of PRP. The centrifuge system used is a simple, non-cooled machine. The centrifuge process is standard with balancing tubes in place. This autologous PRP is then utilized for the treatment of patients with plantar fasciitis.

**Procedure for steroid:** Steroid used was 2mL of Depo-Medrol (80 mg methylprednisolone) locally. Under aseptic precautions 1% lidocaine (Xylocaine) 2-3mL of local anesthesia (AST) was delivered to the point of maximum tenderness. Gentle massage was done. The injection was injected from medial aspect of heel to the point of maximum tenderness from a 2 ml syringe.

**Post Injection protocol:** At-least 3 days after injection all patients were advised to stop any vigorous or sportive activity. If necessary, icing was recommended and painkiller SOS. Physiotherapy was advised for all patients once the pain has subsided.

The results were evaluated and compared using visual VAS, AOFAS at 0 weeks, 4 weeks and 12 weeks, 24 weeks post injection.

**Statistical analysis:** Quantitative data is provided with the aid of the Mean and Standard deviations. The relation between study groups is conducted with the aid of an unpaired t test

as per the results of the normality test. Qualitative data is provided using the frequency and percentage table. The relationship of the research groups is tested with the aid of the Fisher test, the Student 't' test and the Chi-Square test. 'p' value less than 0.05 was statistically significant. Data was entered in MS Excel sheet and was analysed in SPSS 20 software.

### Result

Mean age of patients in PRP group was 47.4 years while Mean age in steroid group was 43.7 years. It was observed that in males were 20% in both group and females were 30% in both groups. It was also observed that planter fasciitis accounted more in housewife and labour as seen in table 1. Majority of patients in PRP group had normal BMI. PRP was more given to Obese patient and steroid was more given to over weight patients.

**Table 1: demographic distribution of patient**

		PRP/Steroid	Counts	% of Total
Sex	F	PRP	15	30.0 %
		STEROID	15	30.0 %
	M	PRP	10	20.0 %
		STEROID	10	20.0 %
Occupation	Bussinessman	PRP	2	4.0 %
		STEROID	3	6.0 %
	HW	PRP	8	16.0 %
		STEROID	8	16.0 %
	Labour	PRP	8	16.0 %
		STEROID	8	16.0 %
	Student	PRP	6	12.0 %
		STEROID	0	0.0 %
Teacher	PRP	1	2.0 %	
	STEROID	6	12.0 %	
Body weight	Normal	PRP	12	24.0 %
		STEROID	5	10.0 %
	Obese	PRP	8	16.0 %
		STEROID	6	12.0 %
	Over weight	PRP	5	10.0 %
		STEROID	14	28.0 %

It was observed that there was a dominance of left side in both the groups as seen in table 2. It was observed that mean duration of symptoms of planter fasciitis in both groups was 4.72 months as seen in table 3

**Table 2: distribution of patient according to laterality**

Laterality	PRP/Steroid	Counts	% of Total
B/L	PRP	8	16.0 %
	STEROID	8	16.0 %
LEFT	PRP	13	26.0 %
	STEROID	13	26.0 %
RIGHT	PRP	4	8.0 %
	STEROID	4	8.0 %

**Table 3: Distribution of patient acc to duration of symptoms**

Duration of symptom	PRP/Steroid	Counts	% of Total
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1 MONTHS	PRP	5	10.0 %
	STEROID	5	10.0 %
3 MONTHS	PRP	6	12.0 %
	STEROID	6	12.0 %
6 MONTHS	PRP	14	28.0 %
	STEROID	14	28.0 %

While comparing American Orthopaedic Foot and Ankle Society Scale (AOFAS) in PRP group and Steroid Group during Follow-up Period it was observed that AOFAS score in PRP group significantly increases in weeks so as for steroid mean score increases significantly with weeks as seen in table 4. While comparing mean score of PRP and steroid group, It shows that mean score is higher in PRP group in 6 month but was not significant.

