

## Comparative study of treatment of chronic plantar fasciitis using platelet rich plasma and local steroid injection

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### Abstract

**Introduction:** It is one of the most common tendinopathy and most common cause of pain in the bottom of heel most cases resolve with time and conservative treatment. Local steroids injection has been one of the treatment modality from many years for patients not responding to oral medications and stretching exercises. One of recent advance in treatment of tendinopathies is use of platelet rich plasma (PRP) having the advantage of being autologous and concentrated that are rich in growth factors. In this study we have compared the efficacy of local steroid and PRP in treatment of plantar fasciitis.

**Materials and Methods:** Study was conducted in Kamareddy Hospital Gulbarga in the period between January 2018 and January 2019. The age of patients in our study was 20 to 50 years. In this study, 3 ml of the extracted PRP or 40 mg of triamcinolone acetate was injected into the heel area. Post-intervention, pain and functional assessment were done at 2 weeks, 6 weeks, 3 months and 6 months with Visual Analogue Score and Ankle Hind Foot scale and Foot and Ankle Disability Index score.

**Results:** The mean age in the steroid group was 37 and in the PRP group was 36, Right side was most commonly involved 55%. In both the groups there was significant difference in the VAS scores  $p < 0.001$  from the time of presentation to the first follow up in both the groups this further improved at the second follow up significant difference  $p < 0.001$  after which it remained constant, between the two groups there was no difference with a chi-squares  $p$  value less than 0.05 at all times.

In both the groups there was significant difference  $p < 0.001$  from the time of presentation to the first follow up in both the groups FADI score.

**Interpretation & Conclusion:** PRP reduces pain for longer duration as compared to steroid but the difference is not statistically significant.

Disadvantages with PRP are cost and cumbersome procedure to make it.

Most Patients preferred steroid over PRP due to cost.

**Keywords:** Platelet rich plasma (PRP), Foot and ankle disability index (FADI).

### Introduction

Plantar fasciitis is commonest cause of foot pain in the world. It is common in the age group of 40-50 years. It is a degenerative condition that occurs near the site of origin of the plantar fascia at the medial tuberosity of the calcaneus.<sup>1</sup> Histological findings suggest that it is a chronic degenerative process, not an acute inflammatory one.<sup>2</sup>

Conservative treatment for plantar fasciitis in the form of stretching, nonsteroidal anti-inflammatories, night splinting, strapping, orthoses, and shoe modifications are effective for 90% of cases. Ten percent remain resistant to these treatments necessitating more aggressive intervention including injection therapy, extra corporeal shock wave therapy (ESWT), and in some instances surgical release of the origin of the plantar fascia.<sup>3</sup>

Steroid injections are a popular method of treating the condition. However, the lack of an inflammatory process histologically in plantar fasciitis questions its mode of action.<sup>4</sup>

Recently, promising results were reported with the use of platelet-rich plasma (PRP) injections for treating muscle and tendon injuries and degeneration.<sup>5-11</sup>

The use of autologous PRP was first used in 1987 by Ferrari, et al.<sup>12</sup> PRP is a bioactive component of whole blood with platelet concentrations elevated above baseline and containing high levels of various growth factors.<sup>13</sup> The

rationale for PRP benefit lies in reversing the blood ratio by decreasing red blood cells (RBC) to 5%, which are less useful in the healing process, and increasing platelets to 94% to stimulate recovery.<sup>14</sup> An increased awareness of platelets and their role in the healing process has led to the concept of therapeutic applications. There is an emerging literature on the beneficial effects of PRP for chronic non-healing tendon injuries including lateral epicondylitis and plantar fasciitis.<sup>15,16</sup>

PRP increases tendon regenerative abilities with a high content of cytokines and cells, in hyper physiologic doses, which should promote cellular chemotaxis, matrix synthesis, and proliferation.<sup>17</sup> Degranulation of the alpha granules in platelets releases many different growth factors that can play a role in tissue regeneration processes. PRP represents a treatment option for many foot and ankle pathologies, including tendinopathy (Achilles, peroneal, posterior tibial, flexor hallucis longus, anterior tibial) and chronic ligamentous injury, such as plantar fasciitis.<sup>18</sup>

### Aim of Study

To assess the efficacy of PRP and local corticosteroid injection for treating chronic plantar fasciitis and provide initial clinical assessment of its effectiveness.

## Materials and Methods

The randomised control study involving 50 patients was conducted in Kamareddy orthopaedic and trauma hospital, Gulbarga, Karnataka in the period between January 2018 and January 2019.

### Inclusion criteria

1. Patients aged between 20-50 years who failed to respond to conservative management.
2. Patients who are willing to participate in the study.

