

EFFICACY OF AUTOLOGOUS PLATELET RICH PLASMA INJECTION IN PLANTAR FASCIITIS AND LATERAL EPICONDYLITIS

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ABSTRACT

We consider that platelet rich plasma injection for lateral epicondylitis and plantar fasciitis has served as an effective tool in management of these conditions. The aim is to study the efficacy of autologous platelet rich plasma injection in lateral epicondylitis and the efficacy of autologous platelet rich plasma injection in plantar fasciitis.

Keywords: platelet rich plasma, epicondylitis, plantar fasciitis, chemotaxis, visual analogue score, spondylo arthritis

Introduction

Platelet rich plasma (PRP) injections are widely studied for treating various musculoskeletal disorders due to its increased healing properties [1]. It contains growth factors such as Platelet-Derived Growth Factor, Insulin-Like Growth Factor, Transforming Growth Factor, Epidermal Growth Factor (EGF), Vascular Endothelial Growth Factor (VEGF), Fibroblast growth factor. Interaction of this growth with differentiation factors, and the adhesive protein factors such as fibronectin and vitronectin are responsible for the healing response promoting the regenerative process of chemotaxis, self proliferation, tissue debris, angiogenesis, extra cellular matrix formation, osteoid production and collagen synthesis, which enhance the healing rate in chronic tendinopathies [4]

This methodology of treating chronic tendinopathies has general importance as this forms a connecting approach between conservative management as well as surgical management³. The incidence of lateral epicondylitis is 4 -7 per 1000 per year in general population, and 35 -54 years age group are commonly involved⁴. Lateral epicondylitis occurs due to overuse of the wrist extensors or supinator muscle which may be incriminating. In lateral epicondylitis the muscle involved is Extensor carpi radialis brevis [5]. Various methods have been advocated for the treatment of lateral epicondylitis rest, physiotherapy, activity modification, bracing, nonsteroidal anti-inflammatory drugs, and injections⁶. Surgery is also an option for patients who have persistent symptoms despite continued efforts at conservative treatment [7].

The common cause of heel pain is plantar fasciitis which affects 10% of the general population. The age group of 40 -70 years most commonly occurs [8]. It tends to occur more often in women, middle aged, military recruits, athletes and the obese persons [9]. The inflammation is due to repeated trauma from overuse or injury. The degeneration occurs at origin of the plantar fascia at the medial tuberosity of the calcaneum [10]. Various methods have been advocated for treating this condition like rest, non-steroidal anti inflammatory drugs, night splints, keeping appropriate wedge on shoe, soft heel pad, plantar stretching exercises, ultrasound massage to heel, extracorporeal shock wave therapy (ESWT), local corticosteroid injections, and operative treatments [11]. Platelet rich plasma helps in healing both lateral epicondylitis and plantar fasciitis following which recurrence rate was found to be low.

MATERIALS AND METHODS

The present sample size of 80 patients were analysed prospectively by injecting platelet rich plasma for conditions such as lateral epicondylitis and plantar fasciitis. The study was conducted in sreebalaji medical college and hospital from march 2017 to march 2018 with a follow up period of 3 months duration.

Inclusion criteria:

1. Plantar fasciitis diagnosed patients.
2. Lateral epicondylitis diagnosed patient.
3. Patients should have minimum three months duration of symptoms.
4. Patients should undergo conservative treatment for a minimum period of three months.
5. Pain scores more than seven at the time of injection.
6. Local steroid injection in the last 2 months.
7. Both male and female
8. Age group above 20 years.

Exclusion criteria:

Lateral epicondylitis and plantar fasciitis of less than three months duration.

1. Pain scores less than seven.
2. Patients without any trial of conservative treatment.
3. Recent local steroid injection.
4. Patients suffering from other causes like rheumatoid arthritis, Sero negative spondyloarthritis .
5. Infection or ulcer at the injection site
6. Patients less than 20 years
7. Cancer.

