Section: Orthopedics

Original Research Article

A PROSPECTIVE STUDY OF FUNCTIONAL OUTCOME OF SEGMENTAL FRACTURE OF TIBIA TREATED WITH INTRAMEDULLARY INTERLOCKING NAIL

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ABSTRACT

Background: Segmental fractures of the tibia represent one of the most severe patterns of tibial shaft fractures and are usually caused by high-energy trauma such as road traffic accidents, industrial injuries, and falls from height. These fractures are associated with extensive soft tissue damage, disruption of blood supply, delayed union, non-union, malalignment, and prolonged functional disability. Intramedullary interlocking nailing has become the treatment of choice for most tibial shaft fractures because it provides stable biological fixation, preserves fracture biology, facilitates early mobilization, and allows predictable fracture healing with satisfactory functional outcomes. The objective is to evaluate the functional outcome of patients with segmental tibial fractures treated with intramedullary interlocking nailing using the American Orthopaedic Foot and Ankle Society (AOFAS) Score and Johner and Wruhs Criteria, to assess fracture union and return to work, to correlate clinical and radiological outcomes, and to document major and minor complications associated with this treatment modality.

Materials and Methods: A prospective observational study was conducted in the Department of Orthopaedics, Narayana Medical College and Hospital, Nellore, involving patients with segmental fractures of the tibial shaft treated by intramedullary interlocking nailing. Patients satisfying the inclusion criteria were evaluated clinically and radiologically at regular follow-up intervals. Outcome measures included time to radiological and clinical union, AOFAS score, Johner and Wruhs grading, return to work, delayed union, non-union, infection, implant-related complications, and overall functional recovery.

Results: Most patients achieved satisfactory fracture union following intramedullary interlocking nailing with good to excellent functional outcomes according to the AOFAS score and Johner and Wruhs criteria. Radiological and clinical union were achieved in the majority of patients within the expected time period. Early mobilization and return to work were observed in most cases, while delayed union and other complications occurred in only a small proportion of patients. Overall, intramedullary interlocking nailing provided stable fixation with acceptable complication rates and favourable functional recovery.

Conclusion: Intramedullary interlocking nailing is a safe, reliable, and effective treatment modality for segmental fractures of the tibia. It provides stable fixation, promotes satisfactory fracture union, allows early rehabilitation and return to work, and results in excellent functional outcomes with a relatively low incidence of complications. It remains an effective treatment option for the management of these complex injuries

Keywords: Segmental tibial fracture, Intramedullary interlocking nail, Tibial shaft fracture, AOFAS score, Johner and Wruhs criteria, Functional outcome, Fracture union, Orthopaedic trauma.

INTRODUCTION

Segmental fractures of the tibia are among the most severe patterns of tibial shaft fractures encountered in orthopaedic practice. They are characterized by two distinct fracture lines that isolate an intermediate segment of bone and usually result from high-energy trauma such as road traffic accidents, falls from height, industrial injuries, and crush injuries. Owing to extensive soft tissue damage, disruption of periosteal blood supply, and instability at two fracture sites, these fractures are associated with a higher incidence of delayed union, non-union, malalignment, infection, and prolonged functional disability compared with simple tibial shaft fractures. Although various treatment modalities have been described for the management of segmental tibial fractures, Intramedullary Interlocking Nailing (IMIL) has become the preferred method because it provides stable biological fixation while preserving fracture biology. The present study was undertaken to evaluate the functional outcome of segmental fractures of the tibia treated with Intramedullary Interlocking Nailing.

Objectives of the study

1. To study the functional outcome of patients with segmental tibial fractures treated by Intramedullary Interlocking Nailing using the American Orthopaedic Foot and Ankle Society (AOFAS) Score and Johner and Wruhs criteria.
2. To assess fracture union and determine the time required for return to work following Intramedullary Interlocking Nailing.
3. To correlate the clinical and radiological outcomes following treatment.
4. To document major complications, including delayed union and non-union, as well as minor complications associated with Intramedullary Interlocking Nailing.

MATERIALS AND METHODS

A prospective observational study was conducted in the Department of Orthopaedics, Narayana Medical College and Hospital, Nellore, during the study period specified in the dissertation. Patients presenting with segmental fractures of the tibial shaft who fulfilled the inclusion criteria were enrolled after obtaining informed consent. All patients underwent fixation with Intramedullary Interlocking Nailing. Clinical and radiological evaluations were performed at regular follow-up visits to assess fracture healing, functional recovery, return to work, and complications. Functional outcome was assessed using the American Orthopaedic Foot and Ankle Society (AOFAS) Score and Johner and Wruhs criteria.

