



# International Journal of Orthopaedics Sciences

E-ISSN: 2395-1958  
P-ISSN: 2706-6630  
IJOS 2024; 10(1): 177-181  
© 2024 IJOS  
<https://www.orthopaper.com>  
Received: 09-12-2023  
Accepted: 14-01-2024

**Dr. Mouneshwaran R**  
Department of Orthopaedics, Sri  
Lakshmi Narayana Institute of  
Medical Sciences, Puducherry,  
India

**Dr. Vijayaragavan R**  
Professor and HOD, Department  
of Orthopaedics, Sri Lakshmi  
Narayana Institute of Medical  
Sciences, Puducherry, India

## A comparative study of functional outcome of single dose intra-lesional platelet rich plasma injection versus single dose corticosteroid injection for plantar fasciitis

**Dr. Mouneshwaran R and Dr. Vijayaragavan R**

**DOI:** <https://doi.org/10.22271/ortho.2024.v10.i1c.3516>

### Abstract

**Background:** Plantar fasciitis is a common cause of heel pain. In some cases, it can lead to significant morbidity and then invasive procedures like Platelet Rich Plasma (PRP) injection and/or intralesional steroid injection are required, in whom conservative treatment is unresponsive. It is still controversial whether PRP is more effective in reducing pain and also improving the function compared to intralesional steroid.

**Aims & Objectives:** To determine efficacy of single dose Intralesional-PRP injection and single dose Intralesional-Corticosteroid injection, also to compare the efficacy between the both in Plantar fasciitis based on the functional outcome by Visual Analogue Pain scale (VAS) at end of 2weeks, 3rd months and 6th months.

**Methodology:** A comparative study on skeletally mature patients with plantar fasciitis who had underwent conservative therapy but failed, were randomized into 2 groups: PRP and Steroid group. Using Visual Analog Scale (VAS), participants were assessed for pain on the Day of presentation, and then after therapy at 2 weeks, 3 months and 6 months.

**Results:** Total of 60 patients were included in the study and randomized into 2 groups -30 for steroid group and 30 for PRP group. Results showed that VAS of PRP group was significantly lower than that of steroid group at 2weeks, 3months and 6 months. PRP was associated with great improvement in VAS score at 6months compared to steroid injection. The result and difference were more pronounced as the time from injection increased and maximal benefit was observed at 6 months follow-up. None of the patients needed a repeat injection at 6 months.

**Conclusion:** PRP injections provide better pain relief and function, compared to corticosteroids, in patients with plantar fasciitis. On comparison with previous studies, results were almost similar that is superiority of PRP over steroid injection in plantar fasciitis.

**Keywords:** Corticosteroid injection, complications, functional outcome, platelet rich plasma, plantar fasciitis

### Introduction

The disorder known as plantar fasciitis (PF), or plantar fasciosis <sup>[1]</sup>, is characterised by the degeneration and inflammation of the plantar fascia <sup>[2]</sup>. The biomechanical strain on the plantar fascia is the main cause of it <sup>[3]</sup>. Mainly made up of a rich extracellular matrix of hyaluronan, the plantar fascia is a thin, elastic band of fibrous connective tissue that is longitudinally orientated. Stecco *et al.* (2018) first discovered the novel cell known as fasciocytes in the plantar fascia. It is in charge of generating hyaluronan, which makes it easier for the deep fascia and muscle to glide over one another <sup>[4]</sup>.

Through the heel periosteum, the plantar fascia and Achilles' paratendon are closely connected. It is bilateral in 30% of cases. The incidence of athlete-related disorders peaks younger, between the ages of 40 and 60 <sup>[5]</sup>. Due to a disease that affects the plantar fascia's origin at the medial calcaneal tuberosity, the discomfort is localised there. The aetiology is complicated and little understood. Known risk factors include obesity, poor foot and ankle biomechanics, flat feet, prolonged standing, jumping, running, and badly fitted footwear. One category of systemic illness that can be connected to or distinguished from plantar fasciitis is seronegative spondyloarthropathies <sup>[6,7]</sup>.