Informed consent:

Informed consent was obtained from all the patients after explaining the disease condition and treatment with platelet rich plasma injection in their local language. All the patients were informed about the study. All the patients agreed for the procedure and to participate in the study. All the patients and their nearest relative had signed in the consent form.

Clinical diagnosis:

Pain in the lateral aspect of the elbow joint is the first clinical diagnosis of lateral epicondylitis. Which is aggravated on wrist dorsiflexion. On examination of the patient localized tenderness is elicited over the lateral epicondyle.

Patient with heel pain are diagnosed to have plantar fasciitis which worsens in the early morning. On examination localized tenderness is elicited over the plantar fascia insertion in the medial aspect of the calcaneum.

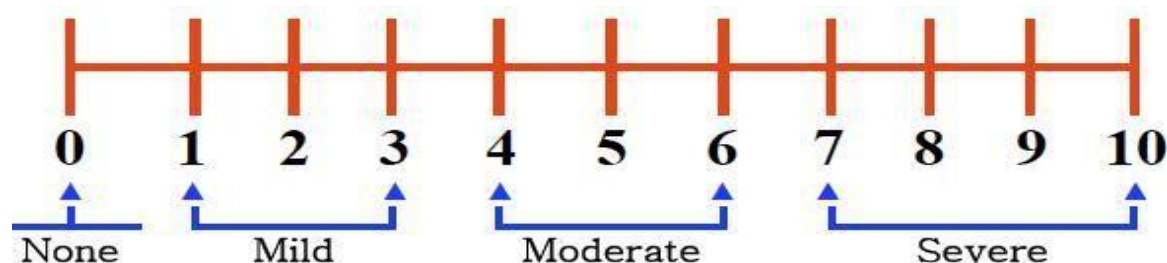
Pain assessment:

Visual Analogue Scale (VAS):

Nopain worstPossible Pain

The patient indicates intensity of pain on a 10cm line marked from “No Pain” at one end to “Worst Possible Pain” it could be at the other end.

Numeric Rating Scale (NRS):



0 1 2 3 4 5 6 7 8 9 10

The patient rates pain on a scale from zero (“0”) to ten (“10”)

On the basis of numerical pain score, intensity of pain is classified into mild, moderate and severe.

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

Method of preparation of platelet rich plasma:

Initially a venous puncture is done and specific volume of autologous blood is collected from the patient (10ml of venous blood sample) into a tube containing an anticoagulant (sterile sodium citrated tubes) (figure 1).



Figure1: Test tube containing an anticoagulant (sodium citrated tube)

This is followed by two centrifugation steps (figure 2)

At 1800 rotations/minute (rpm) for 15 mins centrifugation takes place separating plasma from packed red blood cells. The top layer consists of plasma and bottom layer consists of red blood cell (Figure 3).



Figure2: Centrifuge machine.

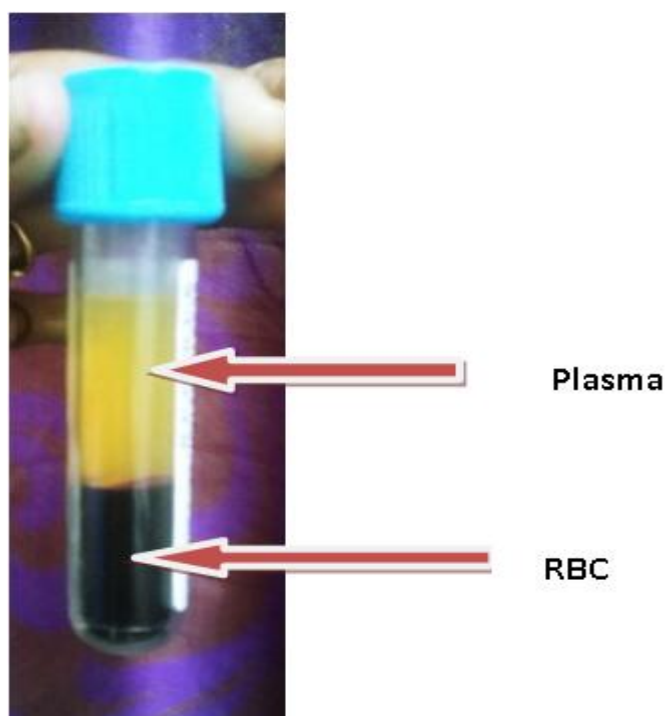


Figure 3

The plasma is shifted to a sterile tube following which the packed cell layer is discarded. The second centrifugation takes place at 3500 rpm for 10 min which yields concentrated platelet layer after extraction of platelet poor plasma (Figure 4)

