

# **THE EFFICACY OF AUTOLOGOUS PLATELET RICH PLASMA INJECTION IN CHRONIC PLANTAR FASCITIS, A PROSPECTIVE STUDY**

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## **ABSTRACT**

### **INTRODUCTION**

Plantar fasciitis is one of the most common tendinopathy and cause of heel pain. It may get resolved with time and conservative treatment like stretching exercises and oral medications. Recent advance in treatment of chronic plantar fasciitis is the use of local PRP injections. It has advantages like being autologous and rich in growth factors. The purpose of this study is to determine the effectiveness of local PRP injection in chronic plantar fasciitis.

### **MATERIALS AND METHODS**

This study was conducted from September 2020 to March 2022 in Narayana Medical College and Hospital, Nellore. 30 patients who came to op were selected based on inclusion and exclusion criteria. 3ml of autologous PRP was extracted and injected

into heel area. Patients were followed up at 0,1,3,6 months intervals and at each follow up pain was evaluated using Numerical pain score.

## **RESULTS**

Patients are followed up at 0,1,3,6 months. At each follow up patients Numerical pain score was calculated and mean was obtained for all patients. The mean pain was 8.5 pre-injection. The mean Numerical pain score at 0,1,3,6 month was 8.5, 4.25, 0.89, 0.33 respectively.

## **CONCLUSION**

Intralesional autologous platelet rich plasma injections were safe and effective in treatment of chronic plantar fasciitis with maximum effect observed after 3<sup>rd</sup> month and sustaining till 6<sup>th</sup> month

## **KEY WORDS**

Plantar fasciitis, Platelet Rich Plasma (PRP), Autologous, Numerical pain score

## **INTRODUCTION:**

Plantar fasciitis is a degenerative condition that occurs near the site of origin of plantar fascia at the medial tuberosity of calcaneum and is a common cause of heel pain. It is common in adults between 50-60 years of age but can occur in any age group. Histological findings suggest that it is a chronic degenerative process, not an acute inflammatory one. Conservative treatment for plantar fasciitis in the form of stretching, nonsteroidal anti-inflammatories, night splinting, strapping, orthoses, and shoe modifications are effective in many cases. If conservative treatment fails, often a corticosteroid injection is given. It gives temporary pain reduction, but no healing.

Recently platelet rich plasma (PRP) is being tried in tendon injuries and degeneration. The use of autologous PRP was first used in 1987 by Ferrari. PRP is a bioactive component of whole blood with platelet concentrations elevated above baseline and containing high levels of various growth factors. PRP is promoted as an ideal autologous biological blood-derived product, which can be exogenously applied to various tissues where it releases high concentrations of platelet derived growth factors that enhance wound healing, bone healing and also tendon healing. In addition, PRP possesses antimicrobial properties that may contribute to the prevention of infections. When platelets become activated, growth factors are released and initiate the body's natural healing response.

The purpose of our work was to study effectiveness of autologous PRP injection in the treatment of chronic plantar fasciitis.

## **MATERIALS AND METHODS:**

This study was conducted from September 2020 to March 2022 in Narayana Medical College and Hospital, Nellore. 30 patients who came to OPD, Department of

Orthopaedics were selected based on inclusion and exclusion criteria described. Patients aged >18 yrs., both males and females, who were clinically diagnosed as chronic plantar fasciitis, with minimum duration of 3 months, who failed conservative treatment with numerical pain score >7 were included in the study. Patients who had local steroid injection in last 3 months, infection or ulcer at Injection site, rheumatoid arthritis and pregnant ladies were excluded from the study.

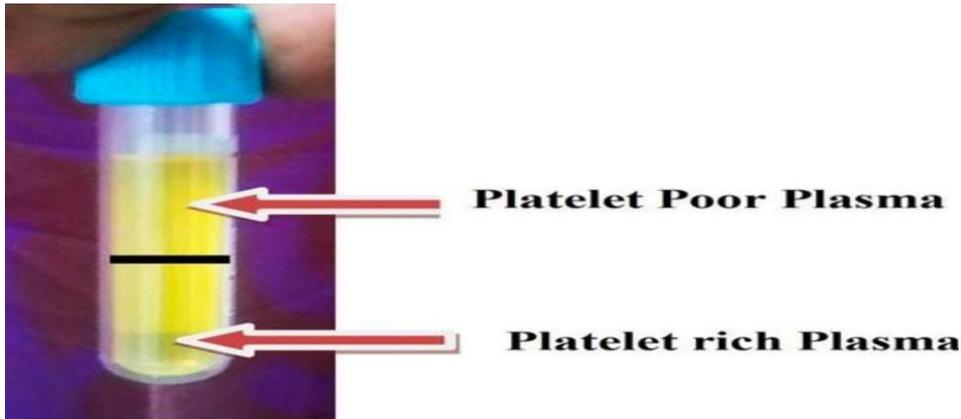
### **Preparation of PLATELET RICH PLASMA:**

A 10 ml of venous blood is collected from antecubital vein into a tube containing an anticoagulant (sterile sodium citrated tubes) and double centrifugation is done to prepare Platelet Rich Plasma.



