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FUNCTIONAL OUTCOME OF ESSEX-LOPRESTI CLASSIFCATION OF CALCANEAL FRACTURES TREATED WITH MINIMALLY INVASIVE PERCUTANEOUS OSTEOSYNTHESIS (MIPO) FIXATION

First Author: **Dr. Shirsha Ray**, Resident, Department of Orthopaedics, Dr. D. Y. Patil Medical College, Hospital & Research Centre, Pune, India

Second Author: **Dr. Mizanur Rahaman Sk**, Resident, Department of Orthopaedics, Dr. D. Y. Patil Medical College, Hospital & Research Centre, Pune, India

Third Author: **Dr. Swaroop Solunke**, Assistant Professor, Department of Orthopaedics, Dr. D. Y. Patil Medical College, Hospital & Research Centre, Pune, India

Address of Correspondence: **Dr. Mizanur Rahaman Sk** (skmizanur29@gmail.com), Department of Orthopaedics, Dr. D. Y. Patil Medical College, Hospital & Research Centre, Pune, India

ABSTRACT

Introduction: Calcaneal fractures are 60% of all tarsal injuries and 2% of all fractures in adults. Although open reduction and internal fixation (ORIF) is the gold standard, it has been found to have soft-tissue problems that are proportionally related to the degree of surgical invasiveness. Because soft tissues are protected, minimally invasive percutaneous osteosynthesis (MIPO) procedures promise a lower risk of wound complications, a quicker recovery period, and faster healing.

Materials and Methods: 15 subjects for the study were selected from the patients who attended Out Patient Department (OPD) and In Patient Department (IPD) of the Department of Orthopaedics, Dr. D Y. Patil Medical College, Hospital & Research Centre, Pune, India after fulfilling the inclusion and exclusion criteria, and after obtaining informed written consent. The cases admitted were examined according to protocol both clinically and radiologically. Essex-Lopresti fracture classification was used and all the cases were operated by the same orthopaedic surgeon by minimally invasive percutaneous osteosynthesis (MIPO) fixation using calcaneal plates and/or CC screws within 3 weeks of injury. The patients were followed up prospectively at 2 weeks, 8 weeks, 12 weeks and 6 months post operatively and assessed by AOFAS Ankle-Hindfoot Score.

Results: On overall AOFAS score comparison, after 6 months of follow up, the AOFAS score was interpreted as ‘good’ in 73.3%, ‘fair’ in 26.7% and ‘poor’ in 0% of the total cases.

Conclusion: Fixation using the MIPO technique via the sinus tarsi or the MIO posterior approach is an effective and safe method for the treatment of calcaneal fractures to achieve anatomical restoration, stable fixation, early mobilisation with minimal soft tissue complications and a good functional outcome.

Keywords: calcaneum, MIPO, plating, foot, surgery

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INTRODUCTION

60% of all tarsal injuries are calcaneal fractures and 2% of all fractures in adults are calcaneal fractures[1]. The majority of them (70%) are intra articular. The most common cause, seen particularly in male construction workers, is falling from a height. Unfortunately, the majority of these people are the family's only wage earners. In addition to the patient's high morbidity, this increases the financial burden[2]. Thoraco-lumbar fractures are frequently associated with calcaneal fractures.

Calcaneal fractures were treated conservatively till the end of the 19th century with rest and limb elevation.

The debate between surgical vs non-surgical procedures is still ongoing, although recent research and other publications have tipped the scales in favour of surgery[3,4,5].

Although open reduction and internal fixation (ORIF) is the gold standard, it has been found to have soft-tissue problems that are proportionally related to the degree of surgical invasiveness.

Because soft tissues are protected, minimally invasive percutaneous osteosynthesis (MIPO) procedures promise a lower risk of wound complications, a quicker recovery period, and faster healing.

The two primary calcaneal fractures are:

- **Joint Depression type:** The fragment in this instance is short and barely reaches partially behind the posterior facet.
- **Tongue type**: The piece in this instance is lengthy and extends till the posterior aspect of the calcaneal tuberosity.

Essex-Lopresti defines these fracture lines[1]. Each fracture line crosses the posterior facet's postero-lateral region.

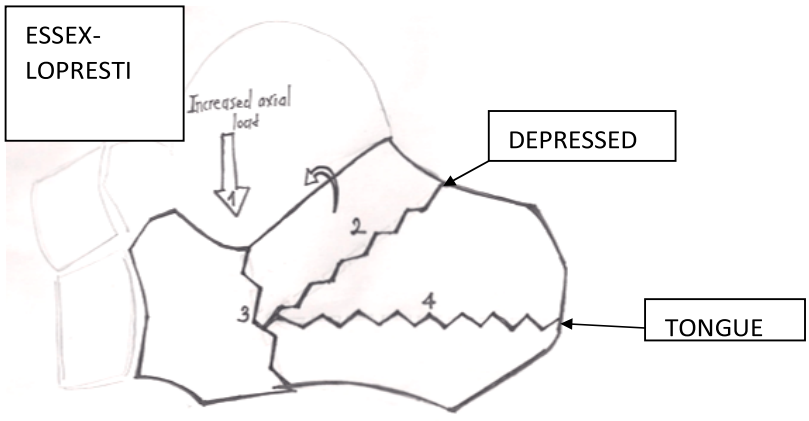

Fig 1: Essex-Lopresti Classification

Mechanism of injury:

Axial forces are virtually invariably the root cause of intra-articular fractures. The calcaneus tuberosity is situated just lateral to the talus. Shearing forces are transmitted through the

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posterior facet and toward the medial wall of the calcaneus by the axial load supplied to the posterior aspect through the talus[6].

The primary fracture line is made when the lateral process of the talus is pushed downward into the neck of the calcaneus, driving the subtalar joint into eversion[1,2,7]. The fracture line may emerge laterally anteriorly, typically at the angle of Gissane, although it may also advance distally as far as the calcaneal cuboid joint on occasion.

The sustentacular (anteromedial) and tuberosity (posterolateral) portions of the calcaneus are the two main segments separated by the primary fracture line, which travels medially. The sustentacular fragment is not significantly displaced and maintains its position since it is typically bound by its attachment to the incredibly robust talocalcaneal interosseous ligament. The sustentaculum-attached medial spike is pushed closer to the medial heel skin if the injury force is applied, and secondary fracture lines branch off the original shear line. The "thalamic fragment," which is the depressed area of the posterior subtalar facet, is produced by the posterior secondary fracture line. It is referred to as a joint depression type when it exits behind the posterior facet and before the Achilles tendon, and as a tongue type when it exits after the Achilles tendon. It typically tears the connection of the thalamic fracture from the lateral wall and generates a "blowout fracture," which results in a well-organized lateral bulge as the talus body forces the thalamic fragment into the spongy, cancellous bone of the calcaneus body fragment. The lateral bulge presses against the fibula calcaneal space as a result of the body fragment's lateral displacement, increasing the risk of fibula calcaneal impingement and peroneal tendon entrapment.

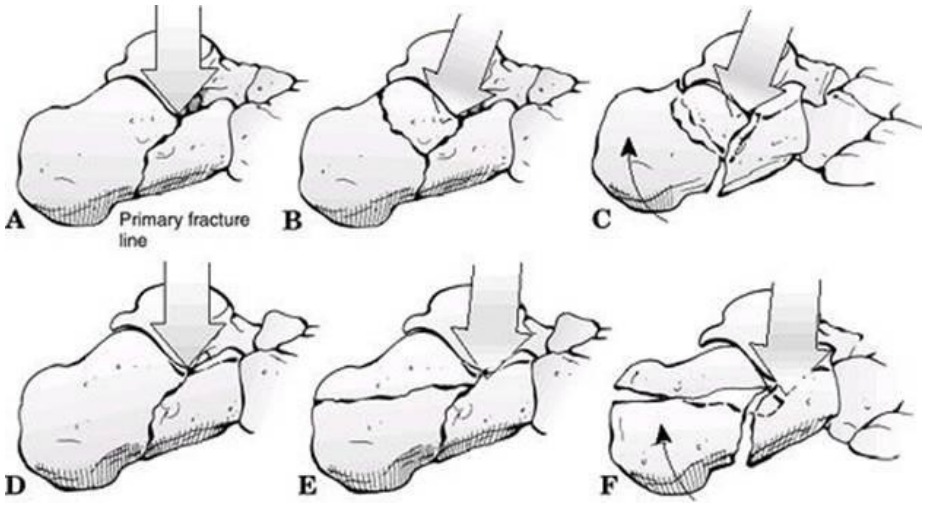

Fig 2: Mechanism of injury (A-C Joint depression type; D-F Tongue type)

AIM

AIM: To assess the functional outcome of Essex-Lopresti classification of calcaneal fractures treated with minimally invasive percutaneous osteosynthesis (MIPO) fixation.

