International Journal of Research in Orthopaedics
Sharma P et al. Int J Res Orthop. 2026 Mar;12(2):386-390
http://www.ijoro.org

DOI: https://dx.doi.org/10.18203/issn.2455-4510.IntJResOrthop20260503

Original Research Article

Efficacy of autologous platelet-rich plasma injection in plantar fasciitis

Pulkit Sharma, Sanjeev Gupta, Nikhil Sharma*

Department of Orthopaedics, Government Medical College, Jammu, Jammu and Kashmir, India

Received: 29 October 2025
Revised: 10 December 2025
Accepted: 15 January 2026

***Correspondence:**
Dr. Nikhil Sharma,
E-mail: happynikhil179@gmail.com

ABSTRACT

Background: Plantar fasciitis (PF) is the most common cause of chronic heel pain in adults, resulting from repetitive micro-trauma and degenerative changes of the plantar fascia. When conservative therapies fail, newer biological modalities such as platelet-rich plasma (PRP) are being explored.
Methods: This prospective study was conducted in the Department of Orthopaedics, Government Medical College, Jammu, over a period of one year in collaboration with the blood bank. Thirty-eight patients with clinically diagnosed plantar fasciitis of ≥3 months' duration, unresponsive to conservative therapy and with a baseline visual analogue scale (VAS) pain score >7, were included. PRP was prepared using the double-spin centrifugation method from 12 mL of autologous venous blood, and 2 ml of PRP were injected at the maximum tender point using the peppering technique. Patients were followed up at 1 week, 1, 2, 4, and 6 months. Pain relief was assessed using the VAS (0–10).
Results: All 38 patients completed a 6-month follow-up. Mean baseline VAS was 8.68±0.47, which decreased to 7.21±1.63 at 1 month, 5.63±2.55 at 2 months, 5.42±2.16 at 4 months, and 5.03±2.43 at 6 months ($p<0.05$). The maximum improvement occurred by the second month and was sustained up to six months. Complete pain relief was achieved in 13.2% of patients by two months, while 78.9% experienced <50% pain reduction. No complications were reported.
Conclusions: Autologous PRP injection is a safe, minimally invasive option for chronic plantar fasciitis, providing modest but sustained pain reduction.

Keywords: Plantar fasciitis, Platelet-rich plasma, Heel pain, Peppering technique, Regenerative therapy

INTRODUCTION

Heel pain is one of the most common complaints in orthopaedic and foot clinics, with plantar fasciitis (PF) accounting for 11-15% of foot-related symptoms. PF affects up to 10% of individuals during their lifetime and is particularly common among middle-aged obese women and younger male athletes.[1] The pathogenesis involves repetitive micro-tears, myxoid degeneration, and chronic inflammation of the plantar fascia due to mechanical overload and the windlass mechanism.[2] Conservative management with NSAIDs, orthotics, stretching exercises, extracorporeal shock-wave therapy, and corticosteroid injections provides symptomatic relief in most cases, but approximately 10% develop chronic refractory disease.[3] While corticosteroid injections may offer short-term pain relief, they carry risks such as plantar fascia rupture and fat-pad atrophy. Recently, platelet-rich plasma (PRP) has emerged as a biological alternative that promotes healing through the release of growth factors such as platelet-derived growth factor, transforming growth factor-β, vascular endothelial growth factor, and epidermal growth factor. These stimulate fibroblast proliferation and collagen synthesis, aiding tissue regeneration. PRP has shown promise in various musculoskeletal disorders, including tendinopathies and ligament injuries.[4] This study aimed to evaluate the efficacy and safety of autologous PRP injection in patients with chronic plantar fasciitis unresponsive to conventional treatment.

METHODS

This was a prospective trial conducted in the Department of Orthopaedics, Government Medical College, Jammu, over a period of one year in collaboration with the Department of Blood Bank, following Institutional Ethics Committee approval. Written informed consent was obtained from all participants. A total of 38 clinically diagnosed cases of plantar fasciitis were enrolled in the study. Eligible participants were those with symptoms persisting for at least three months, who had failed to respond to conservative management for a minimum of three months, had a baseline visual analogue scale (VAS) pain score greater than 7, were aged 18 years or older of either sex, and had not received any steroid injection within the preceding two months. Exclusion criteria included symptom duration of less than three months, VAS below 7, prior steroid injection within two months, presence of infection or ulcer at the injection site, history of rheumatoid arthritis or seronegative spondyloarthropathy, pregnancy, age below 18 years, or suspicion of an alternative diagnosis.