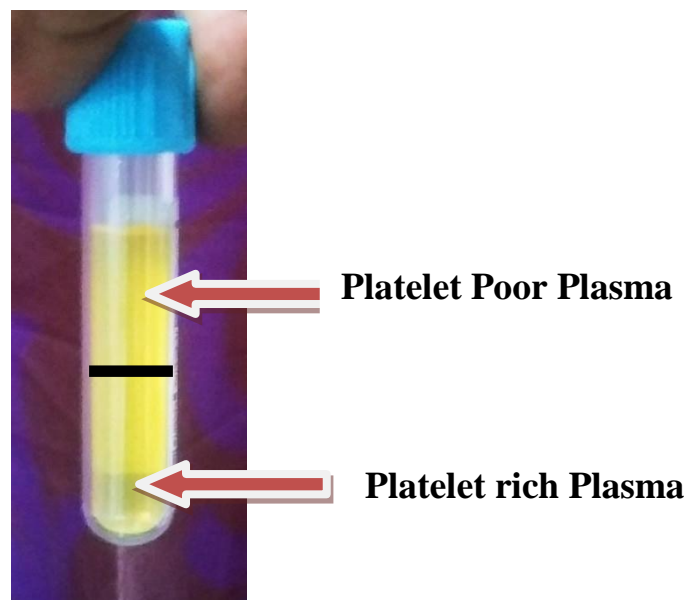


Figure 4

Injection technique:

Patient in supine position and palpate most tenderness point and marked using skin marker. The area was prepared and draped for injection. Initially, a local block of lignocaine is infiltrated subcutaneously. Under proper aseptic precaution a 21-g needle is used to inject, 1ml platelet rich plasma is injected over the maximum tenderness while the remaining platelet rich plasma is injected into the surrounding tissue. (figure 1 and 2).

Post Procedure Protocol:

Following injection, the patient is asked to lie supine for 15 minutes without moving the arm and foot. Instructions regarding the limited use of arm and foot for approximately 24 hours and use of pain reliever is given to the patient while sending them home. The use of non-steroidal medication is prohibited. Standardized stretching protocol for a two weeks follow up is given to the patient. A formal strengthening exercise program is also initiated after the stretching exercises. After the period of 4 weeks the patient are allowed to proceed with normal sporting or daily day activities as before. A visual analog pain score (0 - no pain;



Figure 1: Injecting platelet rich plasma in lateral epicondylitis patient.



Figure 2: Injecting platelet rich plasma in plantar fasciitis patient.

10 - worst pain possible) used as outcome measures. The patients were examined at 1 st month, 2nd month, and 3rd month after the index procedure.

FOLLOW UP:

