



## A COMPARISON OF THE EFFECTS OF LOCAL CORTICOSTEROID INJECTION AND PLATELET RICH PLASMA IN TREATING CHRONIC PLANTAR FASCIITIS

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### ABSTRACT:

**Background:** A relatively prevalent degenerative condition that affects the backfoot is plantar fasciitis. In the past, local steroid injections were frequently utilised to treat chronic plantar fasciitis. Platelet-rich plasma (PRP) has been successfully used in recent years to treat persistent plantar fasciitis.

**Aims & objectives:** The purpose of the current research was to assess and compare the efficacy of a single autologous platelet rich plasma (PRP) injection and steroid injection in individuals with persistent plantar fasciitis.

**Material and Methods:** The current investigation was a single-center, prospective, comparative analysis that included patients 19 to 60 years old, of either gender, with heel pain that was most severe over the plantar aspect and that persisted for more than six months. Patients were randomised into two groups at random: group PRP had a PRP injection, while group steroids received a combination of 1 mL local anaesthetic and 2 mL methylprednisolone.

**Results:** In the current research, 200 patients were allocated into two groups at random: PRP (n = 100) and steroid (n = 100). The majority was female and in the age range of 41 to 50. Age and sexual orientation were comparable between the two groups, and the difference was statistically insignificant. For both groups, the VAS score was computed at baseline, 1, 3, and 6 months. Baseline VAS scores were comparable, and the statistical difference between them was not large. At 1, 3, and 6 months, VAS scores were higher in the PRP group compared to the steroid group, and the difference was statistically significant (p 0.05). Mean AOFAS scores were comparable between the two groups at baseline and after one month, and the difference was not statistically significant (p>0.05).

At 3 and 6 months, the mean AOFAS score was higher in the PRP group compared to the steroid group, and the difference was statistically significant (p 0.05).

**Conclusion:** When symptom relief is desired 3 and 6 months after the initial injection for the treatment of PF, platelet rich plasma (PRP) is superior to corticosteroid injection.

**Keywords:** chronic planter fasciitis, platelet rich plasma (PRP), corticosteroid, VAS for heel pain.

### Introduction:

Plantar fasciitis is a highly prevalent degenerative condition that primarily affects the hindfoot in adults, accounting for 11–15% of the foot complaints. Chronic inflammation and the degeneration of the plantar aponeuroses are its defining features<sup>1-3</sup>. Plantar fasciitis is predisposed by lengthy periods of standing, obesity, feminine gender, advanced age, high arches, leg length discrepancies, uncomfortable footwear, severe foot pronation, pes planus/pes cavus foot abnormalities, and a short Achilles

tendon<sup>4</sup>. The purpose of treatment is to reduce discomfort, encourage healing, restore the foot's normal range of motion and flexibility, support tissues, rectify any biomechanical difficulties, and implement the proper training regimens. The initial line of treatment for conservative therapies is typically ice, rest, and avoidance of potentially taxing activities, followed by physical therapy, orthotics, arch supports, tapping, and splinting<sup>5</sup>. In the past, local steroid injections were frequently utilised to treat chronic plantar fasciitis. Platelet-rich plasma (PRP) has been utilised successfully in recent

years to treat a variety of chronic tendon conditions, including chronic plantar fasciitis<sup>6</sup>. The purpose of the current research was to assess and compare the efficacy of a single auto-logous platelet rich plasma (PRP) injection and steroid injection in individuals with persistent plantar fasciitis<sup>7</sup>.

### **Aims & objectives:**

The purpose of the current research was to assess and compare the efficacy of a single auto-logous platelet rich plasma (PRP) injection and steroid injection in individuals with persistent plantar fasciitis.

### **Material and Methods**

The current research was a single-center, prospective, comparative investigation carried out in the orthopaedic department of a medical college in the heart of India. The research lasted a year (January 2021 to December 2021). The institutional ethical committee approved the research.

**Inclusion criteria:** Patients between the ages of 19 and 60, of either gender, have heel pain that is most severe over the plantar aspect and has persisted for more than six months.