Inclusion Criteria

1. Adult patients with segmental fractures of the tibial shaft.
2. Closed fractures and Grade I open fractures suitable for Intramedullary Interlocking Nailing.
3. Patients willing to undergo operative treatment and regular follow-up.
4. Patients who provided informed consent.

Exclusion Criteria

1. Pathological fractures.
2. Grade II and Grade III open fractures.
3. Associated neurovascular injuries requiring vascular reconstruction.
4. Patients medically unfit for surgery.
5. Patients unwilling or unable to complete the follow-up schedule.

Clinical Evaluation: A detailed history regarding the mode of injury, mechanism of trauma, associated injuries, and time since injury was obtained. General physical examination was followed by thorough local examination of the affected limb, including assessment of swelling, deformity, tenderness, abnormal mobility, soft tissue injury, open wounds, compartment syndrome, and neurovascular status. During follow-up, patients were evaluated for pain, range of motion of the knee and ankle, gait, return to work, and complications. Functional assessment was carried out using the AOFAS Score and Johner and Wruhs criteria.

Radiological Evaluation: Standard anteroposterior and lateral radiographs of the tibia, including the knee and ankle joints, were obtained at presentation and during each follow-up visit. Radiographs were evaluated for fracture configuration, alignment, implant position, callus formation, cortical continuity, progression of fracture union, delayed union, non-union, and maintenance of reduction. Radiological findings were correlated with clinical recovery and functional outcome.

Intramedullary interlocking nail (IMIL NAIL):

Principle: Intramedullary Interlocking Nailing is based on the principle of biological fixation and load-sharing osteosynthesis. The nail is inserted into the medullary canal and secured with proximal and distal interlocking screws, providing axial, rotational, and angular stability while preserving the fracture haematoma and periosteal blood supply. This technique promotes secondary bone healing through callus formation, allows early mobilization, and minimizes soft tissue disruption.

Indications:

- Segmental fractures of the tibial shaft.
- Closed unstable tibial shaft fractures.
- Gustilo–Anderson Grade I open tibial fractures.
- Comminuted tibial shaft fractures.
- Polytrauma patients requiring early stabilization.
- Floating knee injuries.
- Bilateral tibial shaft fractures.

- Delayed union requiring stable internal fixation.
- Fractures unsuitable for conservative management.

Advantages:

- Minimally invasive surgical technique.
- Preserves fracture biology and periosteal blood supply.
- Provides excellent axial and rotational stability.
- Acts as a load-sharing implant.
- Promotes early fracture union.
- Allows early knee and ankle mobilization.
- Facilitates early weight bearing when fracture healing permits.
- Shorter hospital stay.
- Lower incidence of malunion compared with conservative treatment.
- High union rate with satisfactory functional outcome.
- Enables early return to work and daily activities.

Disadvantages:

- Technically demanding procedure.
- Requires image intensifier guidance.
- Risk of anterior knee pain.
- Possibility of delayed union or non-union in high-energy injuries.
- Implant failure if fracture union is delayed.
- Infection, particularly in open fractures.
- Risk of malalignment if reduction is inadequate.
- Need for secondary procedures such as dynamization or implant removal in selected cases.

Surgical procedure: Patients selected for operative management underwent fixation using an Intramedullary Interlocking Nail under spinal or general anaesthesia after obtaining informed consent. Preoperative planning included assessment of fracture configuration, measurement of nail length and diameter, and evaluation of associated soft tissue injuries using anteroposterior and lateral radiographs of the entire tibia.

The patient was positioned supine on a radiolucent operating table with the affected knee flexed approximately 90°. After standard aseptic preparation and draping, a longitudinal incision was made over the proximal tibia through a medial parapatellar or transpatellar tendon approach. The entry point was created at the appropriate location under fluoroscopic guidance using an entry awl.

A ball-tipped guidewire was introduced into the medullary canal and advanced across the proximal fracture, intermediate fragment, and distal fracture under image intensifier guidance after achieving satisfactory reduction. Sequential reaming of the medullary canal was performed wherever indicated to accommodate the selected nail diameter. An appropriately sized Intramedullary Interlocking Nail was then inserted over the guidewire across both fracture sites while maintaining satisfactory alignment.

