IOSR Journal of Dental and Medical Sciences (IOSR-JDMS)
e-ISSN: 2279-0853, p-ISSN: 2279-0861.Volume 25, Issue 6 Ser. 6 (June. 2026), PP 34-46
www.iosrjournals.org

The Effectiveness of Intralesional Injection of Steroids in Patients Diagnosed with Plantar Fasciitis

Rakesh Kiran Yalavarthi,[1] Satheesh S. Gottipati,[1] Gunturu Varsha,[2] Nemalikanti Viharika,[2] Sai Sravanthi Sunkara,[2] Chalamcharla Sai Vamsi,[2] Juturu Revathi Devi[2].

[1]*Dr. Rakesh Kiran Yalavarthi, M.B.B. S, M.S (Ortho). Sr. Consultant Aster Ramesh Hospital, Guntur, Andhra Pradesh, India.*

[1]*Mr. Satheesh S. Gottipati pharmacy practice Dean of Academics & Chief Preceptor Vignan Pharmacy College, Guntur, Andhra Pradesh, India.*

[2] *pharmacy practice Student, Vignan Pharmacy College, Guntur, Andhra Pradesh, India.*

Abstract:

Background:

One of the most frequent causes of heel pain is plantar fasciitis, which is brought on by inflammation and degradation of the plantar fascia, a thick band of tissue that supports the foot's arch. Heel discomfort is commonly experienced by patients, particularly after extended periods of rest or during the first steps in the morning. Plantar fasciitis can develop as a result of risk factors such obesity, extended standing, excessive physical activity, flat feet, high arches, and aging. Walking capacity, everyday activities, and general quality of life can all be impacted by the illness. Some individuals nevertheless have persistent symptoms despite the widespread use of conservative treatments such rest, stretching exercises, physical therapy, and painkillers. Intralesional corticosteroid injections are commonly used in these situations to relieve pain and reduce inflammation. One corticosteroid that is frequently used for this purpose is triamcinolone acetonide (40 mg). Therefore, by evaluating pain alleviation, functional improvement, quality of life, and treatment results over the follow-up period, this study was carried out to analyse the efficacy of intralesional steroid injections in patients diagnosed with plantar fasciitis.

Materials & methods:

This prospective observational study was conducted in the Department of Orthopaedics at Aster Ramesh Hospital, Guntur, Andhra Pradesh, India, from August 2025 to January 2025. A total of 50 patients aged 25–70 years diagnosed with plantar fasciitis were enrolled after obtaining informed consent and IEC approval. All patients received intralesional Triamcinolone Acetonide (40 mg) injection as part of routine treatment. Baseline clinical characteristics, pain scores, Foot Function Index (FFI), and quality-of-life parameters were recorded using a structured questionnaire. Patients were followed for up to two months after injection, and treatment outcomes were assessed during follow-up visits. The effectiveness of steroid therapy was evaluated by comparing pre- and post-injection pain scores, functional status, and quality-of-life outcomes.

Results: *Pain scores showed a significant reduction from pre-treatment (2.12 ± 0.73) to post-activity (0.76 ± 0.78), and this difference was statistically significant ($p < 0.001$).*

Conclusion: *Intralesional triamcinolone acetonide injection is an effective treatment modality for plantar fasciitis, resulting in significant pain reduction and functional improvement. A small proportion of patients with persistent symptoms may require surgical intervention as a further management option.*

Key word*: Plantar Fasciitis, Heel Pain, Intralesional Steroid Injection, Triamcinolone Acetonide, Foot Function Index, Quality of Life, Pain Assessment, Functional Outcomes.*

Date of Submission: 13-06-2026 Date of Acceptance: 25-06-2026

I. INTRODUCTION

Plantar fasciitis is a common condition that causes pain and inflammation in the plantar fascia, a thick band of tissue that connects the heel bone and toes. The most prevalent age range for plantar fasciitis is between 40 and 60, making up around 15% of foot injuries in the general population, with no discernible gender difference. Although it affects both athletes and non-athletes, runners are far more likely to experience it. It frequently results in significant pain and disability that interferes with day-to-day activities and general quality of life. Higher BMI in non-athletes, weight-bearing activities, decreased foot muscle strength and volume, restricted ankle and toe mobility, calcaneal spurs, and structural foot abnormalities are risk factors for plantar fasciitis. Plantar fasciitis is

assumed to occur by local inflammation, fascia degradation, or a mix of both, while the precise aetiology is still unknown. The word "plantar fasciosis" refers to the degenerative process of advancement. [1]