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MATERIALS AND METHODS

15 subjects for the study were selected from the patients who attend Out Patient Department (OPD) and In Patient Department (IPD) of Department of Orthopaedics, Dr. D Y. Patil Medical College Hospital and Research Centre, Pimpri, Pune after fulfilling the inclusion and exclusion criteria and after obtaining informed written consent.
The cases admitted were examined according to protocol both clinically and radiologically. Essex-Lopresti fracture classification was used and all the cases were operated by the same orthopaedic surgeon by minimally invasive percutaneous osteosynthesis (MIPO) fixation using calcaneal plates and/or CC screws within 3 weeks of injury. The patients were followed up prospectively at 2 weeks, 8 weeks, 12 weeks and 6 months post operatively and assessed by AOFAS Ankle-Hindfoot Score.

IMPLANTS USED FOR FRACTURE FIXATION

1) **Arthrex Variable Angle Percutaneous Locking Plate (Fig 3, 4)**

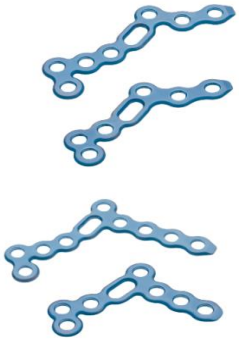

Fig 3 **Fig 4**

3.5mm screw system with the VAL guide allowing upto 15 degrees angulation.

2) **Stryker Corporation USA Modified Lateral Locking Plate (Fig 5, 6)**

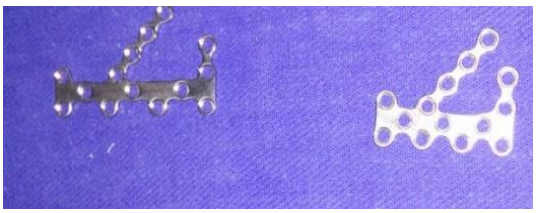

Fig 5

Fig 6

The standard laterally placed plate is thicker, and has been modified somewhat to have two arms perpendicular to the main plate, this is to allow tuberosity and anterior end stabilization. The oblique arm allows the placement screw in sustentacular region.

3) **Partially threaded 4.0/6.5mm Cannulated Cancellous Screws (Fig 7)**

SURGICAL APPROACH AND TECHNIQUE

Anaesthesia: Spinal or spinal+epidural

Patient position: Lateral decubitus

Approach: Depending on the fracture pattern and anatomy, either a MIO Posterior approach (preferred for tongue type fractures) or a minimally invasive Sinus Tarsi approach (preferred for joint depression type fractures) was used.

1) **MIO (Minimally Invasive Osteosynthesis) Posterior Approach:**

The anterolateral boundary of the Achilles tendon and the posterior border of the lateral malleolus were noted as landmarks for skin incision. From the level of the lateral malleolus' tip to halfway between the posterior border of the fibula and the anterolateral border of the Achilles tendon, an axially oriented incision measuring 3 to 4 cm was made (Fig 1a). A periosteum elevator was utilised to make a lateral calcaneal subfascial channel to fit the calcaneal plate after cutting the subcutaneous tissue directly to the bone (Fig 1b). A Steinmann pin was then introduced into the calcaneal tuberosity from the lateral side (Fig 1c). After that, traction was performed along the long axis of the foot to correct the varus and length of the calcaneus while the posterior articular surface was lowered by leverage. A periosteum elevator was inserted into the calcaneus and put beneath the posterior articular surface after the portion of the lateral wall had been partially exposed (Fig. 1d). Leverage was used to directly reduce the posterior articular surface while using C-arm fluoroscopy (Fig. 1e). A pre-bent calcaneus plate was inserted into the subcutaneous lateral channel after the calcaneus had undergone adequate anatomical reduction (Fig 1f). An identical plate was positioned on the implant area as a scope for selective stab incisions and screws were inserted into the rear calcaneal body, the subtalar articular surface, and the anterior process of the calcaneus through the stab incisions after C-

arm fluoroscopy confirmed the plate's correct placement (Fig. 1g). Following the placement of the plate and screw under C-arm fluoroscopy, rubber drains were placed, the incision was closed in layers, and then compression bandaging was applied (Fig. 1h).

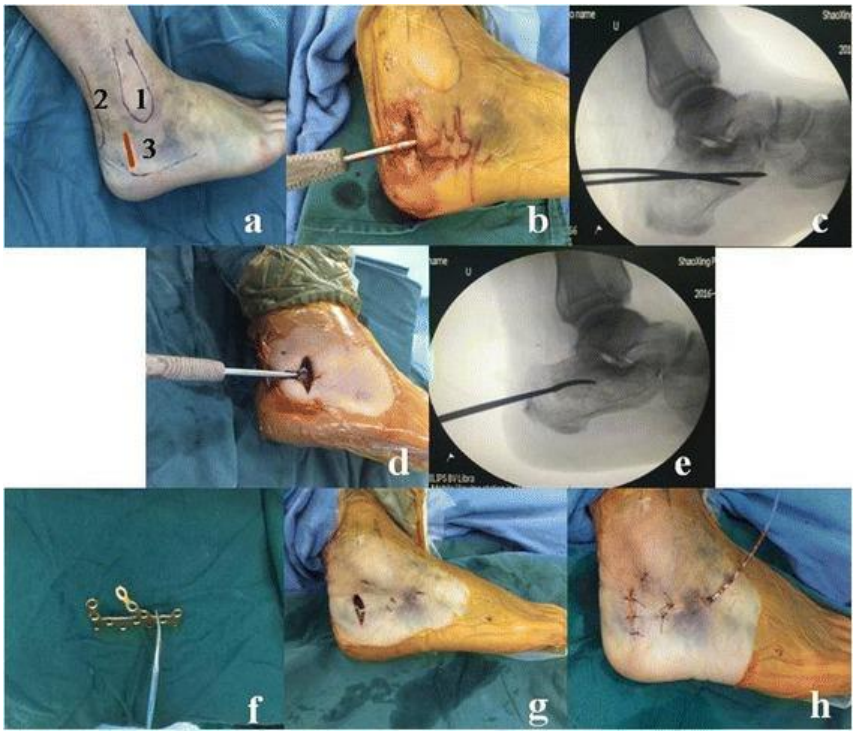

Fig 8: Case 1 via MIO Posterior Approach

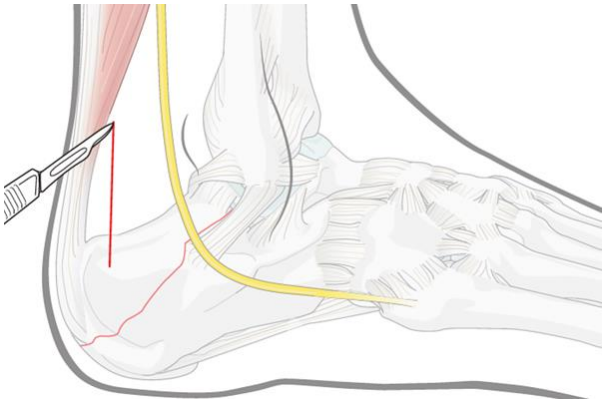

Fig 9: Incision for MIO Posterior approach

2) Minimally invasive Sinus Tarsi Approach:

From the fibula's tip to the base of the fourth metatarsal bone, a 4-5 cm straight incision was made (Fig 10, 12). Extensor digitorum brevis and peroneal tendons were retracted anteriorly and inferiorly, respectively, to reveal the posterior facet. By using an elevator, the posterior facet fragment was raised, restoring the joint. A Steinmann pin was then introduced into the calcaneal tuberosity from the lateral side and the calcaneal varus, length and width was corrected and temporarily fixed using K wires. Under the supervision of C-Arm fluoroscopy, a percutaneous calcaneal locking plate was properly installed following reduction. Fluoroscopy-guided delivery of the screws was done passing through a single cortex. The layers were properly sealed after the drain installation and compression bandaging was done.

Fig 10: Case 2 via Sinus Tarsi approach

Fig 11: Case 2 plate fixation

Fig 12: Case 3 via Sinus Tarsi approach

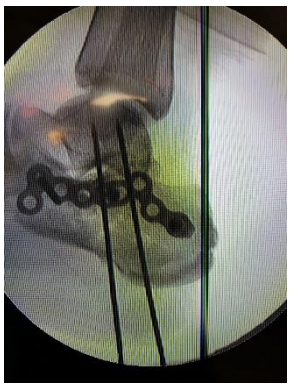

Fig 13: Case 3 plate fixation

POST OPERATIVE MANAGEMENT

- The patient was kept in a below knee slab on Bohler Braun frame elevation.