Proximal interlocking screws were inserted using the targeting jig attached to the nail insertion handle, followed by distal interlocking screws using the freehand technique under fluoroscopic guidance. Correct nail position, interlocking screw placement, restoration of limb length, rotational alignment, and fracture reduction were confirmed in both anteroposterior and lateral views.

The wound was thoroughly irrigated, haemostasis secured, and the incision closed in layers over a sterile dressing. Postoperative radiographs were obtained to document implant position and fracture alignment.

Postoperative protocol:

- Intravenous antibiotics were administered according to hospital protocol.
- Adequate analgesia and limb elevation were provided.
- Static quadriceps and ankle pump exercises were initiated on the first postoperative day.
- Active and passive knee range-of-motion exercises were started as pain permitted.
- Partial weight bearing was commenced depending on fracture stability and radiological evidence of healing.
- Progressive full weight bearing was allowed after satisfactory clinical and radiological union.
- Patients were followed up periodically with clinical examination and serial radiographs to assess fracture healing, implant position, and functional recovery.

Outcome measures:

1. Time to radiological union.
2. Time to clinical union.
3. Functional outcome using the American Orthopaedic Foot and Ankle Society (AOFAS) Score.
4. Functional outcome according to Johner and Wruhs criteria.
5. Time required for return to work.
6. Knee and ankle range of motion.
7. Delayed union and non-union.
8. Postoperative complications including infection, implant failure, malalignment, and anterior knee pain.
9. Overall functional outcome.

RESULTS

Table 1: Demographic Characteristics of the Study Population

Age (years)	Cases	Percentage
18–30 years	9	30.0%
30–40 years	12	40.0%
40–50 years	5	16.7%
50–60 years	4	13.3%
Total	30	100%

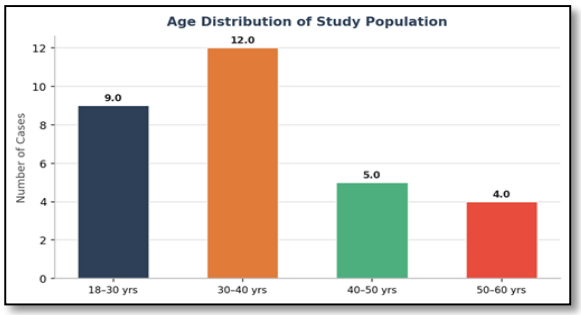

Figure 1: Bar diagram showing age-wise distribution of the study population

[Table 1] presents the age distribution of 30 patients enrolled in the study. The largest group was aged 30–40 years (12 patients, 40%), followed by 18–30 years (9 patients, 30%), 40–50 years (5 patients, 16.7%), and 50–60 years (4 patients, 13.3%). The predominance of the younger age group is consistent with the high-energy mechanism of injury (road traffic accidents) seen in this study.

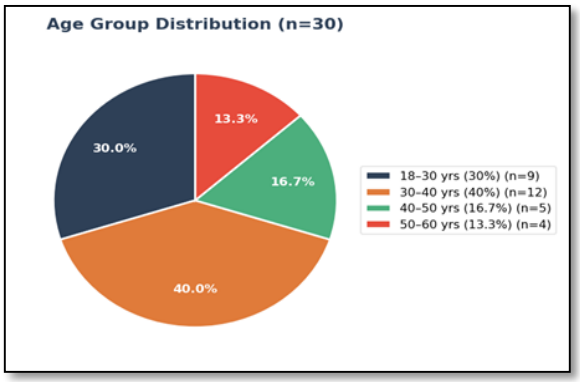

Figure 2: Pie diagram showing percentage distribution of patients by age group

Table 2: Sex Distribution and Mode of Injury of Study Participants

Characteristic	Count	Percentage
Sex – Male	24	80.0%
Sex – Female	6	20.0%
Mode of Injury – RTA	29	96.7%
Mode of Injury – Fall	1	3.3%
Total Patients	30	100.0%