**Fig - 1**

The whole blood is initially centrifuged by placing the syringe directly into the Centrifuge. The first spin is called 'soft spin' at 3000rpm for 3 minutes. This causes Separation of the blood into RBC, buffy coat, platelets and top platelet poor plasma. The upper layer of plasma including the platelets and buffy coat is drawn into another syringe using a 3 way connector. This is subjected to the second centrifugation called 'hard spin' at 4500rm for 15 minutes. This causes separation of the platelets and platelet poor plasma. From this the supernatant plasma can be discarded and the platelets can be re-suspended in appropriate volume of either plasma or normal saline



**Fig – 2**

**INJECTION TECHNIQUE:**

Initially, bupivacaine is infiltrated into the skin and subcutaneous tissue of both groups as a local field block. Approximately 0.05ml is also injected directly into the area of maximum tenderness. Then 3ml of platelet concentrate is injected using a 22-g needle into the plantar fasciitis using a peppering technique. This technique involved a single skin portal and then 5 penetrations of the fascia.



**Fig - 3**

**POST-PROCEDURE PROTOCOL:**

Immediately after the injection, the patient is kept in sitting position without moving the foot for 15 minutes. Patients are sent home with instructions to limit their use of the feet for approximately 48 hours and avoid use of nonsteroidal medication.

**FOLLOW-UP:**

Patients were followed for a period of six months. Follow-ups were performed at 1,3 and 6 months. NUMERICAL PAIN SCORE was used to assess patients subjectively. Numerical pain score is a subjective assessment of pain, where the patient rates the intensity of the pain perceived. Score 0 refers to no pain. Score 10 refers to the worst pain possible. On the basis of numerical pain score, intensity of pain was divided in to

mild, moderate and severe. Score zero to three was taken as mild, four to six as moderate and seven to ten as severe pain.



**Fig - 4**

### RESULTS AND ANALYSIS:

Patients were analysed for pain relief at 1,3 and 6 months. Patients were analysed for percentage reduction of pain. Percentage reduction of pain is obtained by calculating the percentage of the difference of pain score at every follow up from initial pain score at the time of injection.

#### PERCENTAGE OF REDUCTION OF PAIN IN PLANTAR FASCITIS:

In 1<sup>st</sup> month 100% pain relief in no of patients 7(23.3%),50-99% pain relief in no of patients 13(43.33%), <50% pain relief in no of patients 6(20%),0% pain relief in no of patients 4(13.33%).

In 3<sup>rd</sup> month 100% pain relief in no of patients 11(36.6%),50-99% pain relief in no of patients 12(40.00%), <50% pain relief in no of patients 4(13.3%),0% pain relief in no of patients 3(10.0%).

In 6<sup>th</sup> month 100% pain relief in no of patients 15(50%),50-99% pain relief in no of patients 11(36.6%), <50% pain relief in no of patients 2(6.66%), 0% pain relief in no of patients 2(6.66%).