- Head low position with 2 blocks under the bed was given for the first 24 hours to avoid post spinal headache.

- IV antibiotics were given for first 5 days, then shifted to oral antibiotics for the next 5 days.

- Anti-inflammatory and analgesic drugs were given, as well as other supportive medications and tonics including calcium supplements.

- Dressings were done on the 2nd, 5th, and 8th post-operative days.

- On the 2nd post-operative day, if the wound showed uncomplicated healing and is healthy, early active range of motion was initiated at that time. During the second post-operative week, active range of motion of the ankle joint was started as well as gentle passive movement of the subtalar joint.

- Suture removal was done after 2 weeks if the wound was healthy.

- The patients were discharged with the advice to avoid full weight bearing on the affected limb till at least 12 weeks. After which the patient was allowed for partial weight bearing for 3 weeks and full weight bearing subsequently as per pain tolerance by the patient with a removable posterior splint.

- Patients were asked to follow up in OPD after 2 weeks, 8 weeks, 12 weeks and 6 months.

- At the end of 6 months, AOFAS (American Orthopaedic Foot and Ankle Society) Ankle-Hindfoot Score of the patient was calculated.

RESULTS AND OBSERVATIONS

Demographic Profile:

A total of **15** patients from the IPD and OPD of the Department of Orthopaedics, Dr. D Y Patil Medical College, Hospital & Research Centre were selected for the statistical analysis.

Table 1: Age distribution

Age group	Number of Cases	Percentage
≤20	1	6.67%
21-30	6	40%
31-40	3	20%

41-50	3	20%
51-60	2	13.33%

Mean age: 34.93

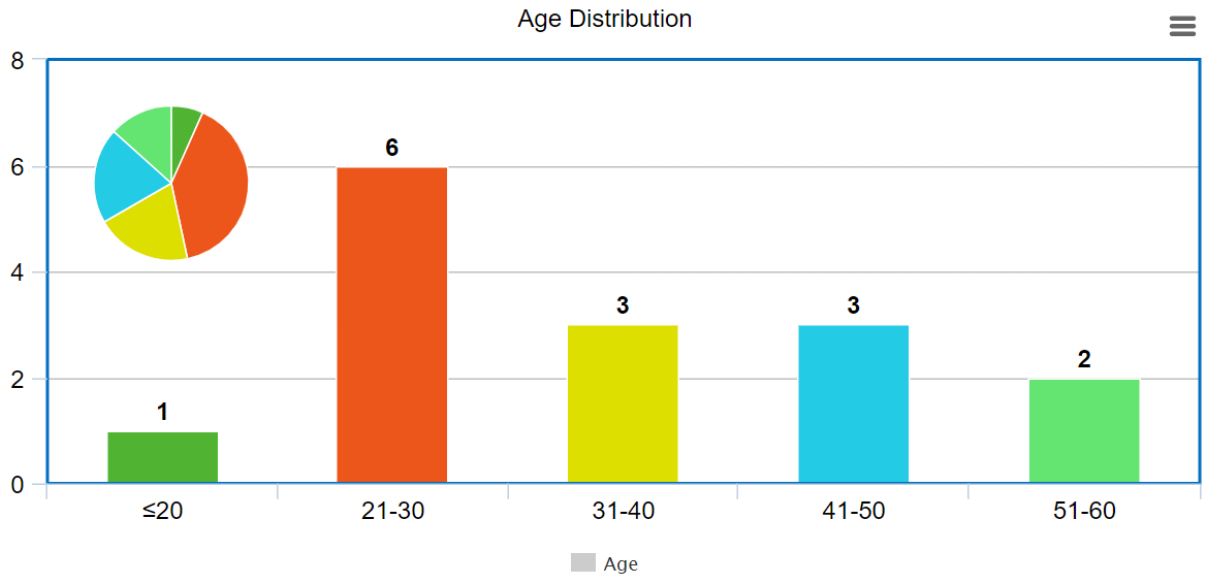

Table 2: Sex distribution

Sex	Number of Cases	Percentage
Male	15	100%
Female	0	0%

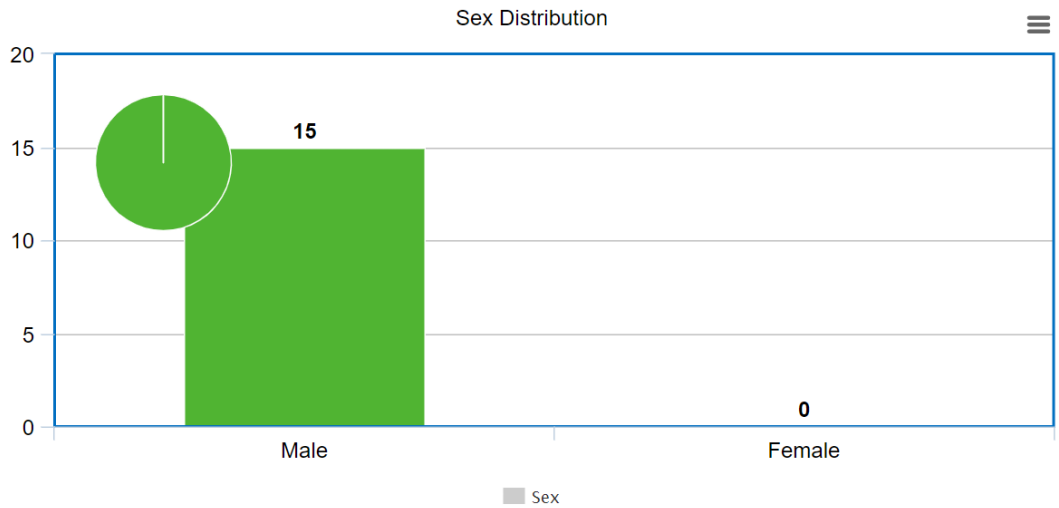

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Table 3: Mechanism of injury

Mechanism of Injury	Number of Cases	Percentage
Fall from height	13	86.67%
RTA	2	13.33%