**Exclusion criteria:** Those with diabetes, Patients who had plantar fasciitis surgery in the past, had bilateral plantar fasciitis that was active, had vascular insufficiency or neuropathy that was accompanied by heel discomfort Patients who refuse to consent

Patients were informed about the research, and they gave their written consent to participate. Patients were split into two groups at random,

Group PRP to be administered PRP injection - After taking 40 mL of blood from the patient's antecubital location and centrifuging it, PRP injection was created in our blood bank. Citrate phosphate dextrose adenine (CPDA) was used to

anticoagulate the blood at a 1:6 ratio. The blood was separated into three main components after ten minutes of spinning at 2,000 rpm: red blood cells, platelets, and platelet-poor plasma (PPP). The supernatant, which contained platelets and plasma, was removed from the tube and centrifuged once again for 10 minutes, but at a speed of 2,600 rpm. Following centrifugation, two layers were created: the upper layer contained concentrated platelets (about 4 mL) and the lower layer contained PRP in the supernatant.

To give group steroids 1 mL of local anaesthetic mixed with 2 mL of methylprednisolone

Using a disposable 20 G steel needle, the affected foot was addressed through the medial site after being properly cleaned and draped. Following injection, the needle was taken out and an aseptic dressing applied. The patient was told to repeatedly flex and extend their ankle to ensure that PRP was distributed evenly. Patient was released from OPD with instructions to apply cold compresses to the foot for 24 hours, bear all of one's weight, take oral antibiotics (tablet levofloxacin 750 mg OD) for three days, and refrain from using analgesics as a form of treatment. At intervals of 0, 1, and 2, patients received 3 injectable doses.

The American Orthopedic Foot and Ankle Society (AOFAS) score for function and the visual analogue scale (VAS) for pain were used to assess each follow-up. Any negative impacts were also noted, if any.

### **Results**

In the current research, 200 patients were allocated into two groups at random: PRP (n = 100) and steroid (n = 100). The majority was female and in the age range of 41 to 50. Age and sexual orientation were comparable between the two groups, and the difference was statistically insignificant.

**Table 1: Age and sex distribution**

| Characteristics | Group PRP | Group Steroid | P value |
|-----------------|-----------|---------------|---------|
| Age (years)     |           |               | 0.84    |
| 19-30           | 8 (8 %)   | 6 (6 %)       |         |
| 31-40           | 22 (22 %) | 20 (20 %)     |         |
| 41-50           | 42 (42 %) | 46 (46 %)     |         |
| 51-60           | 24 (24 %) | 26 (26 %)     |         |
| > 60            | 4 (4 %)   | 2 (2 %)       |         |
| Sex             |           |               | 0.92    |
| Female          | 62 (62 %) | 58 (58 %)     |         |
| Male            | 38 (38 %) | 42 (42 %)     |         |

Both groups' VAS scores were computed at the beginning, at 1, 3, and 6 months. Baseline VAS scores were comparable, and the statistical difference between them was not large. At 1, 3, and 6 months, VAS scores were higher in the PRP group compared to the steroid group, and the difference was statistically significant (p 0.05).

**Table 2: VAS score**

| Timeline   | Group PRP (Mean ± SD) | Group Steroid (Mean ± SD) | p value |
|------------|-----------------------|---------------------------|---------|
| Baseline   | 7.33 ± 1.26           | 7.16 ± 1.12               | 0.68    |
| Baseline   | 5.11 ± 0.46           | 4.23 ± 1.21               | 0.03    |
| At 1 month | 2.03 ± 0.28           | 3.23 ± 0.22               | <0.001  |
| At 3 month | 1.21 ± 0.22           | 2.46 ± 0.31               | <0.001  |

Mean AOFAS scores were comparable between the two groups at baseline and after one month, and the difference was not statistically significant (p>0.05). At 3 and 6 months, the mean AOFAS score was higher in the PRP group compared to the steroid group, and the difference was statistically significant (p 0.05).