**Corresponding Author:**  
**Dr. Mouneshwaran R**  
Department of Orthopaedics, Sri  
Lakshmi Narayana Institute of  
Medical Sciences, Puducherry,  
India

Recently, autologous platelet rich plasma (PRP) has been proposed as a treatment for plantar fasciitis because it contains a number of growth factors and cytokines that may trigger local factors to speed up the healing process [8]. Autologous PRP has no negative consequences, in contrast to steroid injections. Thus far, PRP injections have shown promising results in several studies. This prospective case series employs the VAS score for heel pain, functional outcome scores, and ultrasonographic (USG) measurement of plantar fascia thickness as an outcome measure to ascertain the genuine efficacy of a single local PRP injection in the treatment of plantar fasciitis [9]. It is still controversial whether PRP is more effective in reducing pain and also improving the function compared to intralesional steroid, therefore this research was conducted.

### Aims & Objectives

To determine efficacy of single dose Intralesional-PRP injection and single dose Intralesional-Corticosteroid injection, also to compare the efficacy between the both in Plantar fasciitis based on the functional outcome by Visual Analogue Pain scale (VAS) at end of 2weeks, 3rd months and 6<sup>th</sup> months.

### Methodology

A Prospective parallel group comparative study (Randomized control trials) was conducted among 60 patients at Department of Orthopaedics attached to Sri Lakshmi Narayana Institute of medical sciences, Puducherry from August 2022 to December 2023. A comparative study on Skeletally mature 60 patients with plantar fasciitis who had underwent conservative therapy but failed, were randomized into 2 groups: Group A - PRP (30 patients) and Group B - Steroid group (30 Patients). Using Visual Analog Scale (VAS), participants were assessed for pain on the Day of presentation, and then after therapy at 2 weeks, 3 months and 6 months. Patients requiring bilateral injections, those with related pathologies, uncontrolled diabetes, inflammatory or degenerative osteoarthritis, neurological disorders, skin infections, or a history of infection at the application site within the previous three months were all excluded.

### PRP Preparation method [10]

PRP is obtained from a sample of patients' blood drawn at the time of treatment. A 30 cc venous blood draw will yield 3-5 cc of PRP depending on the baseline platelet count of an individual, the device used, and the technique employed. The blood draw occurs with the addition of an anticoagulant, such as citrate dextrose A to prevent platelet activation prior to its use. PRP is prepared by a process known as differential centrifugation. In differential centrifugation, acceleration force is adjusted to sediment certain cellular constituents based on different specific gravity.

The Institutional Ethical Committee permission was taken prior to the study. The written informed consent was taken from all study participants.

### Data entry & Data analysis

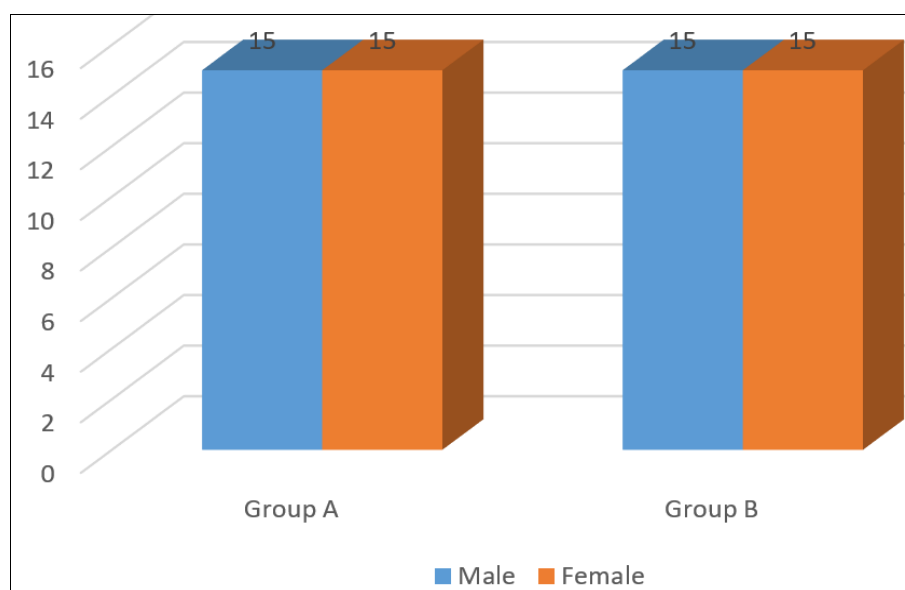
Data were entered using Microsoft Excel and analysed using the Statistical Package for Social Science (SPSS) standard version 26. All continuous variables were summarized using Mean & SD. Categorical variables were summarized using frequency and proportions. Comparison of Quantitative variables across study groups was done using t-test. P-value of <0.05 was considered statistically significant.