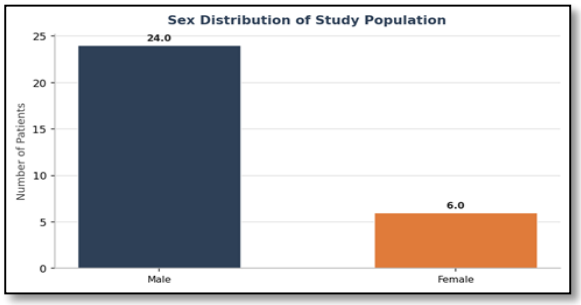

Figure 3: Bar diagram showing sex distribution of study participants

[Table 2] shows the sex distribution and mode of injury in the study population. Males constituted the majority of cases (24 patients, 80%), while females accounted for 6 patients (20%). Road traffic accidents (RTA) were the overwhelmingly predominant mechanism of injury, responsible for 29 cases (96.7%), with only 1 patient (3.3%) sustaining injury due to a fall. This pattern reflects the high incidence of tibial shaft fractures in young male road users.

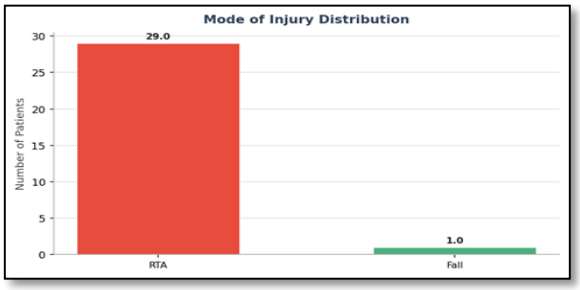

Figure 4: Bar diagram showing mode of injury distribution among study participant.

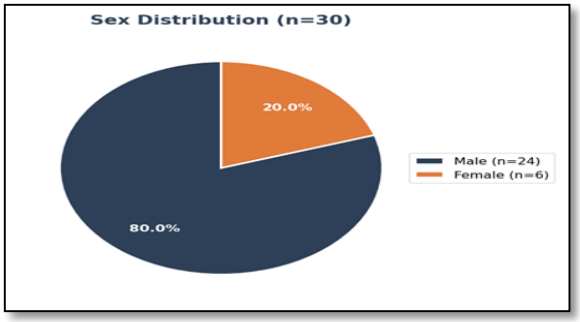

Figure 5: Pie diagram showing sex distribution of the study population

Table 3: Fracture Characteristics of the Study Population

Fracture Type	Number	Percentage
Closed Fractures	24	80.0%
Type I Open Fracture	4	13.3%
Type II Open Fracture	2	6.7%
Total	30	100%

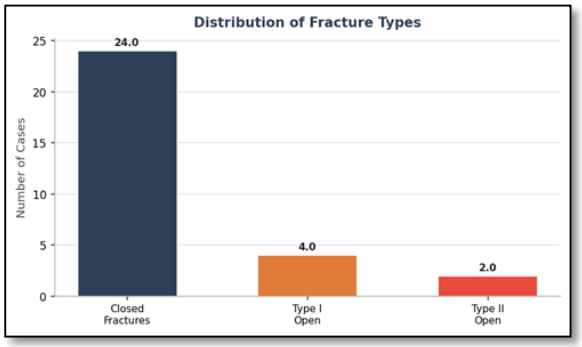

Figure 6: Bar diagram showing distribution of fracture types in the study population

[Table 3] presents the distribution of fracture types among the 30 patients. Closed fractures were the most common, accounting for 24 cases (80.0%). Type I open fractures were seen in 4 patients (13.3%) and Type II open fractures in 2 patients (6.7%). No Type III open fractures were encountered in the study. The predominance of closed fractures is consistent with the blunt force nature of most road traffic injuries.

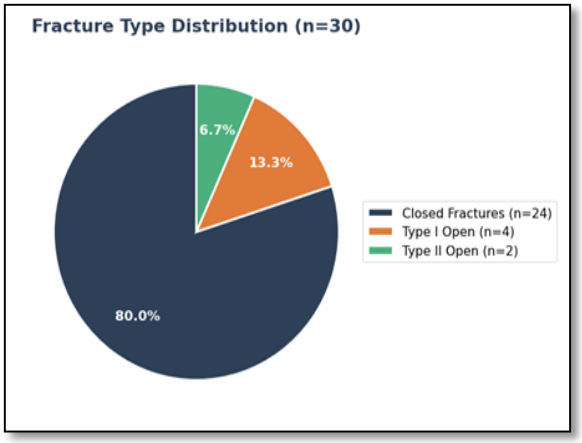

Figure 7: Pie diagram showing percentage distribution of fracture types

Table 4: Operative Characteristics: Time to Surgery and Duration

Operative Parameter	Mean ± SD
Injury Time to Surgery (days)	1.9 ± 0.7
Duration of Surgery (minutes)	97.5 ± 8.5

[Table 4] summarises the operative characteristics of the study. The mean time from injury to surgery was 1.9 ± 0.7 days, indicating that the majority of patients were taken up for intramedullary nailing within 2 days of injury, consistent with the aim of early operative stabilisation. The mean duration of surgery was 97.5 ± 8.5 minutes, reflecting the time taken for closed/open intramedullary interlocking nailing of the tibia.