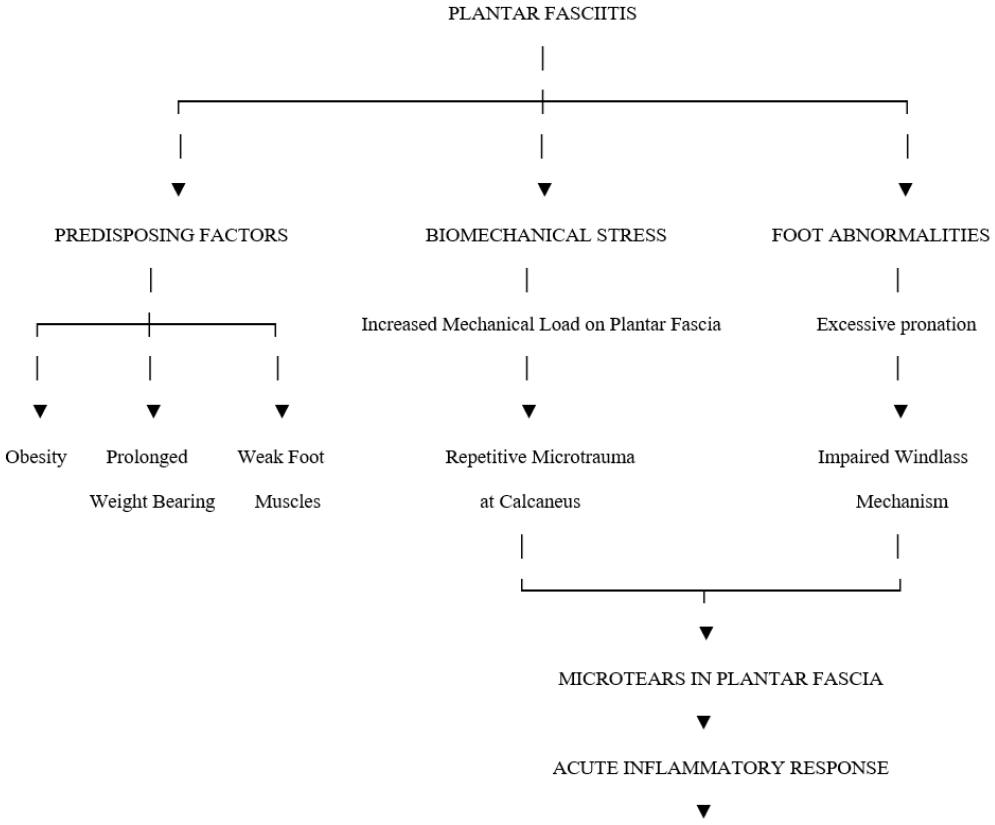
Epidemiology

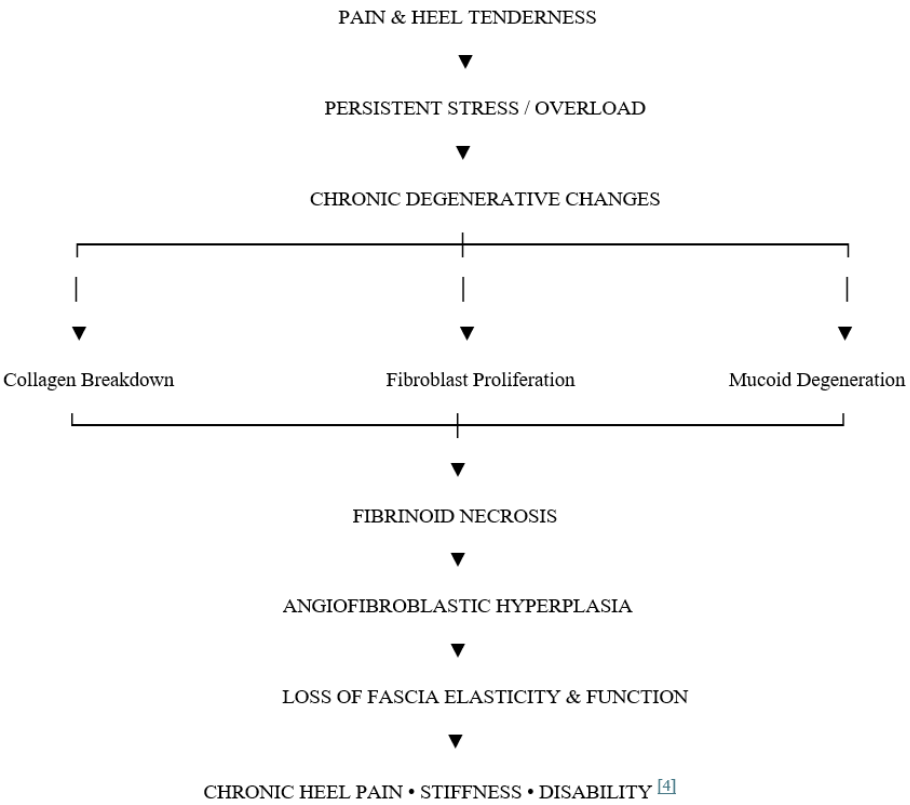
Since plantar fasciitis is the most frequent cause of heel pain in an outpatient department, it is a significant public health issue. In the United States, 10% of people may experience heel discomfort at some point in their lives, with 83% of patients being active, working adults between the ages of 25 and 65.3 In the United States alone, more than two million people are treated for plantar fasciitis. The estimated annual cost of treating plantar fasciitis in the United States is $284 million.5 Research has indicated that the prevalence of plantar fasciitis among runners ranges from 4% to 22%. According to one study, plantar fasciitis was more common in senior athletes (6.6%) than in younger athletes (2.5%).8 It has been demonstrated that elevated body mass index (BMI) is a significant risk factor for plantar fasciitis; those with a BMI of more than 30 kg/m2 are more susceptible than those with a BMI of less than 25 kg/m2. [2]

Anatomy

One way to think of the plantar fascia is as the plantar arch chord. The adductor hallucis is covered by the medial bundle; the abductor digiti quinti is covered by the lateral bundle; and the real plantar fascia is thought to be the central bundle, which arises from the medial tubercle of the calcaneus. This completely encompasses the foot's intrinsic plantar muscles, which split distally into five bands that attach at the base of the five toes' proximal phalanges after reaching the plantar plates of the metatarsophalangeal joints. [3]

Pathophysiology





Clinical diagnosis

The diagnosis of plantar fasciitis is mainly made clinically. Patients typically report medial plantar heel pain when bearing weight, which is frequently at its worst in the first few steps in the morning, but they usually get better after sleeping. Over the course of the day, this pain may worsen, particularly after extended standing. Rising from a seated position might cause acute exacerbations at any time. Doctors should consider other plantar fasciitis risk factors and determine whether the patients' footwear choices are suitable for their daily activity.

Both lower limbs should undergo a comprehensive musculoskeletal evaluation. Reproducible pain with probing of the plantar medial aspect of the heel and pain with passive dorsiflexion of the ankle are classic physical examination findings suggestive of plantar fasciitis. as well as toes (windlass test). There may be a contributing cavus or planus foot malformation. Ankle range of motion ought to be evaluated as well. An equinus contracture is indicated by active dorsiflexion that is less than 10° beyond neutral.

The distinguishing physical examination and historical findings of other items in the differential diagnosis of plantar fasciitis are summarized in the table.

For the initial assessment of plantar fasciitis, diagnostic imaging is not advised. To rule out other factors, however, magnetic resonance pictures, triple-phase bone scans, or other imaging results might be necessary, in the differential diagnosis, especially if the patient has unusual heel pain or if nonsurgical treatment has failed for four to six months.