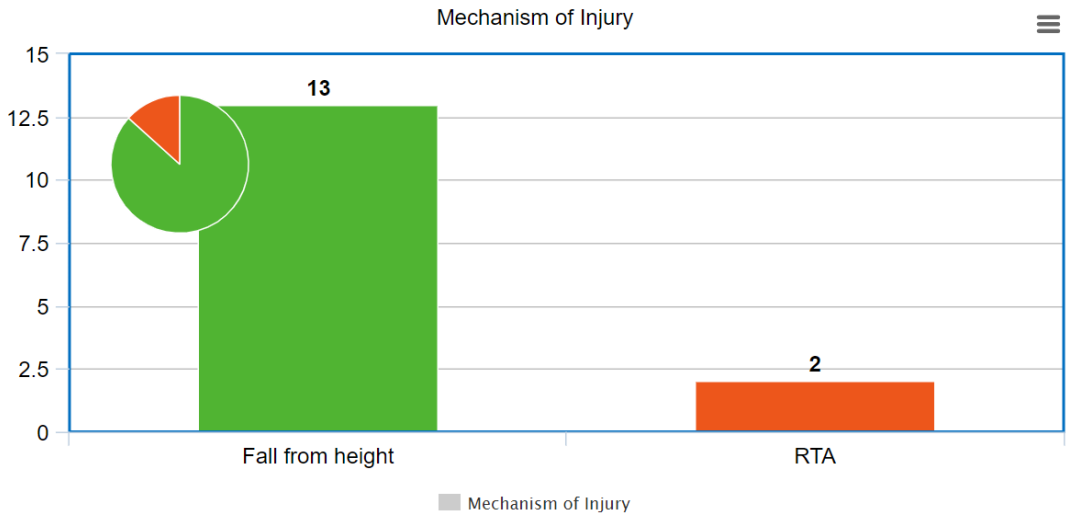


Table 4: Essex-Lopresti Classification Type

Type	Number of Cases	Percentage
Joint Depression	10	66.67%
Tongue	5	33.33%

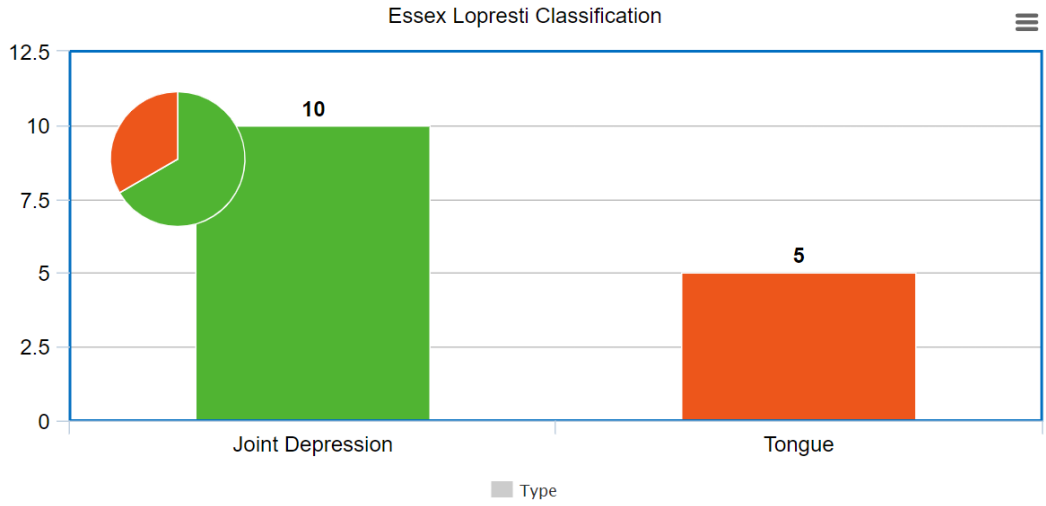
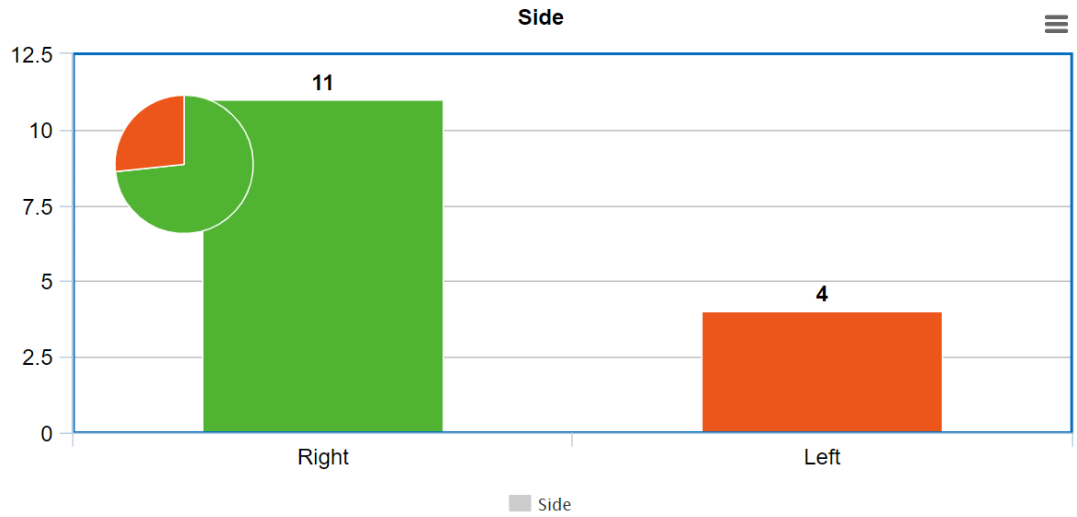


Table 5: Side

Side		Number of Cases	Percentage
Right		11	73.33%
Left	4	26.67%	



AOFAS SCORE

The results of this study were analysed using the AOFAS score (American Orthopaedic Society Foot & Ankle Hindfoot Score) at the final follow up (6 months). This scoring system is extensively used, and it permits comparison of results among several studies. The patients were evaluated using the AOFAS score as follows:

I. Pain (40 points)

☐ None	+40
☐ Mild, occasional	+30
☐ Moderate, daily	+20
☐ Severe, almost always present	+0

II. Function (50 points)

Activity limitations, support requirements

☐ No limitations, no support	+10
☐ No limitation of daily activities, limitations of recreational activities, no support	+7
☐ Limited daily and recreational activities, cane	+4
☐ Severe limitation of daily and recreational activities, walker, crutches, wheelchair, brace	+0

Maximum walking distance, blocks

☐ Greater than six	+5
☐ Four-six	+4
☐ One-three	+2
☐ Less than one	+0

Walking surfaces

☐ No difficulty on any surface	+5
☐ Some difficulty on uneven terrain, stairs, inclines, ladders	+3
☐ Severe difficulty on uneven terrain, stairs, inclines, ladders	+0

Gait abnormality

☐ None, slight	+8
☐ Obvious	+4
☐ Marked	+0

Sagittal motion (flexion plus extension)

☐ Normal or mild restriction (30° or more)	+8
☐ Moderate restriction (15° - 29°)	+4
☐ Severe restriction (less than 15°)	+0

Hindfoot motion (inversion plus eversion)

☐ Normal or mild restriction (75% - 100% normal)	+6
☐ Moderate restriction (25% - 74% normal)	+3
☐ Marked restriction (less than 25% of normal)	+0

Ankle-hindfoot stability (anteroposterior, varus-valgus)

☐ Stable	+8
☐ Definitely unstable	+0

III. Alignment (10 points)

☐ Good, plantigrade foot, ankle-hindfoot well aligned	+10
☐ Fair, plantigrade foot, some degree of ankle-hindfoot malalignment observed, no symptoms	+5
☐ Poor, nonplantigrade foot, severe malalignment, symptoms	+0

IV. Total Score (100 points):

_____ Pain Points +
_____ Function Points +
_____ Alignment Points =

_____ Total Points/100 points

Interpretation:

Excellent: 95-100

Good: 75-94

Fair: 51-74

Poor: 0-50

AOFAS CHART

S: no	PAIN (40)	FUNCTION (50)							ALIGN MENT (10)	TOTAL (100)
		L	WD	WS	G	SM	HFM	AHS		
1	40	7	4	3	8	8	6	8	10	94
2	20	4	4	5	8	8	3	8	10	70
3	20	7	4	3	8	4	3	8	10	67
4	30	7	4	5	8	8	6	8	10	86
5	40	7	2	5	8	8	3	8	10	91
6	30	7	4	5	8	8	3	8	10	83

7	30	7	4	3	8	8	3	8	10	81
8	30	7	4	3	8	8	6	8	10	84
9	30	7	4	3	4	4	3	8	10	73
10	30	7	4	3	4	4	6	8	10	76
11	20	7	2	3	4	8	6	8	10	68
12	30	7	4	5	8	8	3	8	10	83
13	30	4	5	3	8	8	3	8	10	79
14	30	7	4	3	8	8	3	8	10	81
15	30	7	4	3	8	8	3	8	10	81

L – Limitation WD – Walking Distance

WS – Walking Surface G – Gait

SM – Sagittal Motion HFM – HindFoot Motion

AHS – Ankle Hind Foot Stability

AOFAS Pain subset:

Pain	Number of cases	Percentage
None	2	13.33%
Mild, occasional	10	66.67%
Moderate, daily	3	20%
Severe, almost always present	0	0%