PRP preparation

Twelve millilitres of venous blood were drawn into two 6 mL acid-citrate-dextrose vacutainers. The first centrifugation at 2000 rpm for 3 minutes separated plasma from red cells. The plasma layer was then centrifuged at 2500 rpm for 5 minutes to obtain PRP, which was collected after discarding the platelet-poor plasma. The procedural steps are illustrated in figures 1-4. Platelet concentration in the final PRP ranged from 4–9 lakh/µl.

Figure 1: PRP centrifugation machine with two vacutainer tubes positioned for processing.

Figure 2: Centrifugation step performed at 2000 RPM for 3 minutes.

Figure 3: Centrifugation step performed at 2500 RPM for 5 minutes.

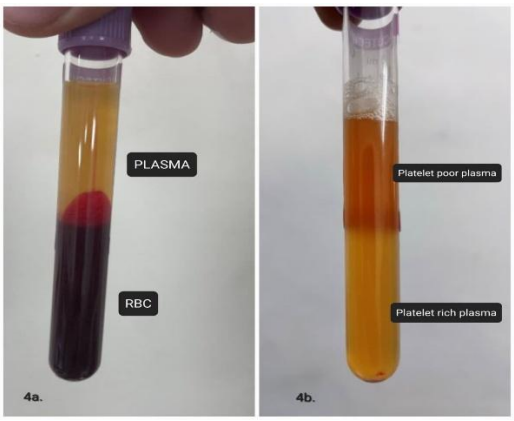

Figure 4: (a) Separation of plasma from RBC after the first centrifugation and (b) post 2nd centrifugation demonstrating upper layer of platelet poor plasma and lower concentrated layer of platelet rich plasma.

Injection technique

The point of maximal tenderness was marked. Under aseptic precautions, 2 ml of PRP were injected using a 5 mL syringe - 1 ml directly at the tender point and the remaining using the peppering technique (Figure 5). Patients were advised rest for 24 hours, followed by gradual weight-bearing and stretching exercises.

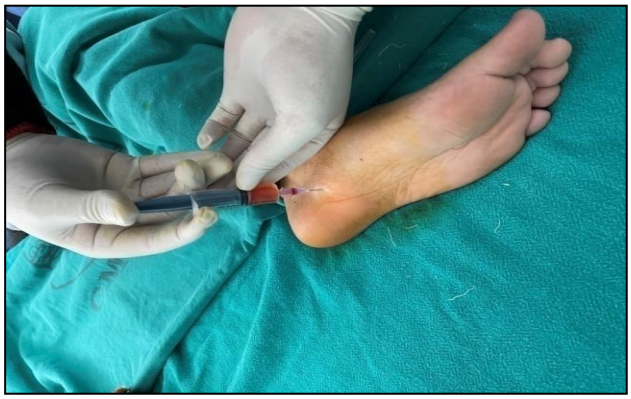

Figure 5: Injection site and technique.

Follow-up and outcome assessment

Patients were reviewed at 1 week, 1, 2, 4, and 6 months, with a telephonic review on day 2 for adverse effects. Pain intensity was measured using the Visual Analogue Scale (VAS), ranging from 0 (no pain) to 10 (worst imaginable pain). Statistical analysis was done using IBM SPSS v21. Continuous variables were expressed as mean±SD and compared using paired t-test; $p<0.05$ was considered significant.

RESULTS

Thirty-eight patients (21 females, 17 males) completed the study. Age distribution is shown in Table 1. The mean duration of pain was 7.53±2.67 months, with most patients in the 6-12 month category. The mean baseline VAS score was 8.68. Mean VAS at 1, 2, 4, and 6 months was 7.21, 5.63, 5.42, and 5.03, respectively (Table 2). The greatest improvement occurred between the first and second months and was maintained through six months. Percentage pain reduction was calculated relative to baseline. None achieved complete pain relief at 1 month, whereas 5 patients (13.2%) reported 100% relief at 2 months, sustained till study end. Overall, 30 patients (78.9%) had < 50% pain reduction (Table 3). The mean pain scores according to the duration of symptoms (in months) are depicted in Table 4. The greatest improvement occurred in the 50-64 year age group. Paired t-test analysis (Table 5) showed a mean difference of 1.578±1.74 ($p=0.000$) between 1–2 months, indicating the most significant pain reduction during this interval. The difference between 2-4 months (0.210±1.06, $p=0.233$) was non-significant, while 4-6 months showed a mild but significant decrease (0.394±0.75, $p=0.003$). Other pairs (1-4, 1-6, and 2-6 months) were all statistically significant, confirming sustained improvement.