Diagnosis	History	Physical Examination Findings	Diagnostic Imaging
Skeletal Origin			
Acute calcaneal tuberosity/body fracture	High-energy axial overloading through heel such as from a fall or MVA	Patients often unable to ambulate; acute ecchymosis and swelling of heel	Plain radiography
Calcaneal stress fracture	Overuse injury associated with sudden increase in athletic activity; deep, dull pain in calcaneal tuberosity worsened by walking on hard surfaces	Reproducible pain with simultaneous medial and lateral compression of calcaneus (squeeze test)	MR imaging, single-phase bone scan
Subtalar and talonavicular arthritis	Insidious lateral and medial heel pain, respectively, and relieved with rest	Pain, swelling, and stiffness worsened by weight-bearing activity	Plain radiography
Soft Tissue Origin			

Diagnosis	History	Physical Examination Findings	Diagnostic Imaging
Acute plantar fascia rupture	Acute plantar "pop" followed by severe heel pain with foot swelling	Ecchymosis and swelling in plantar heel and midfoot; palpable mass under medial arch may exist	Non contrast MR imaging
Fat pad atrophy	Centrally located heel pain worsened by walking on hard surfaces; most common in elderly patients	Deep pain with palpation of medial aspect of heel	MR imaging
Insertional Achilles tendinitis	Posterior heel pain worsened by ascending stairs or hills	Point tenderness over posterior tendon of foot; Achilles contracture may be present	Noncontract MR imaging
Retrocalcaneal bursitis	Pain in posterior heel near calcaneal insertion of Achilles tendon; common in runners	Pain with passive dorsiflexion and eversion of the foot	Noncontract MR imaging, plain radiography
Neurogenic Origin			
Tarsal tunnel syndrome	Pain radiating from the medial malleolus into the foot, which may worsen throughout the day; improves with rest of intrinsic foot muscles	Plantar paresthesias elicited by tapping the tibial nerve behind the medial malleolus (Tinel sign); plantar sensory loss or atrophy	Electrodiagnostic studies, MR imaging, US
LPN/MCN entrapment	Plantar foot pain consistent throughout day	LPN: tender over lateral plantar aspect of foot; possible atrophy of abductor digiti minimi. MCN: tender over plantar aspect of medial arch; no muscle atrophy	Electrodiagnostic studies, MR imaging, US
S1 radiculopathy	Radiating pain traveling down the posterior aspect of leg	Diminished ankle jerk reflex and weakened plantar flexion of foot; weakened toe walking	Electrodiagnostic studies, MR imaging, US
Peripheral neuropathy	Risk factors for peripheral neuropathy; gradual onset of diffuse pain, numbness or tingling in foot that may progress to sharp, jabbing pain	Decreased sensation to vibration, light touch, temperature, and pain; hair loss, smooth skin, muscle atrophy, ulceration, and progressive clawing of toes	Electrodiagnostic studies, nerve biopsy, noncontract MR imaging, US [5]

Risk factors

The primary risk factors for plantar fasciitis in physically active people were as follows, per the systematic review and meta-analysis Risk Factors for Plantar Fasciitis in Physically Active Individuals: A Systematic Review and Meta-analysis:

- Expanded range of motion (ROM) for ankle plantarflexion
- People who had more plantarflexion range of motion were more likely to develop PF.
- Increased BMI (body mass index)
- Plantar fasciitis was substantially correlated with elevated BMI.
- Increased weight (body mass)
- Being overweight was found to be a risk factor because it put more strain on the plantar fascia. [6]

Symptoms

The following symptoms (clinical characteristics) of plantar fasciitis are listed in the review article:

- Heel pain on the medial side
- Heel discomfort that is most apparent during the initial steps following period of inactivity, particularly in the morning
- Pain that gets better with daytime activity
- Pain that becomes worse as the day goes on
- The worsening of symptoms during extended weight-bearing activities
- Pain that occasionally spreads to the entire foot and toes
- The medial calcaneal tuberosity is painful.
- Toe dorsiflexion and tiptoeing exacerbate the pain.
- Achilles tendon tightness
- Usually only affects one foot (unilateral), though occasionally both feet may be affected.
- It is rare to experience paraesthesia (tingling/numbness). [7]

Treatment – surgical

Patients with plantar fasciitis who do not respond to conservative treatment may undergo a number of surgical treatments, according to the research paper Surgical treatment options for plantar fasciitis and their effectiveness: a systematic review and network meta-analysis. The following surgical therapy options were found in the review:
• A plantar fasciotomy that is open Endoscopic plantar fasciotomy

• Release of the gastrocnemius
• Micro tenotomy using radiofrequency
• Dry needling
According to the review, all of these surgical procedures improved pain and functional results, including higher scores on the American Orthopaedic Foot and Ankle Society (AOFAS) and Visual Analog Scale (VAS). Furthermore, no significant side effects were linked to the examined treatment approaches. [8]

Non-surgical treatment
According to the review article Plantar fasciitis, non-surgical (conservative) treatment of plantar fasciitis is the main and first-line approach for most patients. The article highlights several effective conservative management options as follows:
1. First-line non-surgical treatment
The initial management includes:
- Rest and activity modification
- Ice packs or heat therapy
- Non-steroidal anti-inflammatory drugs (NSAIDs)
- Plantar fascia and calf muscle stretching exercises
- Foot orthoses (insoles / arch supports)

These are considered the primary and most important treatments, with plantar stretching and orthosis showing particularly good outcomes.
2. Second-line non-surgical treatment (if symptoms persist)
If patients do not improve with initial therapy, the following are recommended:
- Corticosteroid injections
- Night splints (especially for symptoms lasting more than 6 months)
- Extracorporeal Shock Wave Therapy (ESWT)

These are used when pain persists despite basic conservative measures.
3. Additional non-surgical options mentioned
The review also notes other conservative treatments, though with less strong evidence:
- Heel pads and magnetic insoles
- Walking casts or taping
- Ultrasound therapy
- Platelet-rich plasma (PRP) injections (emerging therapy) [9]

Prevention
Prevention of plantar fasciitis
The article explains that prevention of plantar fasciitis is mainly based on reducing mechanical overload and controlling risk factors. Key preventive strategies include:
- Weight control / avoiding obesity to reduce stress on the plantar fascia
- Regular stretching exercises of the calf muscles and plantar fascia to improve flexibility
- Proper footwear with good arch support and cushioning to reduce heel stress
- Avoiding excessive or sudden increase in physical activity, especially running or prolonged standing
- Early correction of biomechanical abnormalities such as tight Achilles tendon or limited ankle dorsiflexion
- Use of orthotic devices in individuals with abnormal foot mechanics or high risk. [10]

II. MATERIALS & METHODS

Methods and Subjects
This prospective observational study was carried out in the Department of Orthopaedics at Aster Ramesh Hospital, Guntur, Andhra Pradesh, India, a 300-bedded tertiary care hospital, from August 2025 to January 2025. The study was conducted after obtaining approval from the Institutional Ethics Committee. A total of 50 subjects diagnosed with plantar fasciitis were enrolled in the study based on the predefined inclusion and exclusion criteria.
Study Design: Prospective observational study.
Study Location: This was a hospital-based study conducted in the Department of Orthopaedics at Aster Ramesh Hospital, Guntur, Andhra Pradesh, India.
Study Duration: August 2025 to January 2026 (6 months).
Sample Size: A total of 50 patients diagnosed with plantar fasciitis were included in the study.