### Results

**Table 1:** Age group wise distribution of study participants

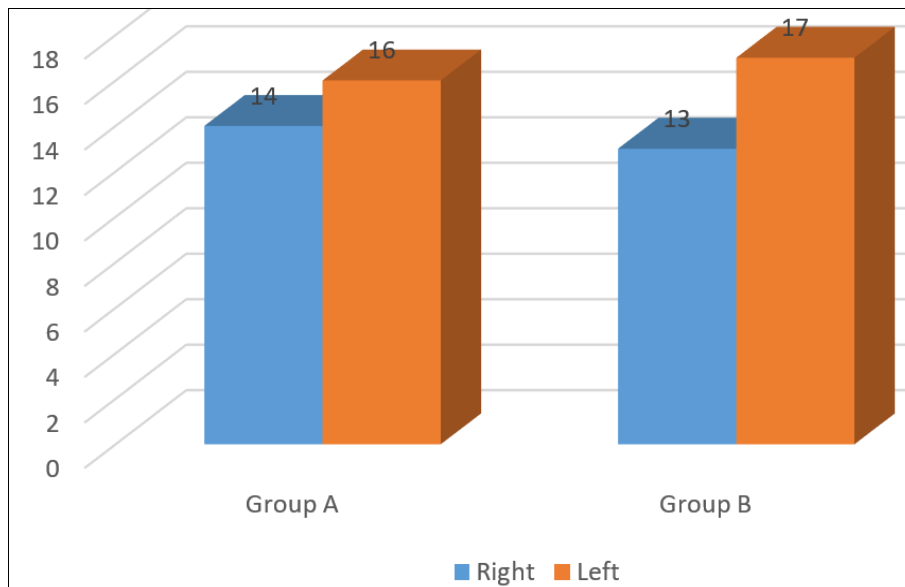
Age group (in years)	Group A	Group B
31-40	9 (15)	9 (15)
41-50	17 (28.3)	19 (31.6)
>50	4 (6.7)	2 (3.3)

Among the study participants, in Group A 17 (28.3%) patients and in group B 19(31.6%) patients were belonged to 41-50 years of age group. The mean age of study participants was respectively,  $43.8 \pm 4.7$  and  $42.9 \pm 3.8$  years in group A and B. [Table 1]



**Fig 1:** Gender wise distribution

In both groups, 50% were males and 50% were females. [Figure 1]



**Fig 2:** Affected side among study participants

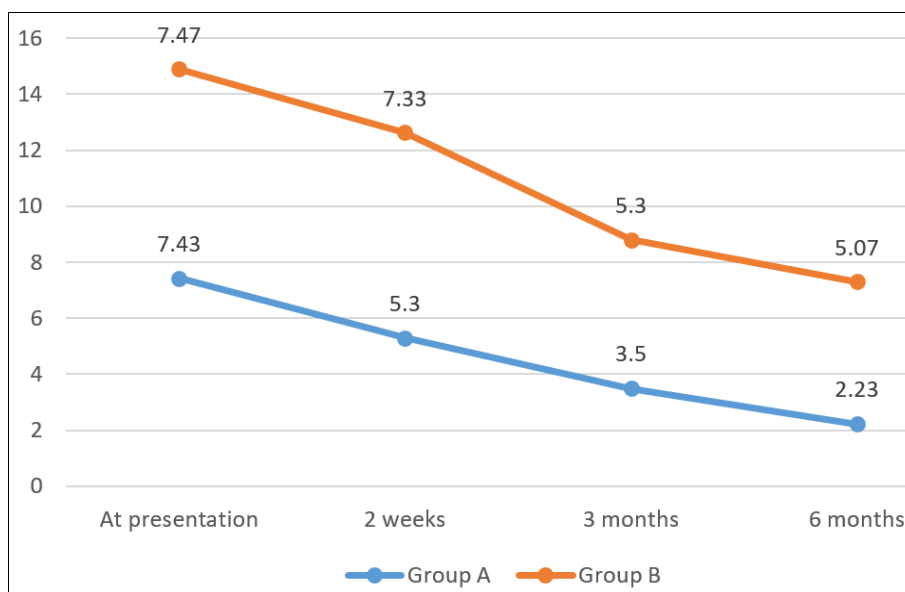
Out of total, 16 cases in group A and 17 cases in group B were affected on left side, while 14 cases in group A and 13 cases in group B affected on Right side. [Figure 2]