Table 1: Distribution of patients according to age.

Age (in years)	No. of patients	Percentage
<35	13	34.21
35-49	10	26.32
50-64	13	34.21
≥65	2	5.26
Total	38	100
Mean±SD	44±13.63	

Table 2: Mean change in the VAS score.

Vas score	Mean	SD
VAS score before PRP injection	8.68	0.47
VAS score at 1 month follow up	7.21	1.63
VAS score at 2 month follow up	5.63	2.55
VAS score at 4 month follow up	5.42	2.16
VAS score at 6 month follow up	5.03	2.43

Table 3: Table showing pain reduction.

VAS score	100% pain relief		(50-99%) pain relief		<50% pain relief		0% pain relief	
	N	%	N	%	N	%	N	%
VAS score at 1 month follow up	0	0	5	13.16	19	50	14	36.84
VAS score at 2 month follow up	5	13.16	2	5.26	27	71.05	4	10.53
VAS score at 4 month follow up	3	7.89	3	7.89	32	84.21	0	0
VAS score at 6 month follow up	6	15.79	1	2.63	30	78.95	1	2.63

Table 4: Mean pain score of patients according to duration of pain (in months).

Vas score	<6 months		6-12 months		>12 months	
	Mean	SD	Mean	SD	Mean	SD
VAS score before PRP injection	8.75	0.46	8.67	0.47	8.5	0.70
VAS score at 1 month follow up	6.75	1.98	7.35	1.59	7	0

Continued.

Vas score	<6 months		6-12 months		>12 months	
	Mean	SD	Mean	SD	Mean	SD
VAS score at 2 month follow up	4.12	2.64	6.21	2.20	3.5	4.947
VAS score at 4 month follow up	4.62	2.19	5.82	1.92	3	4.24
VAS score at 6 month follow up	3.62	3.15	5.60	1.91	2.5	3.53
Average	5.57		6.73		4.9	

Table 5: Pair wise comparison of VAS score after 1st, 2nd month, 4th month and 6th month.

Comparison	Month	Mean (pairwise)	SD	P value
Pair 1	1st 2nd	1.578	1.74	0.000*
Pair 2	2nd 4th	0.210	1.06	0.233
Pair 3	4th 6th	0.394	0.75	0.003*
Pair 4	1st 4th	1.789	1.52	0.000*
Pair 5	1st 6th	2.184	1.69	0.000*
Pair 6	2nd 6th	0.605	1.197	0.004*

DISCUSSION

Platelets contain numerous biologically active substances, including coagulation factors, adhesive proteins, protease inhibitors, and growth factors such as TGF-β1, VEGF, and PDGF, which promote tissue repair through cellular proliferation, angiogenesis, chemotaxis, and extracellular matrix formation.[5] These regenerative properties form the basis for the therapeutic use of PRP in degenerative enthesopathies such as plantar fasciitis. In our study, the mean pain score decreased from 8.68 at baseline to 5.03 at six months, with maximum improvement observed by the second month. No local or systemic adverse reactions were noted. However, only 13.2% of patients achieved complete pain relief, and the majority (78.9%) showed less than 50% reduction in pain, indicating modest overall benefit. Our findings align with those of de Vos et al, who reported no significant advantage of PRP injection over placebo in chronic tendinopathy and attributed clinical improvement mainly to concurrent eccentric exercises.[6] Similarly, Sheth et al, highlighted the lack of standardized protocols and variability in preparation techniques as major limitations in evaluating PRP efficacy.[7] In contrast, Gupta et al, and Choudhary et al, demonstrated significant pain reduction and functional improvement following PRP therapy in chronic plantar fasciitis, supporting its potential as a safe and effective treatment option.[8,9] The outcome variability across studies may be attributed to differences in PRP preparation methods. Factors such as single versus double centrifugation, centrifugation speed, and platelet concentration significantly affect growth factor yield.[10] In the present study, PRP was prepared using the double-spin method, producing platelet counts ranging from 4 to 8 lakhs/µl. Platelet activation was achieved through needling at the injection site, consistent with the technique described by Lee et al, which induces local thrombin release to trigger platelet activation.[11] The "peppering technique" was used for infiltration at the most tender point, as commonly practiced in previous studies.[12] Overall, while PRP injection was safe and showed some degree of pain relief, its clinical efficacy in chronic plantar fasciitis remains variable. Standardization of preparation and administration protocols, along with studies incorporating biochemical assessment of growth factors, are essential to establish its true therapeutic value.