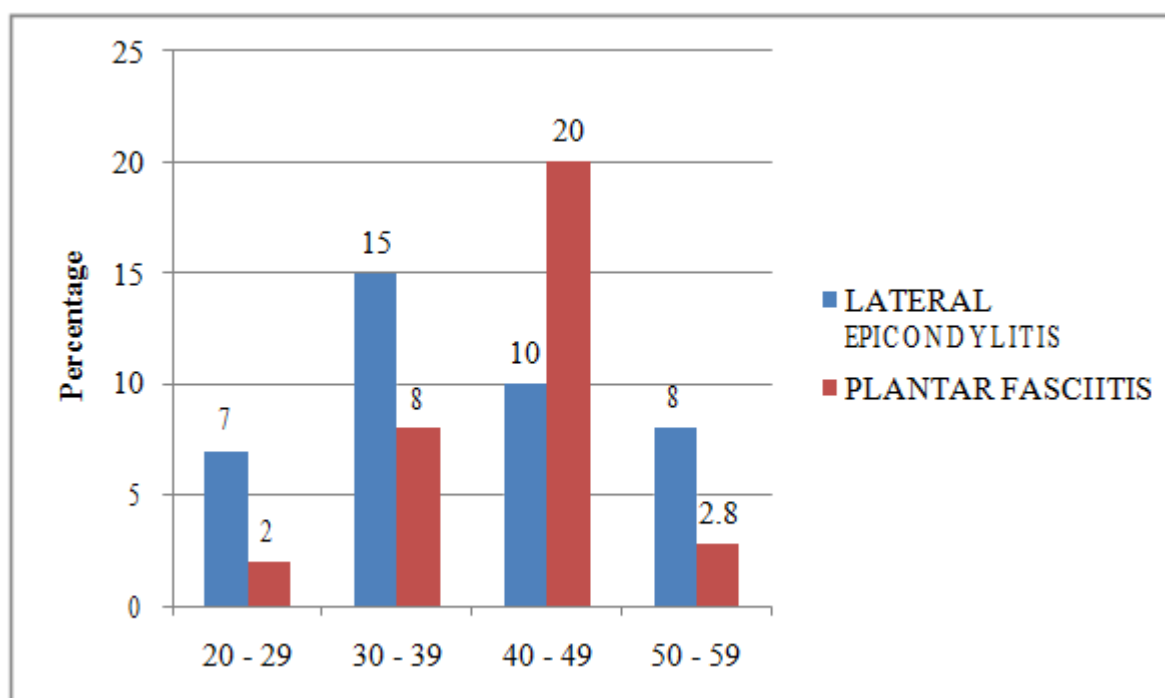
Patients were followed up for 3 months. Follow ups was done at 1st, 2nd and 3rd month. Patients were assessed subjectively using the visual analogue score.

Results

- SPS software system was used to do statistical analysis by comparing the results.
- Patients were analysed for pain relief subjectively at 1st 2nd and 3rd month post injection therapy and there pain is tabulated using visual analogue score (VAS) (pain score).

AGE INCIDENCE:

AGE	20 - 29	30 - 39	40 - 49	50 -59	TOTAL
LATERAL EPICONDYLITIS	7 (17.5%)	15 (37.5%)	10 (25%)	8 (20%)	40 (100%)
PLANTAR FASCIITIS	2 (5%)	8 (20%)	20 (50%)	10 (25%)	40 (100%)



SEX DISTRIBUTION:

SEX	MALES	FEMALES	TOTAL
LATERAL EPICONDYLITIS	22 (55%)	18 (45%)	40 (100%)
PLANTAR FASCIITIS	15 (37.5%)	25 (62.5%)	40 (100%)