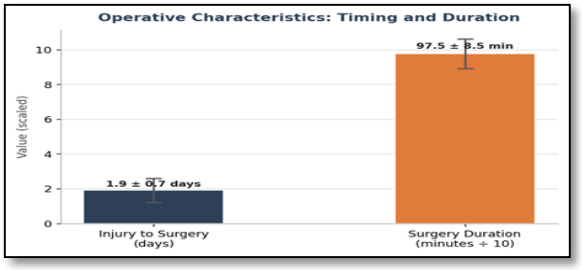

Figure 8: Bar diagram showing operative characteristics: mean injury-to-surgery interval and mean duration of surgery

Table 5: Radiological and Clinical Union Outcomes

Union Outcome	Count	Percentage
Radiological Union – Yes	30	100.0%
Radiological Union – No	0	0.0%
Time to Radiological Union (weeks)	20.9 ± 2.8	—
Clinical Union – Yes	30	100.0%
Clinical Union – No	0	0.0%
Time to Clinical Union (weeks)	18.7 ± 2.7	—

Table 6 shows the union outcomes of all 30 patients treated with intramedullary interlocking nailing. All 30 patients (100%) achieved both radiological and clinical union, with no cases of non-union. The mean time to radiological union was 20.9 ± 2.8 weeks and the mean time to clinical union was 18.7 ± 2.7 weeks. Clinical union preceded radiological union in most patients, which is consistent with standard orthopaedic healing patterns.

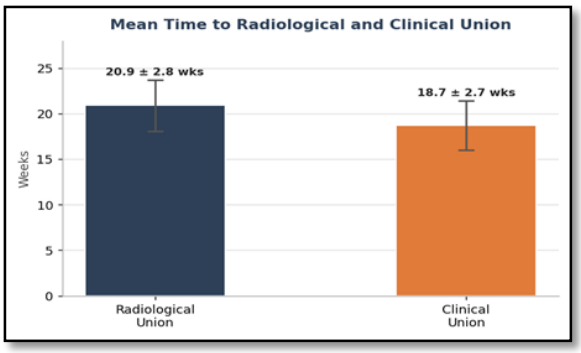

Figure 9: Bar diagram showing radiological and clinical union outcomes in all study patients

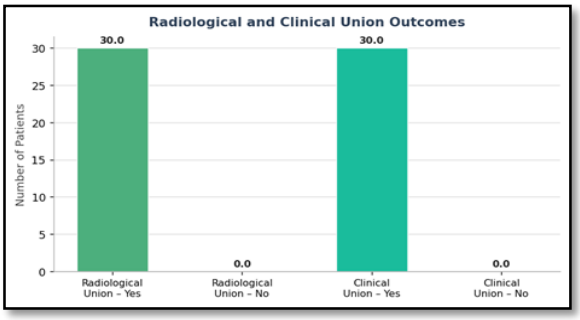

Figure 10: Bar diagram comparing mean time to radiological union and clinical union with standard deviation

Table 6: Functional Outcomes Using AOFAS Score and Johner-Wruhs Grading

Outcome Measure	Number / Mean	Percentage
AOFAS – Fair	6	20.0%
AOFAS – Good	14	46.7%
AOFAS – Excellent	10	33.3%
Johner-Wruhs – Fair	5	16.7%
Johner-Wruhs – Good	15	50.0%
Johner-Wruhs – Excellent	10	33.3%

[Table 6] presents the functional outcomes assessed at final follow-up using two validated scoring systems. On the AOFAS (American Orthopaedic Foot and Ankle Society) score, 10 patients (33.3%) had excellent results, 14 patients (46.7%) had good results, and 6 patients (20.0%) had fair results, with no poor outcomes. Similarly, on the Johner-Wruhs grading, 10 patients (33.3%) achieved excellent, 15 patients (50.0%) good, and 5 patients (16.7%) fair results.