Subject Selection Method: The study population consisted of patients attending the Orthopaedics Department of Aster Ramesh Hospital with clinically diagnosed plantar fasciitis. Eligible patients who met the inclusion criteria and provided written informed consent were recruited consecutively during the study period.

Inclusion Criteria:

- Adults aged 25 to 70 years.
- Able and willing to provide informed consent.
- Clinically diagnosed with plantar fasciitis.
- Heel pain persisting for at least 4 weeks.
- Able to understand and respond to study questionnaires.

Exclusion Criteria:

- Individuals with foot pain due to other conditions such as arthritis, neuropathy, or Achilles tendinopathy.
- Individuals with severe cognitive impairment preventing informed consent.
- History of foot or ankle surgery or major trauma within the previous 6 months.
- Pregnant women.
- Non-ambulatory patients who were unable to walk or bear weight.

Procedure methodology:

A well-structured data collection form and questionnaire were used to prospectively collect data from patients diagnosed with plantar fasciitis attending the Department of Orthopaedics at Aster Ramesh Hospital, Guntur, Andhra Pradesh, India, following approval from the Institutional Ethics Committee (IEC) and written informed consent from all participants.

Sociodemographic information including age, gender, height, weight, occupation, and hospital identifying details were all included in the questionnaire. At baseline, clinical data such as chief complaints, current medical history, past medical history, pharmaceutical history, surgical history, history of trauma, and physical examination findings such flat feet, high arches, edema, and heel valgus were documented.

Based on medical history and clinical examination, orthopaedic experts and resident physicians clinically diagnosed plantar fasciitis in all enrolled patients. A standardized questionnaire was used to measure baseline pain characteristics, such as location of pain, duration of symptoms, afflicted heel (right, left, or both), pain during weight-bearing activities, morning pain, activity-related pain, stiffness, impairment, and medication use.

The Foot Function Index (FFI) pain assessment scale and a standardized pain scoring system were used to gauge the degree of pain. Pain before getting out of bed, pain when standing and walking with or without shoes, pain at the end of the day, pain before bed, and the effect of pain on daily activities were all assessed in the FFI questionnaire. Further details about the length of pain, frequency of drug use, and sleep disturbance

Prior to the steroid injection and during follow-up appointments, quality of life was evaluated. Over the course of the trial, functional outcomes including walking ability, standing tolerance, stair climbing, weight-bearing activities, and general daily functioning were assessed.

As part of standard clinical care, intralesional corticosteroid injections were administered to each subject. Under the guidance of orthopaedic experts and resident physicians, Triamcinolone Acetonide (40 mg) was injected as a corticosteroid at the location of greatest plantar fascia soreness.

Patients were prospectively tracked for treatment outcomes after the injection was administered. Pain severity, duration, quality of life, functional status, and clinical examination results were among the post-treatment evaluations. Within 48 hours following injection, changes in pain severity, the start of pain reduction, and any discomfort or side effects at the injection site were recorded in order to assess the early treatment response.

Depending on clinical needs and patient availability, patients were monitored for a maximum of two months, with one or more follow-up visits. Post-injection pain scores, morning pain, activity-related pain, sleep disruptions, length of pain-free intervals, walking comfort, and pain interference with daily activities were measured during follow-up visits and compared to baseline results.

The decrease in heel discomfort after intralesional triamcinolone acetonide injection served as the main outcome measure. Improvements in quality of life, functional capacity, Foot Function Index scores, length of pain relief, and incidence of side effects after treatment were all considered secondary end measures.

Statistical Analysis

Data was analysed using SPSS version 20 (SPSS). Student's t-test was used to ascertain the significance of differences between mean values of two continuous variables and confirmed by nonparametric Mann-Whitney test. In addition, paired t-test was used to determine the difference between baseline and this was confirmed by the Wilcoxon test which was a nonparametric test that compares two paired groups. Chi-square and Fisher exact tests were performed to test for differences in proportions of categorical variables between two or more groups. The level $P < 0.05$ was considered as the cutoff value or significance, pre-injection and post-injection pain scores,

Foot Function Index (FFI) scores, and quality-of-life assessments were compared to evaluate the effectiveness of intralesional corticosteroid therapy.

III. RESULTS

Gender	participants	Percentage(%)	Mean ± Standard Deviation
Male	15	30%	0.30 ± 0.46
Female	35	70%	

Table no 1Individual Result for Gender

Among the 50 participants 66 foots included in the study, 35 (70%) were female and 15 (30%) were male. Females represented the predominant proportion of the study population, suggesting a greater occurrence of plantar fasciitis among women in this sample. The gender distribution was expressed as **0.30 ± 0.46**.

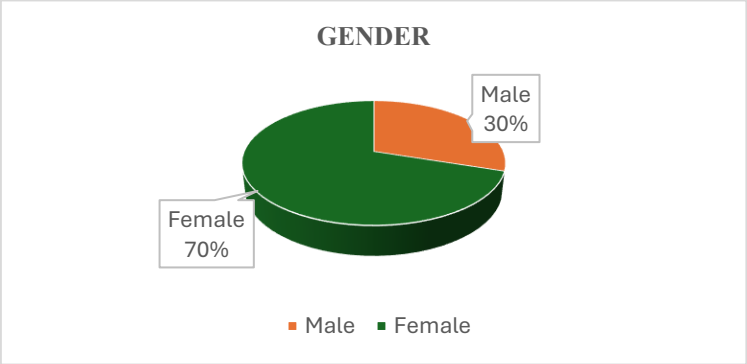


Table no 2 Individual Result for Age

Age	participants	Percentage(%)	Mean ± Standard Deviation
≤20 years	1	2%	46.38 ± 10.19
21–30 years	1	2%	
31–40 years	9	18%	
41–50 years	25	50%	
51–60 years	8	16%	
>60 years	6	12%	

Among the 50 participants 66 foots, the highest proportion was observed in the 41–50 years age group (n = 25, 50%). Participants aged 31–40 years and 51–60 years accounted for 18% (n = 9) and 16% (n = 8), respectively. Six participants (12%) were older than 60 years, whereas only one participant (2%) each was aged ≤20 years and 21–30 years. The overall mean age of the participants was **46.38 ± 10.19 years**.