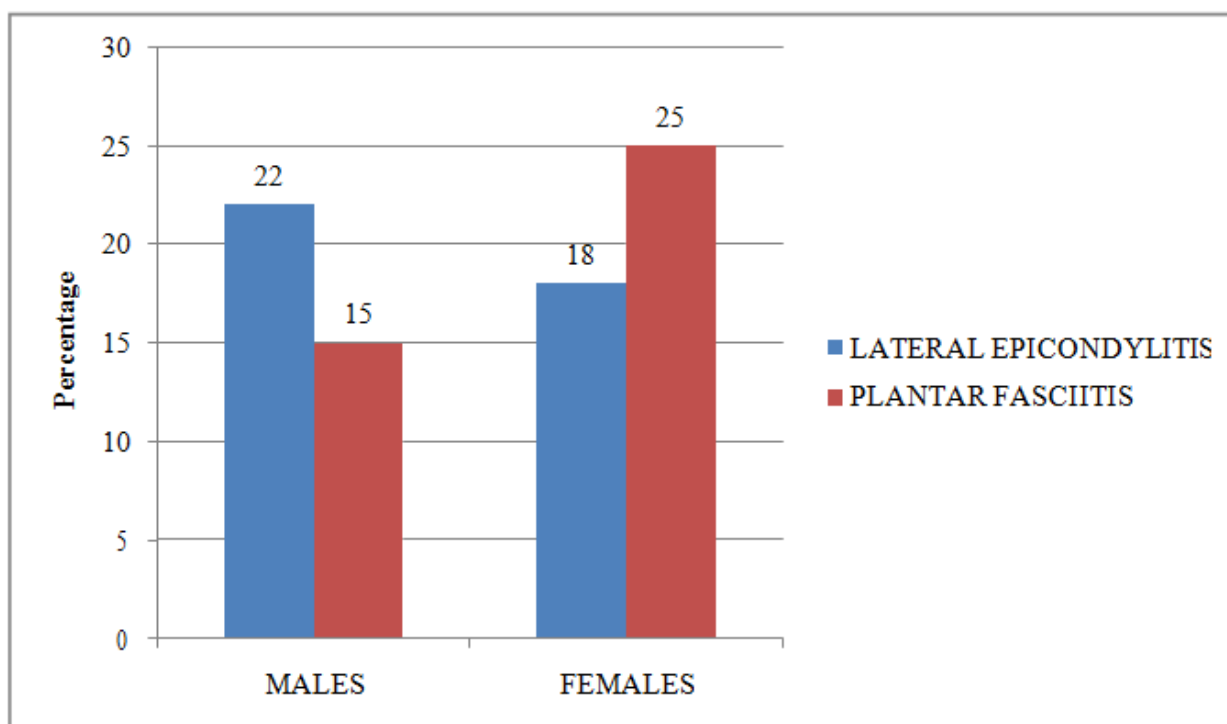


Table 1: Comparison of VAS with age groups in lateral epicondylitis:

VAS Score	Age Group				Total
	20-29	30-39	40-49	50-59	
Excellent	7 (100%)	10 (66.6%)	7 (70%)	2 (25%)	26 (65%)
Good	0	5 (33.34%)	3 (30%)	6 (75%)	14 (35%)
Fair	0	0	0	0	0
Total	7 (100%)	15 (100%)	10 (100%)	8 (100%)	40 (100%)

Chi sq	9.524	P value	0.023*
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* significant (p<0.05).