**Table 2:** Comparison of VAS Score among both groups.

VAS Score	Group A	Group B	p-value
At presentation	7.43 ± 1.06	7.47 ± 1.07	0.884
2 weeks	5.3 ± 1.31	7.33 ± 1.06	0.0001
3 months	3.5 ± 1.04	5.3 ± 1.3	0.0001
6 months	2.23 ± 0.9	5.07 ± 1.4	0.0001

At a time of presentation, there was no statistically significant difference found between mean VAS score among both groups. But after follow up of 2 weeks, 3 months and 6

months there was statistically significant difference found between mean VAS score among both groups. [Table 2]



**Fig 3:** Comparison of VAS Score

At a time of presentation, there is almost same VAS score among both groups. After treatment and in follow up visits, there is significant decreased VAS Score in Group A compared to Group B so, PRP method is found to be more effective treatment for plantar fasciitis. [Figure 3]

**Discussion**

In present study, among the study participants, in group A 17

(28.3%) patients and in group B 19(31.6%) patients belonged to 41-50 years of age group. The mean age of study participants was respectively, 43.8 ± 4.7 and 42.9 ± 3.8 years in group A and B. In both groups, 50% were males and 50% were females. Out of total,16 cases in group A and 17 cases in group B were affected on left side, while 14 cases in group A and 13 cases in group B affected on right side. While in study of Kalia RB *et al.*,<sup>[11]</sup> the mean age was 39 years (range 20–

55 years). Females were predominantly affected and right foot was more commonly involved. These findings differ from other studies due to different admission rate among various hospitals.

At the time of presentation, there was no statistically significant difference found between mean VAS score among both groups. But after follow up of 2 weeks, 3 months and 6 months there was statistically significant difference found between mean VAS score among both groups. After treatment and in follow up visits, there was significant decrease in VAS Score in Group A compared to Group B, So PRP method is more effective treatment for plantar fasciitis. At six months following the injection, the baseline RM score, VAS score, and AOFAS improved from mean 4 to 2 ( $p < 0.001$ ), 7.7 to 4.2 ( $p < 0.001$ ), and 60.6 to 81.9 ( $p < 0.001$ ), respectively, according to Kumar *et al.*'s case series of 44 patients treated with a single PRP injection. According to the findings of all three trials, PRP injections are a highly successful treatment for plantar fasciitis<sup>[12]</sup>. The mean VAS, AOFAS, and RM scores at the 12-month follow-up were 3.3, 88.5, and 1.9 in the PRP group and 5.3, 75, and 2.6 in the steroid group, respectively, according to an RCT by Jain *et al.*<sup>[13]</sup> comparing PRP with steroid injections. This difference was statistically significant.

The primary goals of treating plantar fasciitis are pain relief and improved function. Conservative therapies, such as activity restriction, NSAIDs, ice application, arch support, splinting/strapping, deep tissue massage, plantar fascia stretching exercises, and physical therapy to relieve symptoms, are the principal treatments for plantar fasciitis<sup>[14]</sup>. Exercises that stretch the plantar fascia offer a greater degree of symptom relief than using heat, a silicone heel pad, or calf stretching exercises, according to a Gupta *et al.* RCT<sup>[15]</sup>. About 10% of individuals experience persistent symptoms after receiving conservative treatment, which might result in chronic plantar fasciitis. For the treatment of chronic plantar fasciitis, local corticosteroid injections are currently the gold standard due to their good short-term results. Heel discomfort can be effectively reduced by corticosteroids' anti-inflammatory properties. Additionally, they prevent ground substance proteins and fibroblasts from proliferating. While the benefits are substantial, repeated injections are frequently necessary and come with risks such as plantar fascia rupture or tear, abscesses, infection and osteomyelitis, skin pigmentation loss, harm to the nerves and muscles, flare-ups after the injection, and atrophy of the heel fat pad<sup>[16, 17]</sup>.

Plantar fasciitis can now be treated locally with PRP injections, which contains abundant growth factor (PDGF, VEGF, and TGF)s, interleukins and anti-inflammatory cytokines that promote healing at the site of plantar fascia degeneration and reduce symptoms. The optimal time to inject PRP is when the damaged heel is at its most tender<sup>[18]</sup>.

## Conclusion

Short-term outcomes of single dose PRP injection in chronic plantar fasciitis were observed, along with clinically and statistically substantial improvements in heel pain VAS scores, functional outcome scores, and restoration of plantar fascia thickness as demonstrated by USG tests. For patients with plantar fasciitis, PRP injections offer superior function and pain alleviation than corticosteroids.