### Exclusion criteria

1. Patients of plantar fasciitis in presence of other systemic disease like diabetes mellitus, rheumatoid arthritis, and gout.
2. Hemoglobin < 5.0.
3. Any wound or skin lesion at the plantar aspect of the foot.
4. Pregnancy
5. Severe infection, known malignancy, bleeding disorder, previous surgery.
6. Nerve-related symptoms such as radiculopathy, tarsal tunnel syndrome or tarsi sinus syndrome; foot and ankle osteoarthritis.

## Methodology

All eligible patients satisfying the inclusion criteria will be enrolled and informed written consent will be taken and the patients will be allocated into one of the two groups by computer generated algorithm for the purpose of randomization of sample and one group will receive PRP concentrate and other group will receive corticosteroid injection.

In this study,

1. 3 ml of the extracted PRP is injected into the affected area

**Table 1:** VAS - at various interval

	VAS -At presentation	VAS - 1st follow up	VAS - 2nd follow up	VAS - 3rd follow up	VAS - 4th follow up
PRP	7.2	4.7	3.7	5.53	4.57
STERIOD	7.06	4.23	3.62	4.53	4.05
p value	0.085	0.048	0.051	0.06	0.067

In both the groups there is significant difference in the VAS scores  $p < 0.001$  from the time of presentation to the first follow up in both the groups this further improved at the second follow up significant difference  $p < 0.001$  after which it remained a constant, between the two groups. There is no difference with a chi-squares p value is less than 0.05 at all times.

**Table 2:** FADI - at various intervals

	FADI -At presentation	FADI - 1st follow up	FADI -3rd follow up	FADI - 4th follow up
PRP	36.33	76.33	80	71.2
Steroid	36.8	79.38	84.68	79.39
p value	0.901	0.082	0.0751	0.052

In both the groups there is significant difference  $p < 0.001$  from the time of presentation to the first follow up in both the groups FADI score.

2. 40 mg of prednisolone (2ml) is injected into the affected area.

Post intervention both the groups will be evaluated for Post-intervention pain and functional assessment at 2 weeks, 6 weeks, 3 months and 6 months. Baseline Visual Analogue Score (VAS), Ankle Hind Foot scale and Foot and Ankle Disability Index (FADI) score is recorded.

## Results

The study is a comparative case control randomized observational prospective study conducted in Kamareddy ortho and trauma care hospital Gulbarga in the period between January 2018 and January 2019 in patients with chronic plantar fasciitis who have satisfied the inclusion criteria and exclusion criteria.

In our study we had a total of 50 cases, 25 in the steroid group and 25 in the PRP group.

The least age in our study is 20 years and the maximum age is 50 years, the mean age in the steroid group is 37 and in the PRP group is 36 years.

In the present study overall males appeared to be more affected with plantar fasciitis in both the groups there is statistically significant difference, hence the two groups were comparable.

In the steroid group 5 were bilateral, 7 were left and 13 were right side respectively and in the PRP group 2 bilateral, 10 were left and 13 were right side respectively. Right side is most commonly involved.

The most common occupation involved was (farmers 30%) followed by (shop keepers 25%) and then (teachers 15%).

In the steroid group 35% and in the PRP group 40% were overweight, overall 56%.

## Discussion

Tendinopathy refers to a condition that occurs within a tendon as a result of repeated trauma and overuse, the condition is painful and most often affects the quality of life in the working population. Among all the known tendinopathies plantar fasciitis and tennis elbow account for most cases.<sup>19</sup>

In the present day corticosteroid injections are considered as the treatment of choice for tendinopathies, but they are known for complications like tendon damage and can even cause tendons to rupture. One of the emerging therapeutic modalities is the use of platelet rich plasma for tendinopathies having the advantage of being autologous and concentrated that are rich in growth factor proteins that promote the healing process.

## Comparison of VAS scores

A study by Gyneshwar Tank et al<sup>20</sup> within group comparison in PRP group the results are statistically significant ( $p < 0.05$ ). The mean VAS score decreased from baseline continuously at 4, 8, 12, and up to 24 weeks. The VAS score is statistically significant in comparison with baseline at all durations. We have seen that within group comparison for steroid group, the results are also statistically significant. The mean VAS score decreased from baseline continuously at 4, 8, and up to 12 weeks. But at the end of 24 weeks, there is rise in VAS score when compared to score at 12 weeks.

Ming-Yen Hsiao<sup>21</sup> autologous blood-derived products followed by CSs, were best in providing relief from pain at 3 months. SW therapy and ABPs had similar probabilities of providing pain relief at 6 months, and were better than CSs at that time which is similar to our study.

Babak Vahdatpour,<sup>22</sup> Creaney et al.<sup>23</sup> also demonstrated statistically significant improvement in the pain scores with PRP similar to our study.

## Conclusion

PRP has a better effect on pain in patients with longer duration as compared to local steroids but the difference is not statistically significant. We prefer PRP over steroid for treatment of chronic plantar fasciitis due to better effect on pain with longer duration and side effects of steroids.

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## Conflict of interest

None.

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