**Table 4: AOFAS score in PRP and steroid group in 0, 4, 12, 24 weeks**

PRP		N	Mean	SD	p value
AOFAS 0 weeks	PRP	25	72.6	4.38	-
AOFAS 4 weeks	PRP	25	80.8	4.28	<0.05
AOFAS 12 weeks	PRP	25	88.4	3.86	<0.05
AOFAS 24 weeks	PRP	25	93.2	3.4	<0.05
Steroid		N	Mean	SD	p value
AOFAS 0 weeks	STEROID	25	74.7	6.47	-
AOFAS 4 weeks	STEROID	25	80.8	6.3	<0.05
AOFAS 12 weeks	STEROID	25	87	7.19	<0.05
AOFAS 24 weeks	STEROID	25	91	9.49	<0.05

VAS score in PRP group with increase in weeks of follow up VAS score significantly decreases. So as for steroid group VAS score mean VAS score decreases with increase in weeks of follow up significantly as seen in table 5.

**Table 5: VAS score of PRP and steroid group in 0,4,12,24 weeks**

PRP		N	Mean	SD	p value
VAS 0	PRP	25	8.28	1.061	-
VAS 4 week	PRP	25	5.64	1.075	<0.05
VAS 12 weeks	PRP	25	3.72	0.936	<0.05
VAS 24 week	PRP	25	1.8	0.816	<0.05
Steroid		N	Mean	SD	p value
VAS 0	STEROID	25	8	1.08	-
VAS 4 week	STEROID	25	4.56	0.507	<0.05
VAS 12 weeks	STEROID	25	2.72	0.678	<0.05
VAS 24 week	STEROID	25	1.28	0.458	<0.05

## Discussion

A common musculoskeletal condition seen in daily orthopaedic practise is plantar fasciitis. Acute or chronic plantar fasciitis with heel pain can be very disabling. It has a significant impact on patients' quality of life. There are numerous therapeutic options now being used. Typically, bracing and physical therapy are advised. The fascia is damaged both locally and permanently by CSIs, the effectiveness of which is still up for debate. PRP has been employed in a variety of therapeutic settings since the introduction of biological treatments to orthopaedics, including bone graft augmentation, wound healing, wound hemostasis, accelerated healing of anterior cruciate ligament injuries, and tendinosis therapy

augmentation. Weight loss should be advised in cases of plantar fasciitis that don't go away[6].

In study by Upadhyay S et al [7] among 140 heels with follow up duration of 6 months. The score on VAS scale and AOFAS improved from base line for both group but the patients received PRP therapy had a statistically significant ( $p < 0.05$ ) reduction in pain and improved AOFAS score at last follow up. The result of present study showed that the PRP therapy has potential to reduce pain and improve the functional outcome in cases of chronic plantar fasciitis. However It was found that both are effective. The score on VAS scale and AOFAS improved from base line for both group significantly.

Both methods were effective and successful in treating plantar fasciitis. Although there is no complication related to steroids was observed, when the potential risks of corticosteroid such as fat pad atrophy, osteomyelitis of the calcaneus, and iatrogenic rupture of the plantar fascia are taken into consideration, PRP injection seems to be safer while being just as effective in the treatment of plantar fasciitis.

kşahin et al have shown that treatment with PRP and corticosteroids is similar at a 6-month follow-up, whereas Vahdatpour B et al have demonstrated superior results with PRP treatment over corticosteroids at the 6-month follow-up.[8,9] Another study by Acosta-Olivo et al have shown improved functional outcome in both groups over a period of 16 weeks, but no significance difference was observed between the groups, whereas Monto has observed significant improvement in functional outcome of the PRP group compared to the corticosteroid group throughout a follow-up of 2 years[10,11].

The study was mainly based on clinical observations. USG and MRI documentation was not used in our study. As such quantitative improvement of the facial thickness and facial healing was not documented. Long term effects were not observed as the duration of study was limited to 6 months. Compliance with the home rehabilitation program and its impact on results was not measured.

### **Conclusion**

we conclude that the administration of PRP in plantar fasciitis treatment appears to be a similarly effective method as steroid injection for the reduction of pain and provide better functional results at 6-month follow-up. However, prospective and randomized studies are main strength for results and also, long-term follow-up are needed.

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### **Conflict of interest**

None declared

### **Ethical approval**

The study was approved by the Institutional Ethics Committee

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