**Table 3: Mean AOFAS score**

| Timeline   | PRP (Mean ± SD) | Steroid (Mean ± SD) | P value |
|------------|-----------------|---------------------|---------|
| Baseline   | 44.45 ± 11.35   | 45.12 ± 10.14       | 0.81    |
| At 1 month | 71.35 ± 6.2     | 68.8 ± 8.45         | 0.33    |
| At 3 month | 83.2 ± 8.15     | 74.25 ± 8.3         | <0.001  |
| At 6 month | 94.4 ± 4.8      | 65.4 ± 11.0         | <0.001  |

## Discussion

Numerous terms, such as policeman's heel, heel spur syndrome, jogger's heel, sub calcaneal pain, plantar heel pain, plantar fasciopathy, plantar fasciitis (PF), and plantar fasciosis, have been used to describe discomfort at the plantar surface of the heel<sup>8</sup>. Collagen denaturation occurs in chronic situations as a result of accumulated trauma that prevents the microtears at its connection from healing. Histological evidence such as collagen necrosis, chondroid metaplasia, and calcification help to demonstrate a degenerative process in PF. For the treatment of

PF, medical interventions such nonsteroidal anti-inflammatory medications (NSAID), local corticosteroid injections, platelet-rich plasma injections, and prolotherapy are employed. The plantar fascia's hypovascularity makes it difficult for the body to access a significant amount of platelets and other growth factors for spontaneous repair<sup>9</sup>.

By injecting PRP directly into the lesion, platelets release growth factors that hasten tissue repair, including platelet derived growth factor, transforming growth factor beta, and endothelial growth factor. 140 heels participated in a

research by Upadhyay S et al. with a 6-month follow-up period. Both groups' VAS and AOFAS scores improved from the baseline, however at the final follow-up, the PRP therapy patients had a statistically significant ( $p < 0.05$ ) pain reduction and improved AOFAS score<sup>10</sup>. The findings of the current research indicated that PRP therapy has the ability to enhance functional outcomes and reduce discomfort in instances of persistent planter fasciitis. It was discovered to be substantially more efficient than corticosteroid injection<sup>11</sup>.

Similar results were seen in the current investigation. Corticosteroids (CSs) had an early effect, lowering pain to a moderate level in 82.4% of patients when compared to PRP ( $P = 0.000$ ), according to a related research by Sahoo PK et al. The effect, however, did not last for a very long time<sup>12</sup>. With a mean VAS score of 2.0 0.9 and 0.8 0.8, respectively, PRP was found to have greater pain alleviation during 3 months and 6 months of follow-up. At the 6-month follow-up, the FFI and RM scores significantly improved ( $P = 0.000$ ). PRP can therefore be suggested for a long-lasting improvement in PF. Similar results were seen in the current investigation.

In a research by Tank G et al., the VAS scores for the platelet-rich plasma and corticosteroid injection groups decreased over the course of six months, from 8.44 and 8.38, respectively, to 1.46 and 3.02. The FAAM scores for the PRP and corticosteroid injection groups were 29.9 and 31.6 at the first visit, respectively, and climbed to 83.4 and 69.1 after six months. The thickness of the plantar fascia was significantly reduced (by 35.90% vs. 28.67% in the corticosteroid group) in the PRP group following injection. When used to treat PF, PRP extract greatly improves function while reducing discomfort, outperforming the effects of steroids over the long term<sup>13</sup>. Although numerous steroid injections are necessary for efficient and long-lasting pain treatment, they can also rupture fascia and cause the fat pad to atrophy. The foot windlass mechanism is hampered by fascial rupture, which also encourages inflammation in the nearby tissue. Subcalcaneal cushioning is

lessened as a result of plantar fat pad atrophy, making it more vulnerable to injury and discomfort. Depot steroid injections near the plantar fascia's insertion at the calcaneum are typically thought of as an efficient early intervention. However, a recent Cochrane research found that local steroid injections may only marginally lessen heel pain for the first month; they do not continue to do so<sup>14-16</sup>.

Some of the negative effects of local steroid injections include tendon rupture, collagen necrosis, plantar fascia rupture, atrophy of the plantar fat pad, plantar nerve damage, calcaneal osteomyelitis, and skin necrosis. PRP is marketed as a prime example of an auto-logous biological blood-derived product that may be given exogenously to a variety of tissues and release high quantities of platelet-derived growth factors to improve tendon, bone, and wound healing. Additionally, PRP has antibacterial qualities that might help to avoid infections<sup>17-19</sup>.

## Conclusion

When symptom relief is desired 3 and 6 months after the initial injection for the treatment of PF, platelet rich plasma (PRP) is superior to corticosteroid injection. The VAS for heel pain and functional outcome ratings have improved clinically and statistically as a result of PRP injections in the short term. Therefore, PRP injection is preferable for plantar fasciitis pain treatment over the long term.