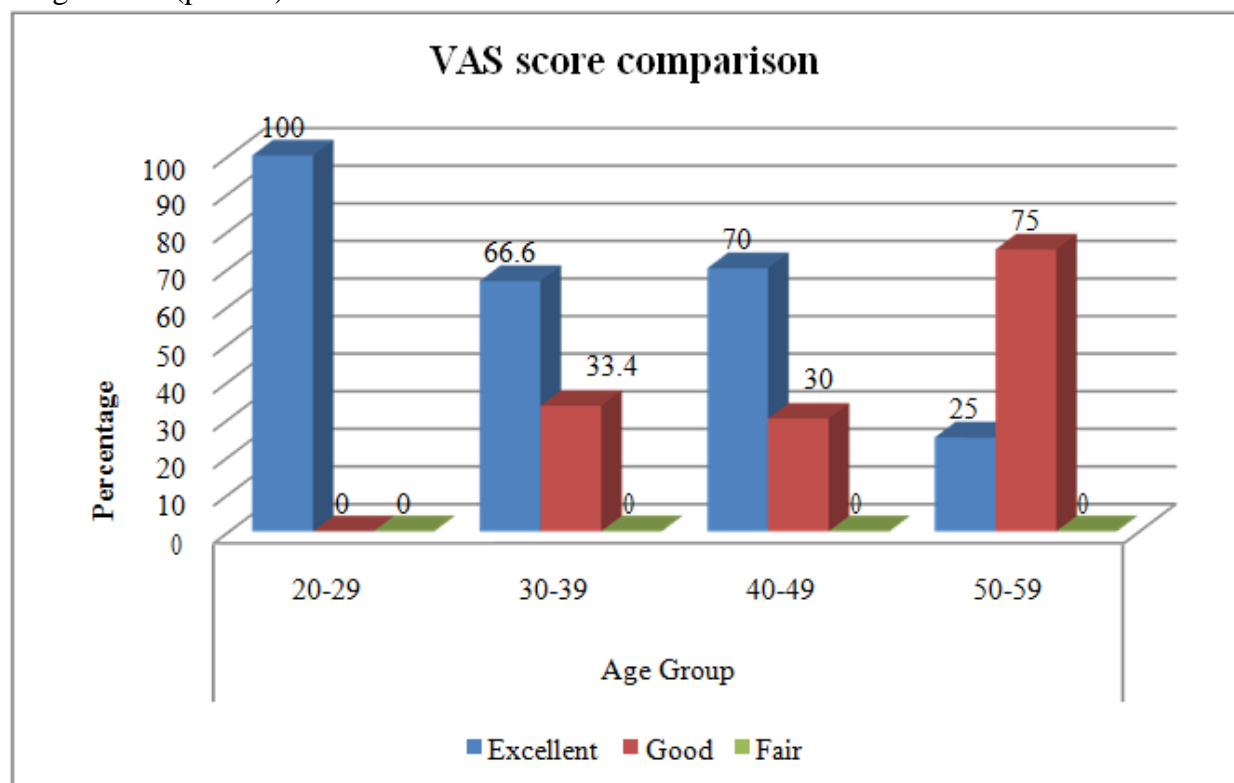
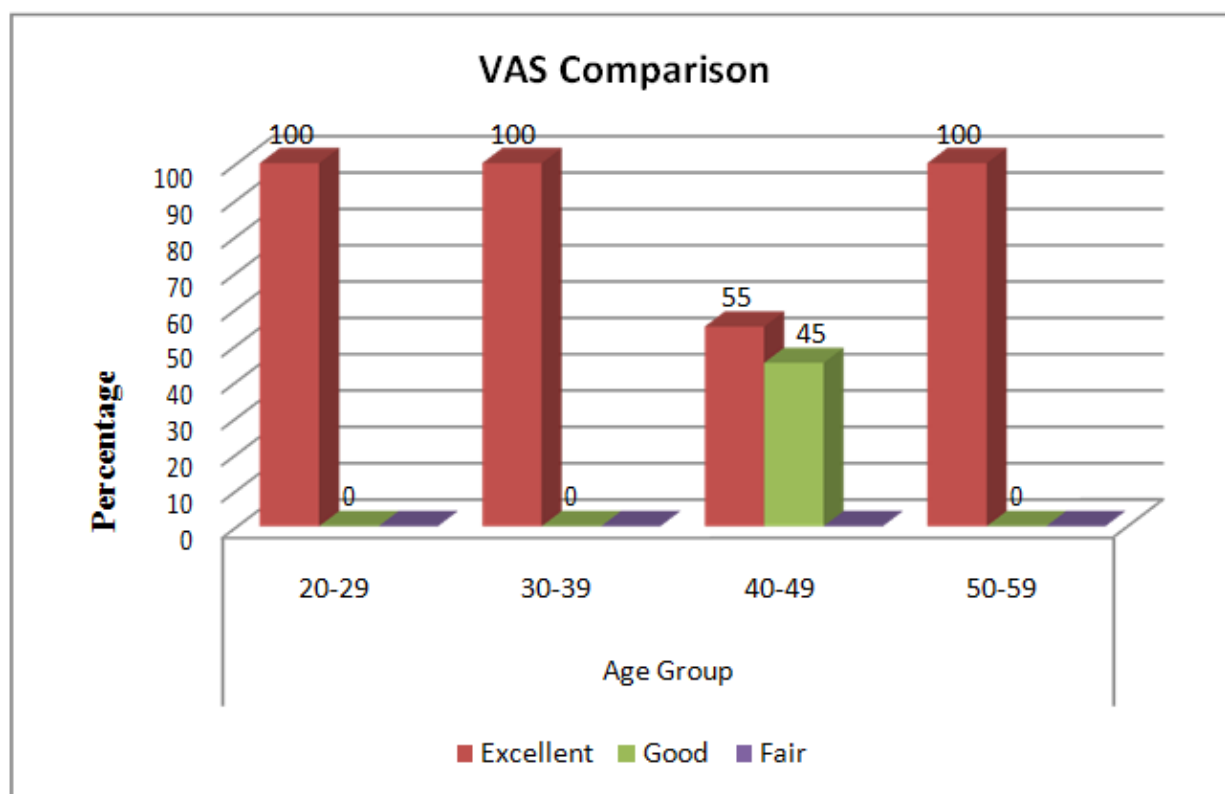