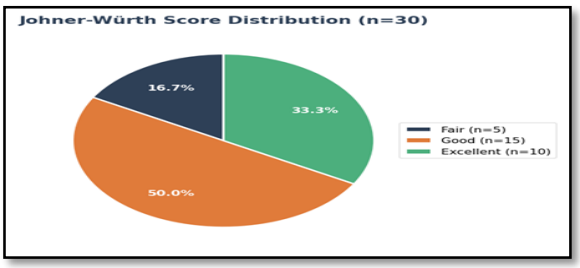

Figure 12: Pie diagram showing AOFAS score category distribution among study patients

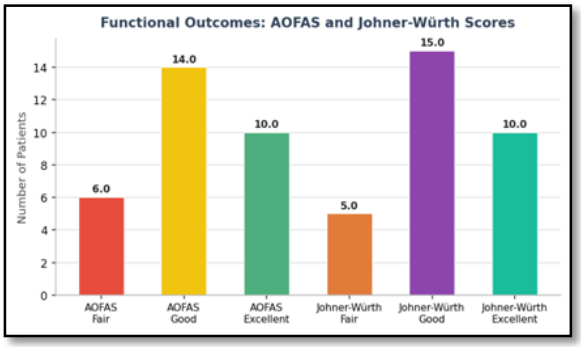

Figure 11: Bar diagram showing distribution of AOFAS and Johner-Wruhs functional outcome scores

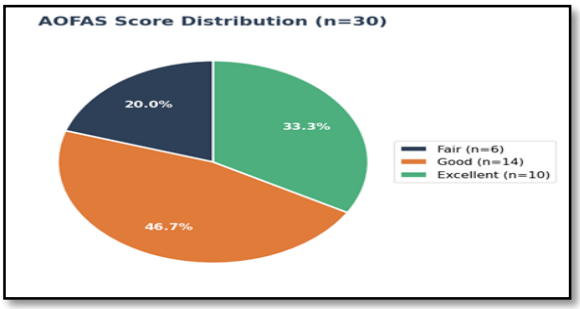

Figure 12: Pie diagram showing Johner-Wruhs grading distribution among study patients

Table 7: Return to Work Status Following Surgery

Return to Work	Number	Percentage
Yes – Returned to Work	28	93.3%
No – Did Not Return	2	6.7%
Total	30	100.0%

[Table 7] shows that 28 out of 30 patients (93.3%) successfully returned to their pre-injury occupational activities following surgery, indicating a high rate of functional rehabilitation. Only 2 patients (6.7%) were unable to return to their previous work, and this was attributed to complications such as delayed union and persistent functional limitation. The high return-to-work rate reflects the effectiveness of intramedullary interlocking nailing in restoring functional independence.

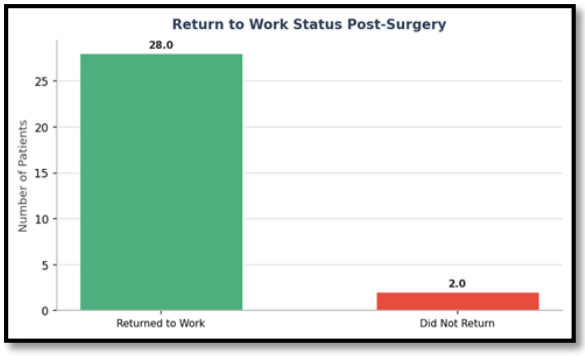

Figure 13: Bar diagram showing return to work status among study patients following surgery

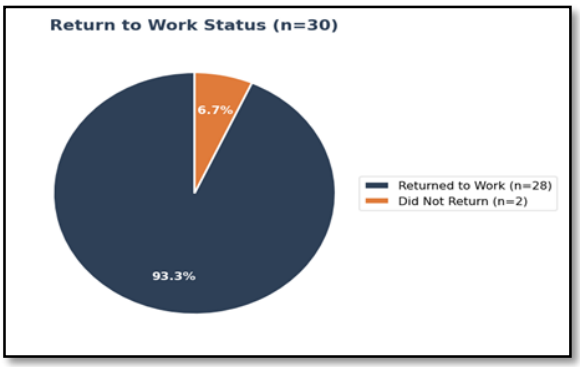

Figure 14: Pie diagram showing proportion of patients who returned to work following surgery