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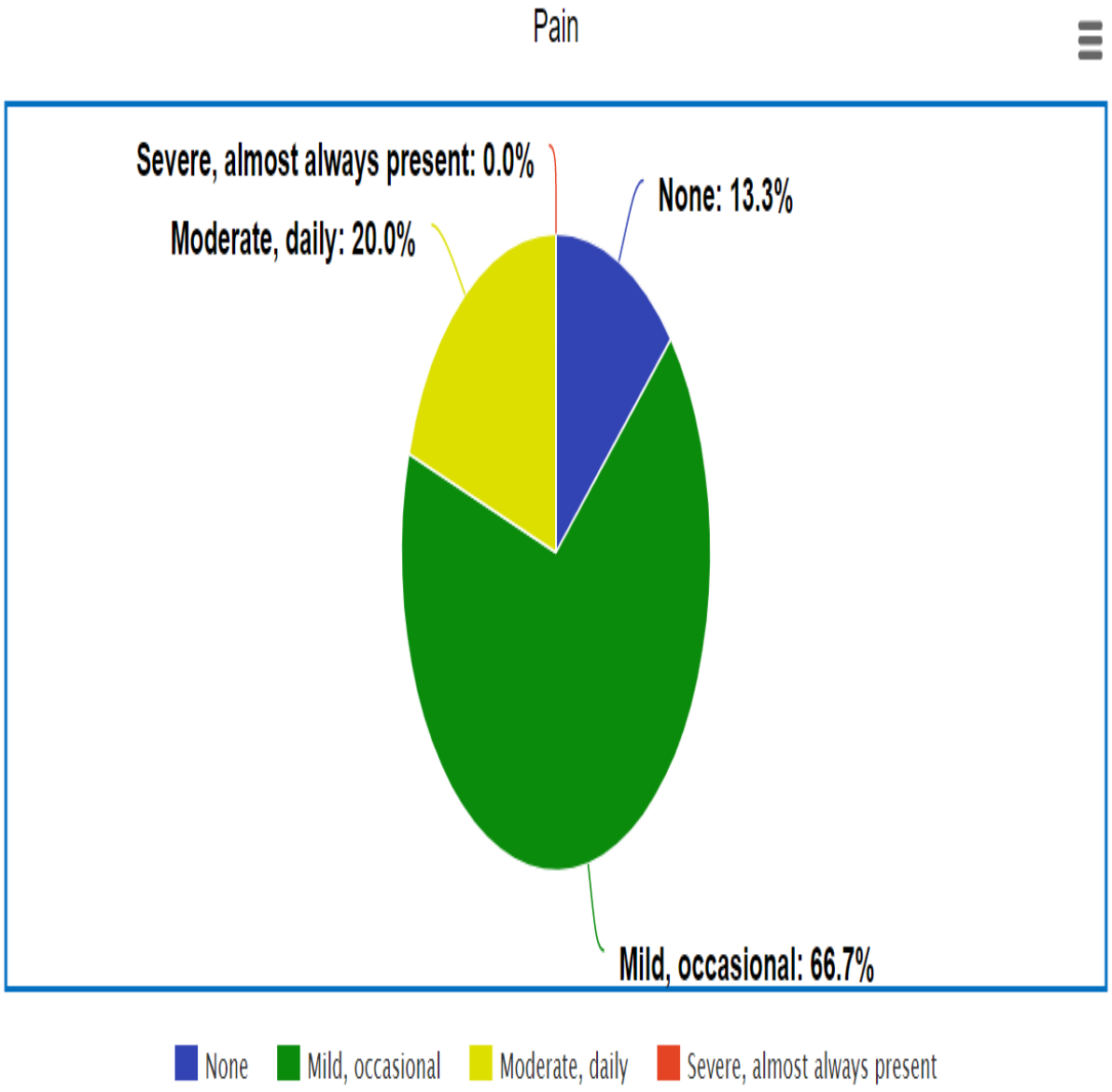
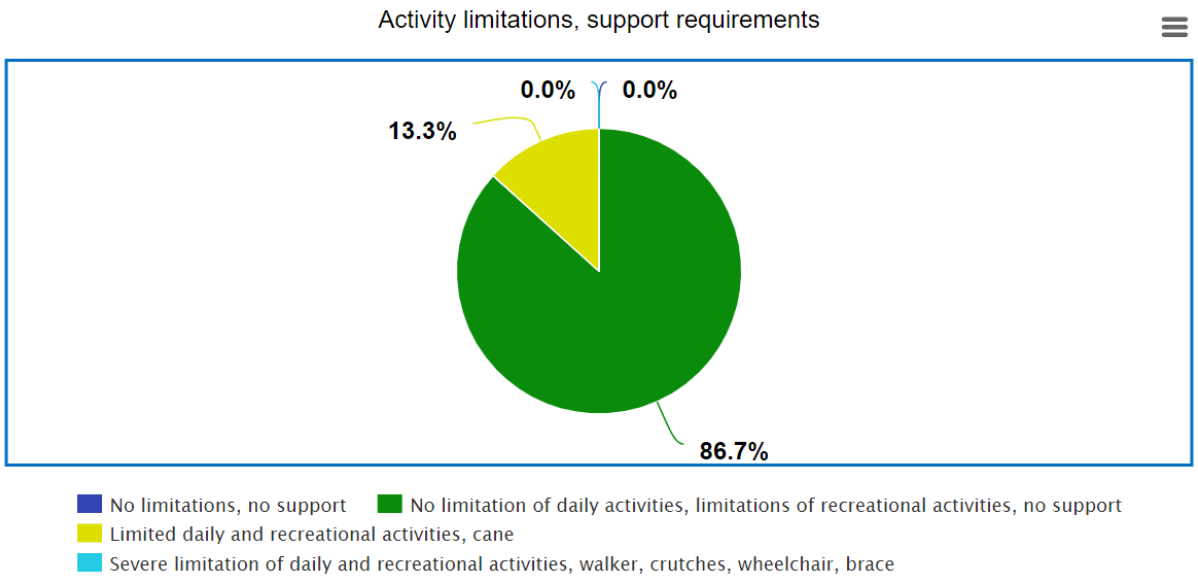


Pie chart 1: AOFAS score – Pain results

AOFAS Daily limitations, support requirements subset:

Daily limitations, support requirements	Number of cases	Percentage
No limitations, no support	0	0%
No limitations of daily activities, limitations of recreational activities, no support	13	86.67%
Limited daily and recreational activities, cane	2	13.33%
Severe limitation of daily and recreational activities, walker, crutches, wheelchair, brace	0	0%



Pie chart 2: AOFAS score – Activity limitations, support requirement results

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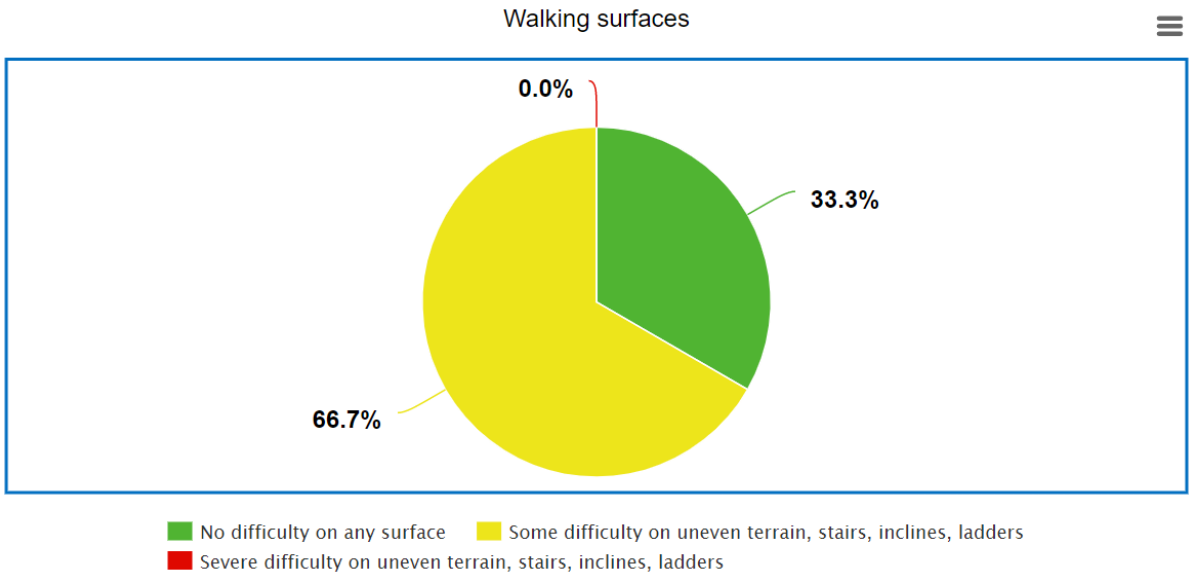
AOFAS walking surfaces subset:

Walking surfaces	Number of cases	Percentage
No difficulty on any surface	5	33.33%
Some difficulty on uneven terrain, stairs, inclines, ladders	10	66.67%
Severe difficulty on uneven terrain, stairs, inclines, ladders	0	0%



Pie chart 3: AOFAS score – Walking surfaces results

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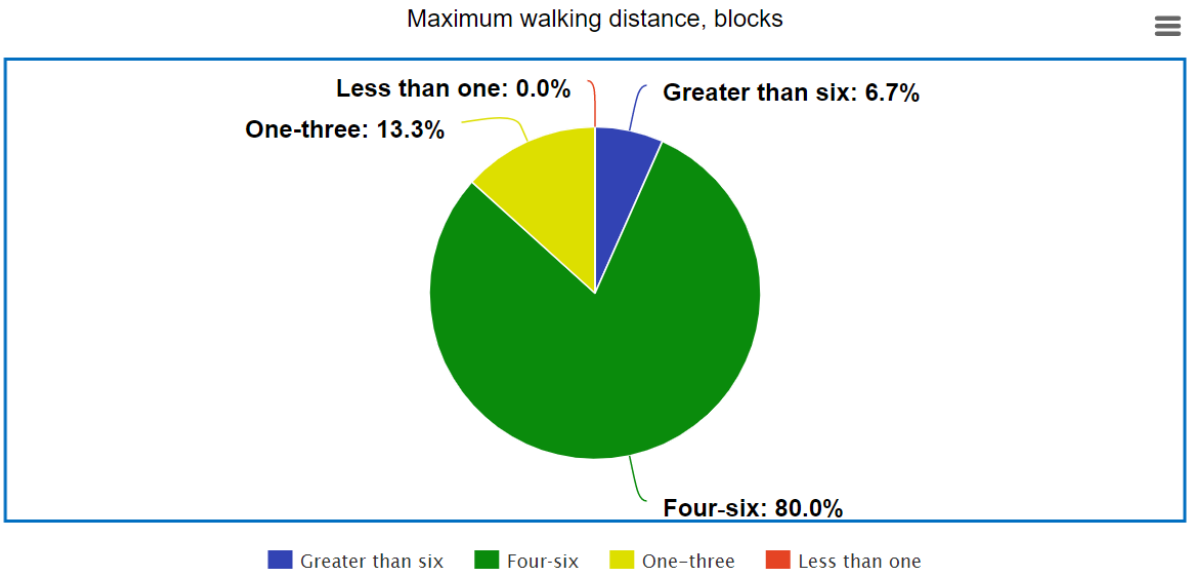
AOFAS maximum walking distance, blocks subset:

Maximum walking distance, blocks	Number of cases	Percentage
Greater than 6	1	6.67%
4-6	12	80%
1-3	2	13.33%
Less than 1	0	0%



Pie chart 4: AOFAS score – Maximum walking distance, blocks

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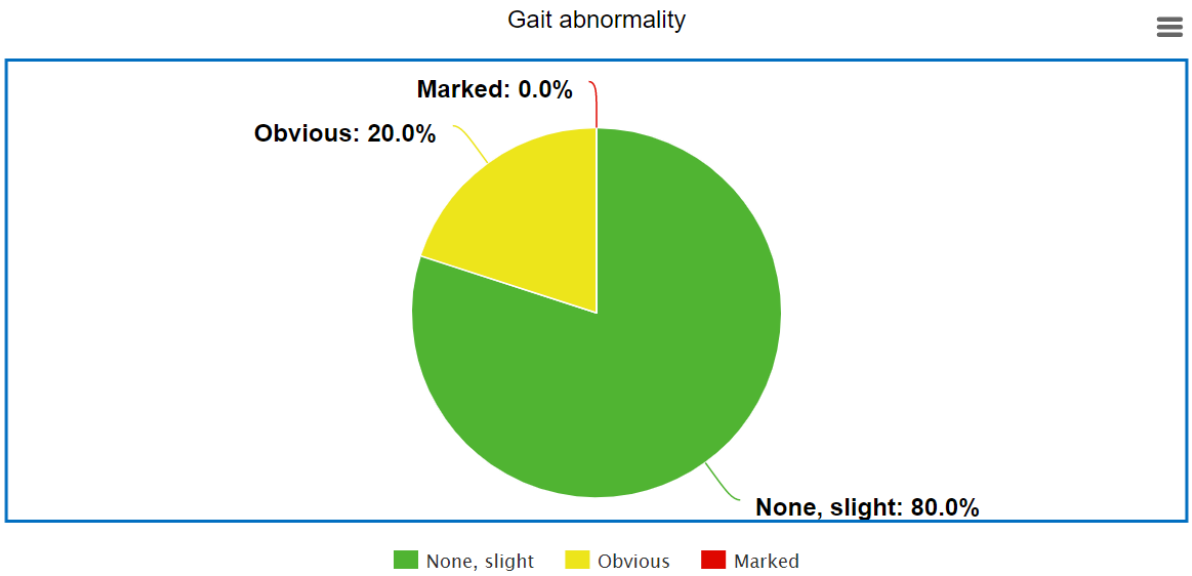
AOFAS gait abnormality subset:

Gait abnormality	Number of cases	Percentage
None, slight	12	80%
Obvious	3	20%
Marked	0	0%



Pie chart 5: AOFAS score – Gait abnormality results

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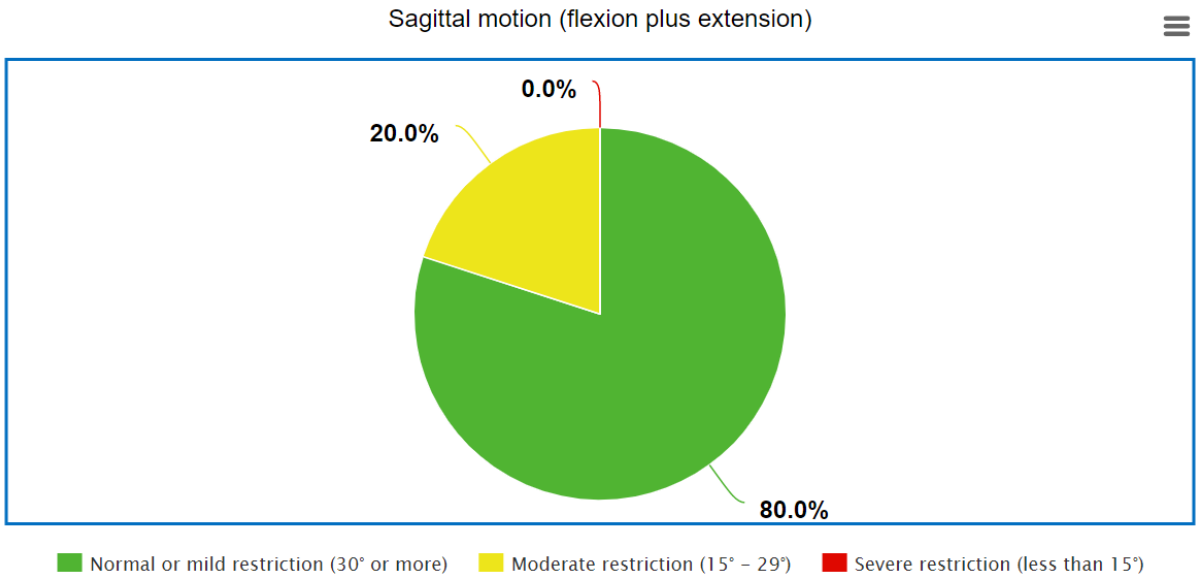
AOFAS sagittal motion (flexion plus extension) subset:

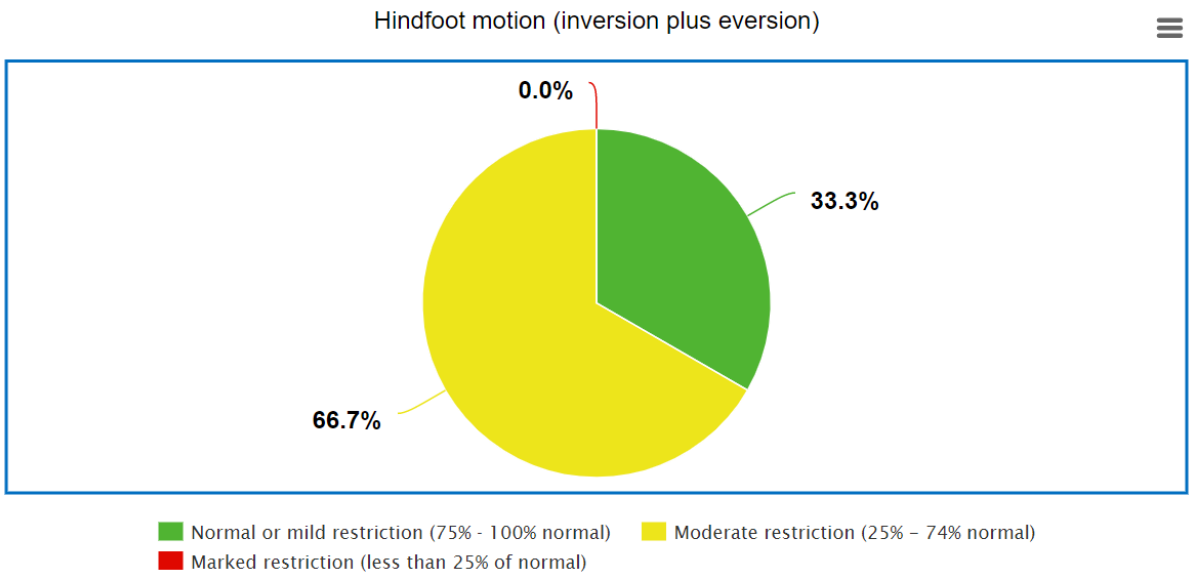
Sagittal motion	Number of cases	Percentage
Normal or mild restriction	12	80%
Moderate restriction	3	20%
Severe restriction	0	0%



Pie chart 6: AOFAS score – Sagittal motion results

AOFAS hindfoot motion (inversion plus eversion) subset:

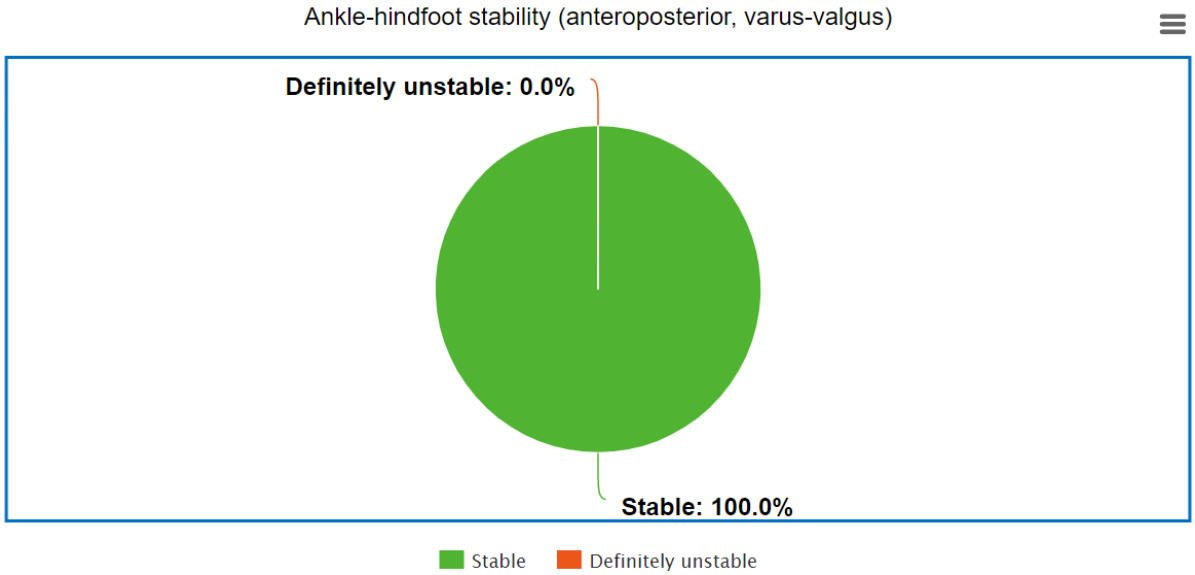
Hindfoot motion	Number of cases	Percentage
Normal or mild restriction	5	33.33%
Moderate restriction	10	66.67%
Severe restriction	0	0%



Pie chart 7: AOFAS score – Hindfoot motion results

AOFAS ankle-hindfoot stability (anteroposterior, varus-valgus) subset:

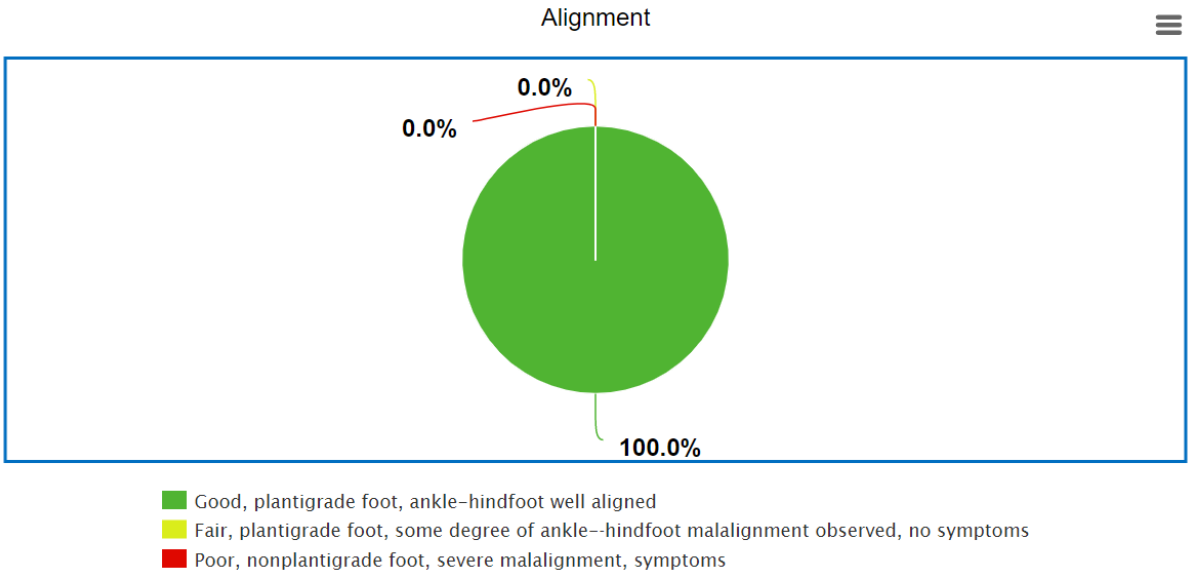
Ankle-hindfoot stability	Number of cases	Percentage
Stable	15	100%
Definitely unstable	0	0%



Pie chart 8: AOFAS score – Ankle-hindfoot stability results

AOFAS alignment subset:

Alignment	Number of cases	Percentage
Good	15	100%
Fair	0	0%
Poor	0	0%



Pie chart 9: AOFAS score – Alignment results

AOFAS Score results:

AOFAS Score	Number of cases	Percentage
Excellent (95-100)	0	0%
Good (75-94)	11	73.33%
Fair (51-74)	4	26.67%
Poor (0-50)	0	0%

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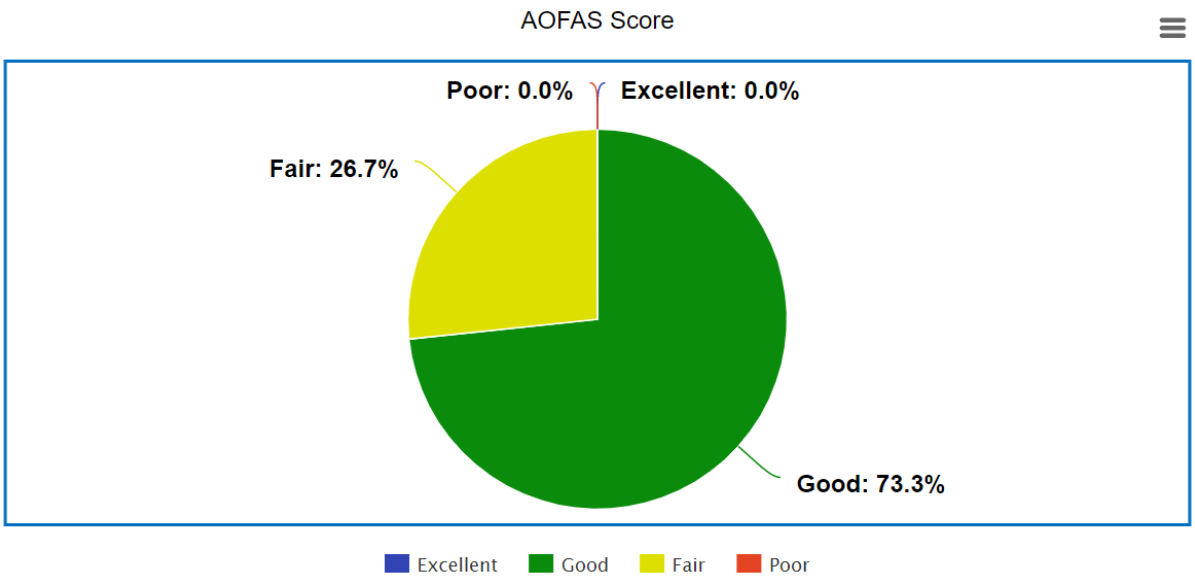
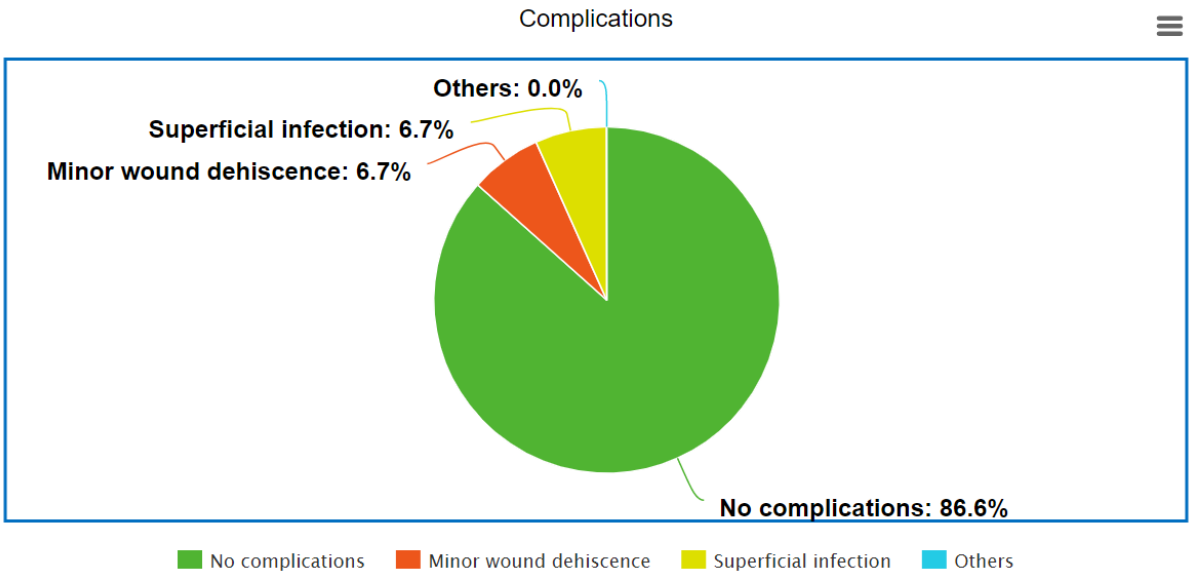