Table 2: Comparison of VAS score with age in Plantar Fascitis:

VAS Score	Age Group				Total
	20-29	30-39	40-49	50-59	
Excellent	2 (100%)	8 (100%)	11 (55%)	10 (100%)	31 (77.5%)
Good	0	0	9 (45%)	0	9 (22.5%)
Fair	0	0	0	0	0
Total	2 (100%)	8 (100%)	20 (100%)	10 (100%)	40 (100%)
Chi sq	11.613		P value	0.009*	

*-Significant (p<0.05)



MEAN PAIN SCORE:

Pain score was assessed at the time of injection. The mean pain score of all the patients was 8.5 %. The mean pain score at 1,2,3 months was 4.825%, 3.3125%, and 1.935% respectively. When individually analyzed mean pain score for lateral epicondylitis at 0, 1,2,3 months was 8.55%, 4.725%, 3.25%, 1.9 % respectively. Similarly mean pain score for plantar fasciitis at 0,1,2,3 months was 8.45%,4.925%,3.375%,1.925% respectively.

Table 3: Mean pain score:

Patients	Mean pain score at the time of injection	Mean pain score 1 st month	Mean pain score at 2 nd month	Mean pain score at 3 rd month
Lateral epicondylitis (40)	8.55%	4.725%	3.25%	1.9%
Plantar fasciitis (40)	8.45%	4.925%	3.375%	1.925%
Total (80)	8.5%	4.825%	3.3125%	1.935%

The mean difference between in VAS scoring system at the time of presentation was 8.5%, and there was gradual and significant improvement in VAS scoring system of both lateral epicondylitis and plantar fasciitis. Which showed as 4.825% at 1st month, 3.3125% at 2nd month, and 1.935% at 3rd month respectively.

Discussion

The growing trend in using platelet rich plasma injection for condition like plantar fasciitis and lateral epicondylitis had significantly improved in last decade. The steep rise in use of platelet rich plasma is because of good functional outcome of this modality. We have taken up this study to evaluate the efficacy of platelet rich plasma in lateral epicondylitis and plantar fasciitis. We selected a sample size of 80 patients who were suffering from lateral epicondylitis and plantar fasciitis. The number of patients were divided into 40(100%) for plantar fasciitis and 40(100%) for Lateral epicondylitis. Out of which the sex distribution which was attributed to lateral epicondylitis was 22 males (55%) and 18 females (45%) and plantar fasciitis was 15 males (37.5%) and 25 females (62.5%).

Comparison of VAS score at each age group for lateral epicondylitis had a significant difference in their functional outcome at the end of mean follow up period of 3 months. The p value was 0.023. Which was found to be significant. Similarly comparison of VAS score at each group for plantar fasciitis had a significant difference at the end of mean follow up period of 3 months. The P value was 0.009. Which was found to be significant.

The comparison of these groups for lateral epicondylitis and plantar fasciitis at different age groups had shown significant difference in their outcome at the end of 3 months. Therefore usage of platelet rich plasma injection for lateral epicondylitis and plantar fasciitis has shown significant outcome due to its healing properties.

CONCLUSION

The significant difference in P value in different age groups had shown a proportionate improvement due to platelet rich plasma injection in varying age groups. Hence this type of management decreases the progressiveness for surgical management of lateral epicondylitis and plantar fasciitis.

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Ethical approval: The study was approved by the Institutional Ethics Committee

CONFLICT OF INTEREST

The authors declare no conflict of interest.

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