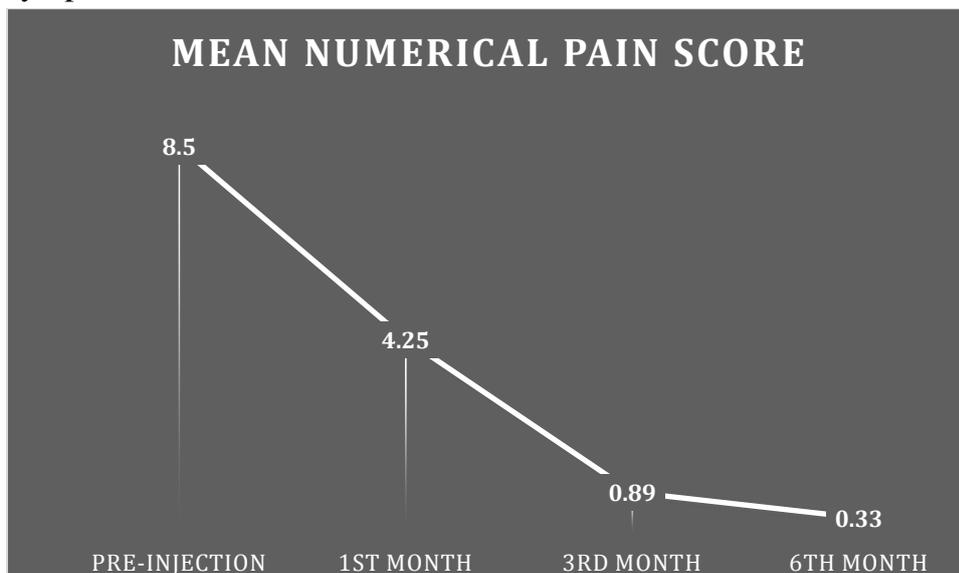
Pain relief	100% relief		50-99% relief		<50% relief		0% relief	
	No.	%	No.	%	No.	%	No.	%
1 <sup>st</sup> month	7	23.33	13	43.33	6	20	4	13.33
3 <sup>rd</sup> month	11	36.6	12	40	4	13.30	3	10
6 <sup>th</sup> month	15	50	11	36.6	2	6.66	2	6.66

**Table - 1**

#### MEAN NUMERICAL PAIN SCORE:

At the time of injection, Mean numerical pain score was assessed. The mean numerical pain score of all patients was 8.5 in plantar fasciitis. The mean numerical pain score for plantar fasciitis at 0, 1, 3 and 6 months was 8.5, 4.25, 0.89 and 0.33

respectively. From the above data it can be inferred that patient get maximum relief of symptoms at 3<sup>RD</sup> month and is sustained till 6<sup>th</sup> month.



### DISCUSSION:

Plantar fasciitis is a common musculoskeletal condition characterised by heel pain. Primary treatment is NSAIDs and non drug approaches such as heel pads, foot arch supports, plantar fascia stretching exercises. When conservative treatment results in a non-satisfactory outcome, the patient is often interested in treatment options other than surgery. Steroid injections are a popular method of treating the condition but only seem to be useful in the short term and only to a small degree. Treatment with corticosteroids has a high frequency of relapse and recurrence. In a recent study, researchers discovered that compared to local steroids platelet rich plasma injection intralesionally is a novel kind of treatment, it provides significant pain relief and improves function.

Growth factors found in the alpha granules of platelets is the basic science of PRP. In platelet granules the growth factors seen are TGF — beta, CGF, VEGF, and PDGF. Once the platelets were activated these growth factors get released. These growth factors also initiate the process of tissue healing through cell proliferation and differentiation, chemo taxis, tissue debris removal, angiogenesis, and the synthesis of extracellular matrix components.

Augustus D et al. proposed double centrifugation method used in this study. In our study, we employed the peppering technique for injecting platelet rich plasma. Keith s Hetchman et al, Joost.c. Eerbooms et al, Ertugrul ksahin et al, Ehab Mohammed selem Ragab et al, and Ehab Mohammed selem Ragab et al all used a technique in which first they palpated the maximum tender point and they pricked the point of maximum

tenderness and injected PRP with a single skin portal and five to six penetrations into the surrounding tissues. It is called as peppering technique.

Aziza syed omar published a study in 2011 on the local injection of autologous platelet rich plasma and corticosteroid in the treatment of lateral epicondylitis and plantar fasciitis: According to the results of their randomised clinical trial, they concluded that local injection of autologous PRP is a promising form of therapy for Tennis elbow and Plantar fasciitis. It is both safe and effective in relieving pain.

In this study Numerical pain score was used to assess the pain status. The numerical pain score was assessed at the time of injection and subsequent follow-up. The mean numerical pain score for plantar fasciitis at 0, 1, 3 and 6 months was 8.5, 4.25, 0.89 and 0.33 respectively. From the above data, it can be concluded that patient receives maximum relief of symptoms at 3<sup>rd</sup> month and is sustained till 6<sup>th</sup> month. However, in this study maximum improvement of symptoms observed after 3 months. This improvement of symptoms after 3 months were maintained until the completion of the research, with the exception of four patients. One patient with plantar fasciitis experienced recurrence of symptoms after 6 months period of follow up.

While there are many studies assessing the efficacy of autologous PRP, there are no studies that compare the severity of disease and the time it takes to recover after receiving PRP. In this study duration for maximum effectiveness of PRP was studied.

### **Conclusion:**

Intralesional autologous platelet rich plasma injections were safe and effective in treatment of chronic plantar fasciitis with maximum effect observed after 3<sup>rd</sup> month and sustaining till 6<sup>th</sup> month.

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