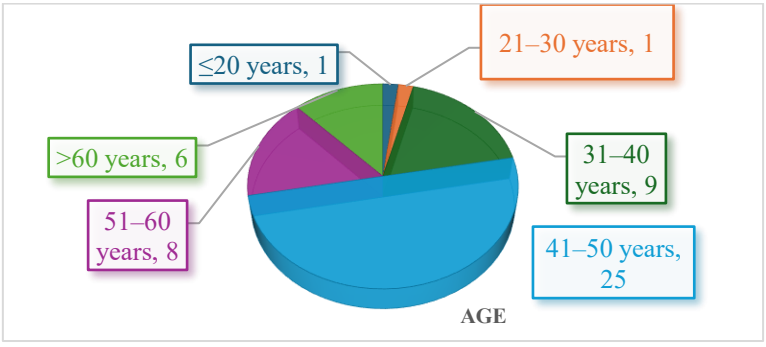


Table no 3 Individual Result for Height

Height(cm)	participants	Percentage(%)	Mean ± Standard Deviation
<150	2	4%	160.88 ± 7.71
150–159	19	38%	
160–169	22	44%	
≥170	7	14%	

Among the 50 participants 66 foots, the highest proportion was observed in the 160–169 cm height category, accounting for 22 (44%) of the study population. Participants with heights ranging from 150–159 cm constituted 19 (38%), while 2 (4%) participants had a height of less than 150 cm. The mean height of the study participants was **160.88 ± 7.71**.

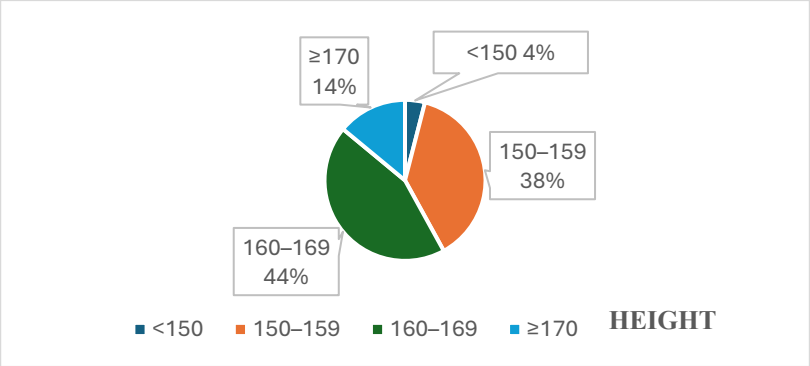
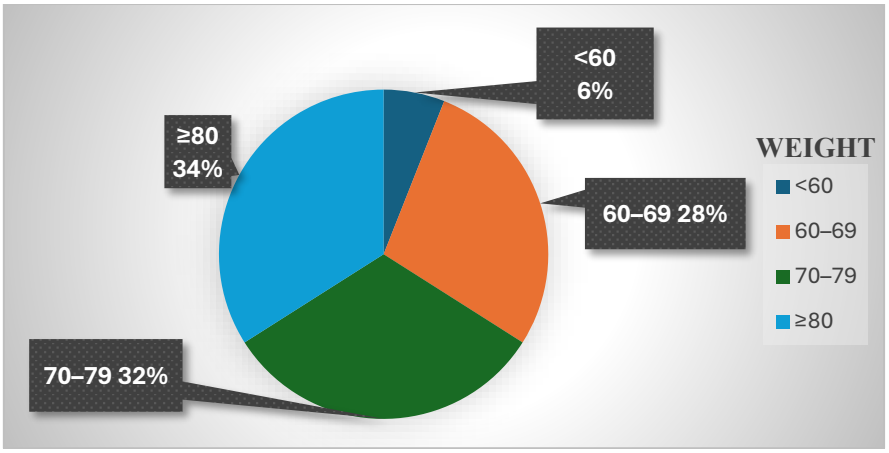


Table no 4 Individual Result for Weight

Weight (kg)	participants	Percentage(%)	Mean ± Standard Deviation
<60	3	6%	73.70 ± 9.90
60–69	14	28%	
70–79	16	32%	
≥80	17	34%	

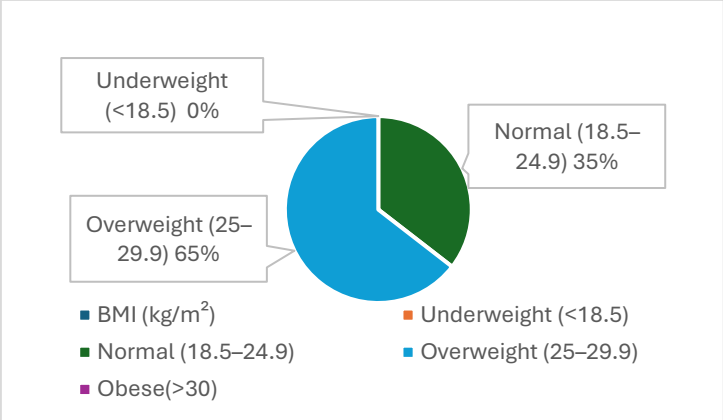
Among the 50 participants 66 foots, the highest proportion was observed in the ≥80 kg weight category, accounting for 17 (34%) of the study population. Participants weighing 70–79 kg constituted 16 (32%), followed by those weighing 60–69 kg with 14 (28%) participants. Only 3 (6%) participants had a body weight of less than 60 kg. The mean body weight of the study participants was 73.70 ± 9.90 kg.