Pie chart 10: Total AOFAS Score results

Complications:

Complications	Number of cases	Percentage
No major complications	13	86.67%
Minor wound dehiscence	1	6.67%
Superficial infection	1	6.67%
Others	0	0%



Pie chart 11: Complications

DISCUSSION

In a tertiary care hospital in Pune, Maharashtra, 15 adult patients with calcaneal fractures of the Essex-Lopresti classification participated in this hospital-based study. The study aim was to assess the functional outcome of Essex-Lopresti classification of calcaneal fractures treated with minimally invasive percutaneous osteosynthesis (MIPO) fixation.

Table 1 compared age groups with the incidence of the fracture; we found that 6.67% of the cases were below the age of 20, 40% between 21-30, 20% between 31-40, 20% between 41-50, 13.33% between 51-60. The mean age was 34.93. This correlated with another study[8] where the mean age for calcaneal fractures in a tertiary hospital was 36.8.

Further, we compared the gender distribution with the incidence of the fracture (Table 2) which showed that 100% of the cases were male with no female distribution. This correlated with another study[9] where calcaneal fractures occurred 2.5 times more in males than in females.

Comparison (Table 3) of the mechanisms of injury revealed that 86.67% of the cases were due to a fall from height and 13.33% of the cases were due to road traffic accidents. This corelated with another study[10] where 80% of the cases were due to a fall from height and 20% were due to road traffic accidents.

The type of fracture distribution (Table 4) studied showed that 66.67% of the cases were joint-depression type fractures and 33.33% of the cases were the tongue type of Essex-Lopresti classification of calcaneal fractures.

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Index side comparison (Table 5) showed that 73.33% of the fractures were in the right calcaneum while 26.67% were in the left.

Pain severity subset of AOFAS score compared post operatively after 6 months of follow up (Pie chart 1) revealed that 13.3% of the patients complained of no pain, 66.7% complained of mild, occasional pain, 20% complained of moderate, daily pain and 0% complained of severe pain which was almost always present.

Activity limitations and support requirements subset of AOFAS score after 6 months of follow up (Pie chart 2) showed that 0% of the cases had no limitations or support requirement, 86.7% had no limitations of daily activities with limitations of recreational activities with no support requirement, 13.3% had limited daily and recreational activities with cane requirement and 0% had severe limitations needing walker, crutches, wheelchair or a brace.

Post operative comparison of walking surface subset of AOFAS score after 6 months of follow up (Pie chart 3) showed that 33.33% of the cases had no difficulty walking on any surface, 66.7% had some difficulty on uneven terrain, stairs, incline, ladders and 0% had severe difficulty.

Further, maximum walking distance, blocks subset of AOFAS score after 6 months of follow up when compared (Pie chart 4) exhibited that 6.7% of the patients were able to walk more than 6 blocks, 80% were able to walk up to a maximum of 4-6 blocks, 13.3% were able to walk up to a maximum 1-3 blocks and 0% had a maximum walking distance of less than 1 block.

Gait abnormality subset of the AOFAS score after 6 months of follow up (Pie chart 5) displayed that 80% of the cases had no/slight gait abnormality, 20% had an obvious gait abnormality and 0% had marked gait abnormality.

After 6 months of follow up, we compared sagittal motion subset of AOFAS score amongst the patients (Pie chart 6) where sagittal motion (flexion plus extension) was normal or mildly restricted in 80% of the patients, moderately restricted in 20% of the patients and severely restricted in 0% of the patients.

Hindfoot motion subset of the AOFAS score after 6 months of follow up (Pie chart 7) displayed that the hindfoot motion (inversion plus eversion) was normal or mildly restricted

in 33% of the cases, moderately restricted in 66.7% of the cases and severely restricted in 0% of the cases.

Hindfoot stability subset of the AOFAS score after 6 months of follow up (Pie chart 8) revealed 100% stability in all of the cases.

Alignment subset of the AOFAS score after 6 months of follow up (Pie chart 9) showed good, plantigrade, ankle hindfoot well aligned in all (100%) of the cases.

According to published literature, there are primarily three clinical grading systems used to assess the outcome of calcaneal fractures. The American Orthopaedic Foot and Ankle Society- Ankle-Hindfoot score is most frequently mentioned followed by the Maryland Foot Score, and the Creighton-Nebraska Score. Hence, we made the decision to employ the widely used, accurate, and dependable AOFAS Ankle- Hindfoot Score.

On overall AOFAS score comparison (Pie chart 10), after 6 months of follow up, the AOFAS score was interpreted as ‘good’ in 73.3%, ‘fair’ in 26.7% and ‘poor’ in 0% of the total cases.

Complications

We assessed post operative complications among the sample population (Pie chart 11) of which 86.66% of the cases had no major complications. Complications like minor wound dehiscence was seen in 6.67% of the patients post-operatively and superficial infections in 6.67% of the cases, which were treated with IV antibiotics after culture sensitivity reports and subsequently resolved. Although completely avoiding minor complications was not possible, compared to other studies[11], our study showed slightly marginally lower complication rates post-operatively.

CONCLUSION

In our prospective and longitudinal study to assess the functional outcome of Essex-Lopresti classification of calcaneal fractures treated with minimally invasive percutaneous osteosynthesis (MIPO) fixation in IPD and OPD patients of Dr DY Patil Medical College and Hospital, Pune, the results correlated with similar studies done on the subject.

Following thorough preoperative preparation, the Essex-Lopresti classification of fractures of the calcaneum was successfully treated with early functional recovery and satisfactory outcomes using minimally invasive approaches and appropriate hardware.

The surgical method must be carefully taken into account. The timing of the procedure, which is influenced by the disappearance of edema and the appearance of the wrinkle sign, is a crucial factor in determining the treatment's success. Cases that were taken up for fixation within 10 days had better outcomes than those who underwent surgery later.

When compared to other studies where different approaches and methods of fixation have been used to treat calcaneal fractures surgically, the difference in the functional outcome by using the minimally invasive approaches was not statistically significant, although the complication rates were marginally lower.

In conclusion, fixation using the MIPO technique via the sinus tarsi or the MIO posterior approach is an effective and safe method with good clinical results for the treatment of calcaneal fractures to achieve anatomical restoration under supervision, stable fixation, early mobilisation with minimal soft tissue complications and a good functional outcome.

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Pt No.	Age	SEX	DM/ HT	Mode of injury	Essex-Lopresti type	Side	Approach	Result	AOFAS SCORE	Complications
1	42	M	-	Fall from height	Tongue	Right	MIO Post.	Good	94	
2	55	M	-	RTA	Joint depression	Right	Sinus Tarsi	Fair	70	
3	20	M	-	Fall from height	Joint depression	Right	Sinus Tarsi	Fair	67	Superficial infection
4	32	M	-	Fall from height	Joint depression	Left	Sinus Tarsi	Good	86	
5	30	M	-	RTA	Tongue	Right	MIO Post.	Good	91	
6	26	M	-	Fall from height	Joint depression	Left	Sinus Tarsi	Good	83	
7	28	M	-	Fall from height	Tongue	Left	MIO Post.	Good	81	
8	24	M	-	Fall from height	Joint depression	Right	Sinus Tarsi	Good	84	
9	41	M	-	Fall from height	Joint depression	Right	Sinus Tarsi	Fair	73	
10	27	M	-	Fall from height	Joint depression	Left	Sinus Tarsi	Fair	76	
11	47	M	-	Fall from height	Joint depression	Right	Sinus Tarsi	Fair	68	Minor wound dehiscence
12	31	M	-	Fall from height	Tongue	Right	MIO Post.	Good	83	
13	40	M	-	Fall from height	Joint depression	Right	Sinus Tarsi	Good	79	
14	23	M	-	Fall from height	Tongue	Right	MIO Post.	Good	81	
15	58	M	-	Fall from height	Joint depression	Right	Sinus Tarsi	Good	81	

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