## References

- Schwartz EN, Su J. Plantar fasciitis: A concise review. Perm J., 2014, 18.
- Alanazi M, Khan R, Muqri A, Alnosaier Z, Dalak M, Alajlani S, *et al.* Plantar fasciitis in primary care: A review. Int. J Med. Dev. Ctries. 2022;6(7):1002-5.
- Luffy L, Grosel J, Thomas R, So E. Plantar fasciitis: A review of treatments. J Am Acad. Physician Assist. 2018;31:20-4.
- Chen CM, Lee M, Lin CH, Chang CH, Lin CH. Comparative efficacy of corticosteroid injection and non-invasive treatments for plantar fasciitis: A systematic review and meta-analysis. Sci. Rep., 2018, 8.
- Todros S, Biz C, Ruggieri P, Pavan PG. Experimental analysis of plantar fascia mechanical properties in subjects with foot pathologies. Appl. Sci. 2021;11:1-11.
- Stecco C, Fede C, Macchi V, Porzionato A, Petrelli L, Biz C, *et al.* The fasciocytes: A new cell devoted to fascial gliding regulation. Clin. Anat. 2018;31:667-76.
- Stecco C, Corradin M, Macchi V, Morra A, Porzionato A, Biz C, *et al.* Plantar fascia anatomy and its relationship with Achilles tendon and paratenon. J Anat. 2013;223:665-76.
- Poenaru D, Badoiu S, Ionescu A. Therapeutic considerations for patients with chronic plantar fasciitis (Review). Med Int., 2021, 1.
- Cotchett M, Rathleff MS, Dilnot M, Landorf KB, Morrissey D, Barton C. Lived experience and attitudes of people with plantar heel pain: A qualitative exploration. J Foot Ankle Res., 2020, 13.
- Dhurat R, Sukesh M. Principles and Methods of Preparation of Platelet-Rich Plasma: A Review and Author's Perspective. J Cutan. Aesthet. Surg. 2014;7(4):189-97. DOI: 10.4103/0974-2077.150734
- Kalia RB, Singh V, Chowdhury N, Jain A, Singh SK, Das L. Role of Platelet Rich Plasma in Chronic Plantar Fasciitis: A Prospective Study. Indian J Orthop. 2020;55(1):142-148. DOI: 10.1007/s43465-020-00261-w. PMID: 34122767; PMCID: PMC8149543.
- Kumar V, Millar T, Murphy PN, Clough T. The treatment of intractable plantar fasciitis with platelet-rich plasma injection. The Foot (Edinb). 2013;23(2-3):74-77. DOI: 10.1016/j.foot.2013.06.002.
- Jain K, Murphy PN, Clough TM. Platelet rich plasma versus corticosteroid injection for plantar fasciitis: A comparative study. The Foot (Edinb) 2015;25(4):235-237. DOI: 10.1016/j.foot.2015.08.006.
- Cornwall MW, McPoil TG. Plantar fasciitis: etiology and treatment. Journal of Orthopaedic and Sports Physical Therapy. 1999;29(12):756-760. DOI: 10.2519/jospt.1999.29.12.756.
- Gupta R, Malhotra A, Masih GD, Khanna T, Kaur H, Gupta P, *et al.* Comparing the role of different treatment modalities for plantar fasciitis: a double blind randomized controlled trial. Indian Journal of Orthopaedics. 2020;54(1):31-37. DOI: 10.1007/s43465-019-00038-w.
- Beeson P. Plantar fasciopathy: Revisiting the risk factors. Foot and Ankle Surgery. 2014;20(3):160-165. DOI: 10.1016/j.fas.2014.03.003.
- Kirkland P, Beeson P. Use of primary corticosteroid injection in the management of plantar fasciopathy: Is it

time to challenge existing practice? Journal of the American Podiatric Medical Association. 2013;103(5):418-429.  
DOI: 10.7547/1030418.

18. Buchbinder R. Clinical practice. Plantar fasciitis. New England Journal of Medicine. 2004;350(21):2159-2166.  
DOI: 10.1056/NEJMcp032745

**How to Cite This Article**

Mouneshwaran R, Vijayaragavan R. A comparative study of functional outcome of single dose intra-lesional platelet rich plasma injection versus single dose corticosteroid injection for plantar fasciitis. International Journal of Orthopaedics Sciences 2024; 10(1): 177-181.

**Creative Commons (CC) License**

This is an open access journal, and articles are distributed under the terms of the Creative Commons Attribution-NonCommercial-ShareAlike 4.0 International (CC BY-NC-SA 4.0) License, which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.