BMI(kg/m²)	participants	Percentage(%)	Mean ± Standard Deviation
Underweight (<18.5)	0	0%	28.58 ± 4.23
Normal (18.5–24.9)	11	22%	
Overweight (25–29.9)	20	40%	
Obese (≥30)	19	38%	

Table no 5 Individual Result for BMI

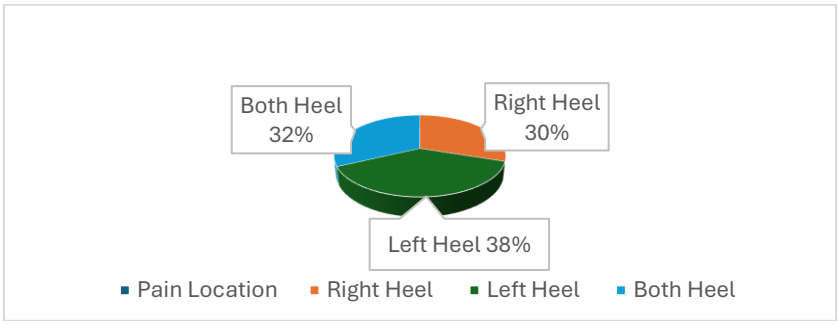
Among the 50 participants 66 foots, the highest proportion was observed in the overweight category (BMI 25–29.9 kg/m²), accounting for 20 (40%) of the study population. Participants classified as obese (BMI ≥30 kg/m²) constituted 19 (38%), while 11 (22%) participants had a normal BMI (18.5–24.9 kg/m²). No participants were categorized as underweight (BMI <18.5 kg/m²). The mean BMI of the study participants was **28.58 ± 4.23 kg/m²**.



Pain Location	participants	Percentage(%)	Mean ± Standard Deviation
Right Heel	15	30%	16.67 ± 2.08
Left Heel	19	38%	
Both Heel	16	32%	

Table no 6 Individual Result for Pain Location

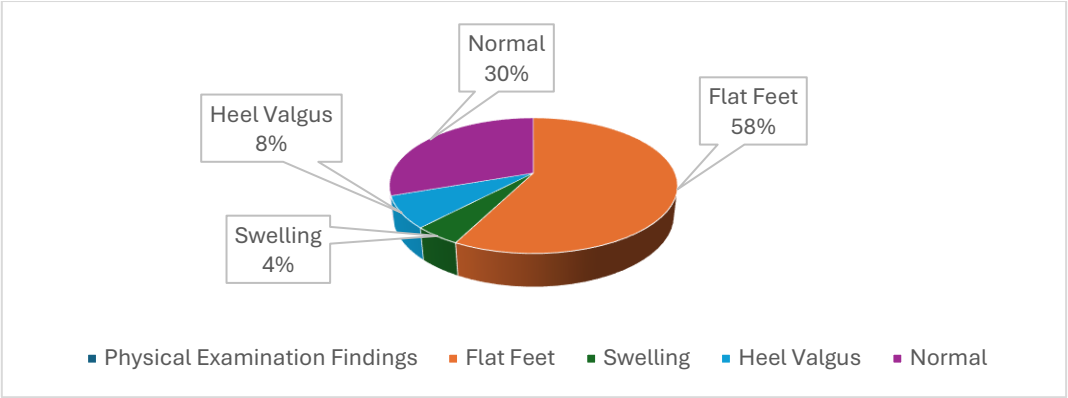
Among the 50 participants (66 feet), the highest proportion of pain was reported in the left heel, accounting for 19 (38.00%) of the study population. Pain in both heels was observed in 16 (32.00%) participants, while right heel pain was reported in 15 (30.00%) participants. The mean pain location score was 2.02 ± 0.82.



Physical Examination Findings	Feet	Percentage(%)	Mean ± Standard Deviation
Flat Feet	38	57.58%	2.11 ± 1.39
Swelling	3	4.55%	
Heel Valgus	5	7.58%	
Normal	20	30.30%	

Table no 7 Result for Physical Examination Findings

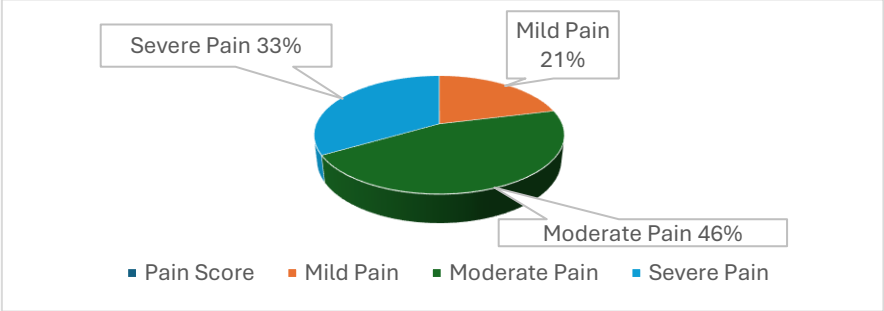
Among the 50 participants (66 feet), the highest proportion of physical examination findings was flat feet, accounting for 38 (57.58%) of the study population. Normal foot structure was observed in 20 (30.30%) participants, while heel valgus was reported in 5 (7.58%) participants. Swelling was the least common finding, observed in 3 (4.55%) participants. The mean physical examination score was 2.11 ± 1.39.



Pain Score	Feet	Percentage(%)	Mean ± Standard Deviation
Mild Pain	14	21.21%	2.12 ± 0.73
Moderate Pain	30	45.45%	
Severe Pain	22	33.33%	

Table no 8 Pre-Treatment Pain Score

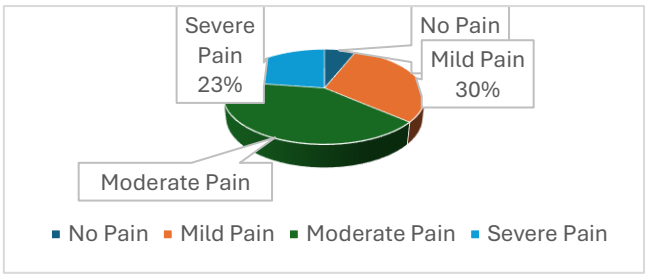
Among the 50 participants (66 feet), the highest proportion reported moderate pain, accounting for 30 (45.45%) of the study population. Severe pain was observed in 22 (33.33%) participants, while mild pain was reported in 14 (21.21%) participants. The mean pain score was 2.12 ± 0.73.