CONCLUSION

Autologous PRP injection in our study did not result in a statistically significant reduction in pain; however, it proved to be a safe procedure and may be considered as an alternative treatment option in resistant cases of plantar fasciitis. The maximum therapeutic benefit was observed at two months and persisted up to six months. Further well-designed trials are warranted to standardize PRP preparation and optimize its clinical efficacy.

Limitations

This study had several limitations. Firstly, absence of a control group restricted direct comparison of efficacy. Secondly, pain assessment was subjective, relying solely on patient-reported VAS scores. Thirdly, the platelet count in PRP was not standardized and depended on individual baseline counts, and no correlation between platelet concentration and outcome was established. Finally, PRP was not compared with other treatment modalities such as corticosteroids, which could have clarified its relative effectiveness.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: Not required

REFERENCES

1. Tahririan MA, Motififard M, Tahmasebi MN, Siavashi B. Plantar fasciitis. J Res Med Sci. 2012;17(8):799-804.
2. Shetty N, Shetty V, Shetty S. A Comparative Prospective Study of Platelet Rich Plasma vs. Corticosteroid Injection in Plantar Fasciitis not Responding to 6 Weeks of Conservative Treatment. Int J Foot Ankle. 2018;2(2):008.
3. Yang WY, Han YH, Cao XW, Pan JK, Zeng LF, Lin JT, et al. Platelet-rich plasma as a treatment for plantar fasciitis: A meta-analysis of randomized controlled trials. Medicine (Baltimore). 2017;96(44):e8475.
4. Martinelli N, Marinozzi A, Carnì S, Trovato U, Bianchi A, Denaro V. Platelet-rich plasma injections for chronic plantar fasciitis. Int Orthop. 2013;37(5):839-42.
5. Alsousou J, Thompson M, Hulley P, Noble A, Willett K. The biology of platelet-rich plasma and its application in trauma and orthopaedic surgery: a review of the literature. J Bone Joint Surg Br. 2009;91(8):987-96.
6. de Vos RJ, Weir A, van Schie HTM, Bierma-Zeinstra SM, Verhaar JA, Weinans H, et al. Platelet-Rich Plasma Injection for Chronic Achilles Tendinopathy: A Randomized Controlled Trial. JAMA. 2010;303(2):144-9.
7. Sheth U, Simunovic N, Klein G, Fu F, Einhorn TA, Schemitsch E, et al. Efficacy of autologous platelet-rich plasma use for orthopaedic indications: a meta-analysis. J Bone Joint Surg Am. 2012;94(4):298-307.
8. Gupta S, Bandari D. Autologous platelet-rich plasma injection in tennis elbow and plantar fasciitis. Current Orthop Pract. 2016;27(4):405-8.
9. Choudhary R, Agrawal AC, Garg AK, Inamdar AP, Verma S. Long term clinical results of autologous platelet rich plasma in recalcitrant plantar fasciitis.IP Int J Orthop Rheumatol. 2012;7(1):12-6.
10. Mazzocca AD, McCarthy MB, Chowaniec DM, Cote MP, Romeo AA, Bradley JP, et al. Platelet-rich plasma differs according to preparation method and human variability. J Bone Joint Surg Am. 2012;94(4):308-16.
11. Lee KS, Wilson JJ, Rabago DP, Baer GS, Jacobson JA, Borrero CG. Musculoskeletal applications of platelet-rich plasma: fad or future?. AJR Am J Roentgenol. 2011;196(3):628-36.
12. Prakash YR, Dhanda A, Yallapur KL, Inamdar SS, Darshan GT, Ramakrishna M. Peppering versus Single Injection Technique in Tennis Elbow - A Prospective Comparative Study. Malays Orthop J. 2022;16(1):91-6.

Cite this article as: Sharma P, Gupta S, Sharma N. Efficacy of autologous platelet-rich plasma injection in plantar fasciitis. Int J Res Orthop 2026;12:386-90.