## References

1. Baz AA, Gad AM, Waly MR. Ultrasound-guided injection of platelet-rich plasma in cases of chronic plantar fasciitis. *Egypt J Radiol Nucl Med.* 2017; 48(1):125-32.
2. Wrobel JS, Fleischer AE, Matzkin-Bridger J, Fascione J, Crews RT, Bruning N, et al. Physical examination variables predict response to conservative treatment of nonchronic plantar fasciitis: secondary analysis of a randomized, placebo controlled footwear research. *PM R.* 2016; 8(5):436-44.

3. Gautham P, Nuhmani S, Kachanathu SJ. Plantar fasciitis: a review of literature. *Saudi J Sports Med* 2014;14:69-73.
4. Tahririan MA, Motififard M, et al. Plantar fasciitis. *J Res Med Sci* 2012 Aug;17(8):799–804.
5. Yang W, Han Y, et al. Platelet-rich plasma as a treatment for plantar fasciitis. *Medicine (Baltimore)* 2017 Nov;96(44):e8475.
6. Riel H, Cotchett M, Delahunt E, Rathleff MS, Vicenzino B, Weir A, et al. Is ‘plantar heel pain’ a more appropriate term than ‘plantar fasciitis’? Time to move on. *Br J Sports Med* 2017;51:1576-7.
7. 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:e8475.
8. Babatunde OO, Legha A, Littlewood C, Chesterton LS, Thomas MJ, Menz HB, et al. Comparative effectiveness of treatment options for plantar heel pain: A systematic review with network meta-analysis. *Br J Sports Med* 2019;53:182-94.
9. Barman A, Mukherjee S, Sahoo J, Maiti R, Rao PB, Sihna M K, et al. Single intra-articular platelet-rich plasma versus corticosteroid injections in the treatment of adhesive capsulitis of the shoulder: A cohort research. *Am J Phys Med Rehabil* 2019;98:549-57.
10. Lee H-R, Park KM, Joung YK, Park KD, Do SH. Platelet-rich plasma loaded hydrogel scaffold enhances chondrogenic differentiation and maturation with up-regulation of CB1 and CB2. *J Control Release Off J Control Release Soc* 2012;159:332-7.
11. Upadhyay S, Damor V. Auto-logous platelet rich plasma versus corticosteroid injection for chronic plantar fasciitis: a prospective controlled randomized comparative clinical research. *Int J Res Med Sci* 2018;6:xxx-xx.
12. Sahoo PK, Ujade NA, Das SP. Effectiveness of single injection of platelet-rich plasma over corticosteroid in the treatment of plantar fasciitis – A randomized, comparative research. *J Musculoskelet Surg Res* 2020;4:187-93.
13. Tank G, Gupta R, Gupta A, Rohila R. Comparative Research of Platelet-rich Plasma and Corticosteroid Injection in the Treatment of Plantar Fasciitis. *J Foot Ankle Surg (Asia-Pacific)* 2017;4(2):84-89.
14. Yang WY, Han YH, Cao XW, Pan JK, Zeng LF, Lin JT, et al. Platelet-rich plasma as a treatment for plantar fasciitis: a metaanalysis of randomized controlled trials. *Medicine (Baltimore)*. 2017; 96 (44) : e8475 .
15. Sherpy NA, Hammad MA, Hagrass HA, Samir H, Abu-ElMaaty SE, Mortada MA. Local injection of auto-logous platelet-rich plasma compared to corticosteroid treatment of chronic plantar fasciitis patients: a clinical and ultrasonographic follow-up research. *Egypt Rheumatol.* 2016; 38(3):247-52.
16. David JA, Sankarapandian V, Christopher PRH, Chatterjee A, Macaden AS. Injected corticosteroids for treating plantar heel pain in adults. *Cochrane Database Syst Rev* 2017;6:CD009348.
17. Tatli YZ, Kapasi S. The real risks of steroid injection for plantar fasciitis, with a review of conservative therapies. *Curr Rev Musculoskelet Med* 2009;2:3-9.
18. Edwards S, Calandruccio J: Auto-logous bloodinjections for refractory lateral epicondylitis. *J Hand Surg Am* 2003, 28:272-278.
19. Peerbooms et al., Use of platelet rich plasma to treat plantar fasciitis: design of a multi centre randomized controlled trial *BMC Musculoskeletal Disorders* 2010, 11:6.