Pain Score	Feet	Percentage (%)	Mean ± Standard Deviation
No Pain	4	6.06%	1.80 ± 0.86
Mild Pain	20	30.3%	
Moderate Pain	27	40.91%	
Severe Pain	15	22.73%	

Table no 9 Pre Activity pain score

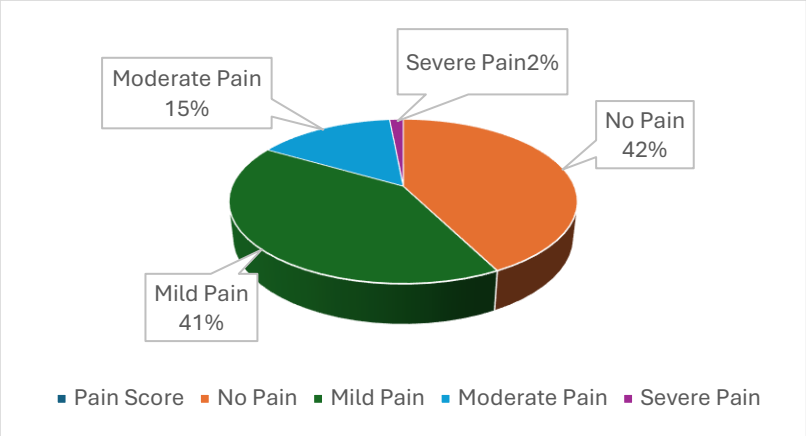
Among the 50 participants (66 feet), the highest proportion reported moderate pain, accounting for 27 (40.91%) feet. Mild pain was observed in 20 (30.30%) feet, while 15 (22.73%) feet reported severe pain. No pain was the least common finding, reported in only 4 (6.06%) feet. The mean pain score was 1.80 ± 0.86,



Pain Score	Feet	Percentage(%)	Mean ± Standard Deviation
No Pain	28	42.42%	1.76 ± 0.78
Mild Pain	27	40.91%	
Moderate Pain	10	15.15%	
Severe Pain	1	1.52%	

Table no 10 Post-Treatment Pain Score

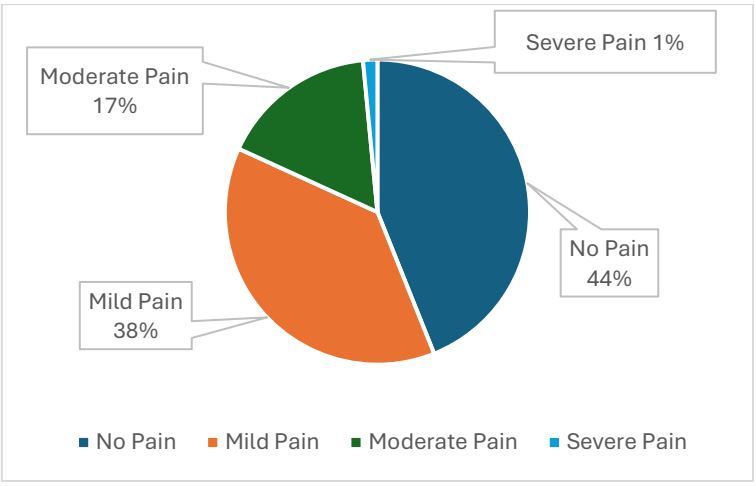
Among the 50 participants (66 feet), the highest proportion reported no pain, accounting for 28 (42.42%) of the study population. Mild pain was observed in 27 (40.91%) participants, while moderate pain was reported in 10 (15.15%) participants. Severe pain was the least common, observed in 1 (1.52%) participant. The mean pain score was 1.76 ± 0.78.

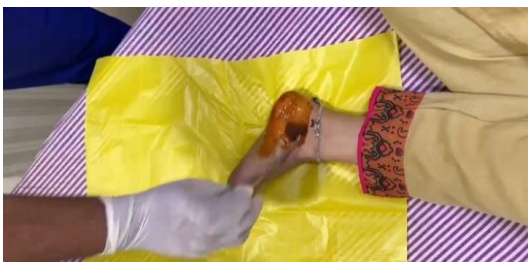


Pain Score	Feet	Percentage(%)	Mean ± Standard Deviation
No Pain	29	43.94%	0.76 ± 0.78
Mild Pain	25	37.88%	
Moderate Pain	11	16.67%	
Severe Pain	1	1.52%	

Table no 11 Post Activity pain score

Among the 50 participants (66 feet) included in the study, the highest proportion reported no pain, accounting for 29 (43.94%) of the study population. Mild pain was observed in 25 (37.88%) feet, while moderate pain was reported in 11 (16.67%) feet. Severe pain was the least common, observed in 1 (1.52%) foot. The mean pain score was 0.76 ± 0.78.





Administration of Therapeutic Injection for Plantar Fasciitis

Targeted Needle Placement for Plantar Fascia Intervention,

IV.DISCUSSION

The present study provides a comprehensive analysis of demographic, anthropometric, clinical, and pain-related characteristics among individuals with plantar fasciitis. The findings demonstrate clear patterns in gender distribution, age prevalence, biomechanical factors, and treatment outcomes, which are consistent with existing literature on plantar fasciitis risk factors and symptom progression.

The gender distribution showed a higher prevalence among females (70%) compared to males (30%), suggesting that plantar fasciitis may be more common in women. This finding may be attributed to factors such as footwear choices, hormonal influences, and biomechanical differences in foot structure. The gender distribution score (0.30 ± 0.46) further reflects this imbalance in the study population.

Age-wise distribution indicated that the majority of participants were in the 41–50 years age group (50%), with a mean age of 46.38 ± 10.19 years. This suggests that plantar fasciitis is predominantly a middle-aged condition, likely due to cumulative mechanical stress, reduced tissue elasticity, and occupational load over time. The lower representation in younger age groups further supports the degenerative and overuse-related nature of the condition.

Anthropometric variables revealed that most participants had a height between 160–169 cm (44%) and a weight category of ≥80 kg (34%), with a mean weight of 73.70 ± 9.90 kg. The BMI distribution showed that a large proportion of participants were overweight (40%) or obese (38%), with a mean BMI of 28.58 ± 4.23 kg/m². These findings strongly suggest that increased body weight and higher BMI may contribute significantly to plantar fasciitis due to increased mechanical loading on the plantar fascia.

Regarding pain location, left heel involvement (38%) was slightly more common compared to right heel (30%) and bilateral heel pain (32%). This may indicate asymmetric loading patterns during gait or postural imbalances. The mean pain location score of 2.02 ± 0.82 reflects moderate distribution across affected sites.

Physical examination findings revealed that flat feet (57.58%) were the most common abnormality, followed by normal foot structure (30.30%), heel valgus (7.58%), and swelling (4.55%). The predominance of flat feet suggests a strong association between altered foot biomechanics and plantar fasciitis development. The mean physical examination score of 2.11 ± 1.39 further supports the presence of biomechanical abnormalities in the majority of participants.

Pain assessment before treatment indicated that moderate pain was most prevalent (45.45%), followed by severe pain (33.33%) and mild pain (21.21%), with a mean pre-treatment pain score of 2.12 ± 0.73. Similarly, pre-activity pain scores showed that moderate pain was highest (54%), indicating significant functional limitation during daily activities.

Following treatment, a marked improvement in pain levels was observed. Post-treatment results showed that 42.42% of participants reported no pain and 40.91% reported mild pain, with only 15.15% experiencing moderate pain and 1.52% severe pain. The mean pain score reduced to 1.76 ± 0.78. Further improvement was observed in post-activity pain scores, where 43.94% reported no pain and only 1.52% experienced severe pain, with a reduced mean score of 0.76 ± 0.78. This indicates that the intervention was effective in reducing both resting and activity-related pain in plantar fasciitis patients.

Overall, the study findings suggest that plantar fasciitis is more prevalent among middle-aged, overweight females with biomechanical foot abnormalities such as flat feet. The significant reduction in pain scores post-treatment highlights the effectiveness of the management strategy used in the study. These results are consistent with previous research emphasizing the role of mechanical stress, obesity, and foot structure abnormalities in the pathogenesis and progression of plantar fasciitis, as well as the benefit of conservative treatment approaches in pain reduction and functional improvement.

V. CONCLUSION

This study included 50 participants (66 feet). After treatment, significant improvement was observed: 42.42% of feet became pain-free, and 40.91% had only mild pain. Moderate pain reduced to 15.15%, and severe pain to 1.52%. Overall, 96% of participants showed favourable outcomes (no or mild pain), indicating strong clinical effectiveness of the intervention.

For few participants with persistent symptoms, surgical intervention options were suggested as a further management plan.

REFERENCES

[1]. Liebmann, K.; Kimbrough, D.W.; Best, T.M.; Kouroupis, D.; Rodriguez Materon, S. Plantar Fasciitis Pathophysiology and the Potential Role of Mesenchymal Stem Cell-Derived Extracellular Vesicles as Therapy. Biomedicines 2025, 13, 1528. Https://doi.org/10.3390/ biomedicines13071528

[2]. Dr. Milind choudhary 1 dr. Narindar singh 2, dr. Manorma singh 3 1PG scholar, PG Dept of Shalya Tantra, NIA, Jaipur, 1Associate professor, PG Dept of Shalya Tantra, NIA, Jaipur 1Lecturer, PG dept of Shalya Tantra, NIA, Jaipur http://www.ijrar.org/papers/IJRAR21D1126.pdf

[3]. Marina Gigli, and Lorenzo Ponziani Journal of Orthopaedics, Trauma and Rehabilitation Volume 32, Issue 2, December 2025, Pages 221-227 The Author(s) 2025, Article Reuse Guidelines https://doi.org/10.1177/22104917241303777

[4]. Liebmann, K.; Kimbrough, D.W.; Best, T.M.; Kouroupis, D.; Rodriguez Materon, S. Plantar Fasciitis Pathophysiology and the Potential Role of Mesenchymal Stem Cell-Derived Extracellular Vesicles as Therapy. Biomedicines 2025, 13, 1528. Https://doi.org/10.3390/ biomedicines13071528

[5]. John V. Thompson, DO; Sundeep S. Saini, OMS IV; Christopher W. Reb, DO; and Joseph N. Daniel, DO J Osteopath Med; 114(12): 900-901 https://doi.org/10.7556/jaoa.2014.177

[6]. Hamstra-Wright KL, Huxel Bliven KC, Bay RC, Aydemir B. Risk Factors for Plantar Fasciitis in Physically Active Individuals: A Systematic Review and Meta-analysis. Sports Health. 2021 May-Jun;13(3):296-303. Doi: 10.1177/1941738120970976. Epub 2021 Feb 3. PMID: 33530860; PMCID: PMC8083151. Https://pubmed.ncbi.nlm.nih.gov/33530860/

[7]. Tahririan MA, Motififard M, Tahmasebi MN, Siavashi B. Plantar fasciitis. J Res Med Sci. 2012 Aug;17(8):799-804. PMID: 23798950; PMCID: PMC3687890. Https://pmc.ncbi.nlm.nih.gov/articles/PMC3687890/

[8]. Nayar SK, Alcock H, Vemulapalli K. Surgical treatment options for plantar fasciitis and their effectiveness: a systematic review and network meta-analysis. Arch Orthop Trauma Surg. 2023 Aug;143(8):4641-4651. Doi: 10.1007/s00402-022-04739-0. Epub 2023 Jan 3. PMID: 36596990.https://pubmed.ncbi.nlm.nih.gov/36596990/

[9]. Tahririan MA, Motififard M, Tahmasebi MN, Siavashi B. Plantar fasciitis. J Res Med Sci. 2012 Aug;17(8):799-804. PMID: 23798950; PMCID: PMC3687890. Https://pmc.ncbi.nlm.nih.gov/articles/PMC3687890/

[10]. Rabadi D, Seo S, Wong B, Chung D, Rai V, Agrawal DK. Immunopathogenesis, early Detection, current therapies and prevention of plantar Fasciitis: A concise review. Int Immunopharmacol. 2022 Sep; 110:109023. Doi: 10.1016/j.intimp.2022.109023. Epub 2022 Jul 11. PMID: 35834954. Https://pubmed.ncbi.nlm.nih.gov/35834954/