Table 8: Postoperative Complications Following Intramedullary Nailing

Complication	Present (n)	Percentage
Delayed Union	6	20.0%
Non-Union	0	0.0%
Malunion	0	0.0%
Superficial Infection	4	13.3%
Deep Infection	0	0.0%
Implant Failure	0	0.0%
Anterior Knee Pain	0	0.0%

[Table 8] summarises the postoperative complications recorded in the study. Delayed union was the most common complication, occurring in 6 patients (20.0%), all of whom eventually progressed to union. Superficial wound infection was seen in 4 patients (13.3%), managed successfully with wound care and antibiotics. Importantly, there were no cases of non-union, malunion, deep infection, implant failure, or anterior knee pain. The absence of serious complications highlights the safety and efficacy of the intramedullary nailing technique employed.

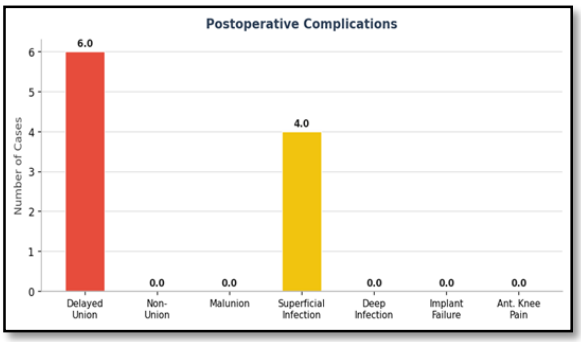

Figure 15: Bar diagram showing the distribution of postoperative complications among study patients.

Table 9: Age Comparison by Delayed Union Status

Group	N	Mean Age ± SD (years)	P-value (t-test)
Delayed Union – Yes	6	51.1 ± 8.9	< 0.005 (Sig)
Delayed Union – No	24	38.9 ± 9.7	—
Total	30	41.3 ± 9.3	—

[Table 9] compares the mean age of patients who developed delayed union with those who did not. Patients with delayed union had a significantly higher mean age (51.1 ± 8.9 years) compared to those without delayed union (38.9 ± 9.7 years). The difference was statistically significant ($p < 0.005$), indicating that advancing age is a significant risk factor for delayed union following tibial intramedullary nailing. This finding is consistent with the known reduction in bone healing capacity with increasing age.

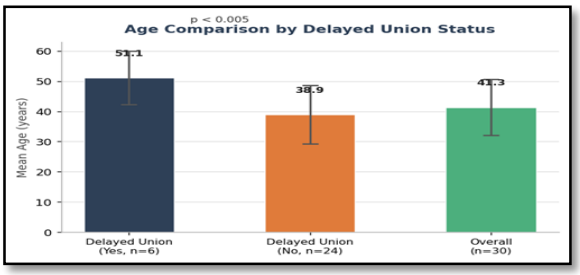

Figure 16: Bar diagram with error bars comparing mean age between patients with and without delayed union

Table 10: Sex Distribution by Delayed Union Status

Sex / Complication	Count	Percentage
Male – Delayed Union Yes	4	13.3%
Male – Delayed Union No	20	66.7%

Female – Delayed Union Yes	2	6.7%
Female – Delayed Union No	4	13.3%
Total	30	100%

[Table 10] presents the distribution of delayed union according to sex. Among 24 male patients, 4 (16.7%) developed delayed union. Among 6 female patients, 2 (33.3%) developed delayed union. Although the proportion of delayed union was higher among females, the small sample size in the female subgroup limits definitive statistical conclusions. Overall, delayed union was observed in 6 of the 30 patients (20%), and its occurrence across both sexes underscores the multifactorial nature of this complication.

Figure 17: Grouped bar diagram showing sex distribution in relation to delayed union status.

Table 11: Union Time Comparison by Fracture Type

Fracture Type	N	Mean Union time (weeks) ± SD	P-value (t-test)
Closed Fractures	24	19.0 ± 2.5	0.0086 (Sig)
Open Fractures	6	22.7 ± 2.5	—
Total	30	20.9 ± 2.8	—

[Table 11] compares the mean radiological union time between closed and open fractures. Closed fractures united significantly faster (mean 19.0 ± 2.5 weeks) compared to open fractures (mean 22.7 ± 2.5 weeks), and this difference was statistically significant ($p = 0.0086$). The longer union time in open fractures is expected due to associated soft tissue damage, periosteal stripping, and greater risk of infection. This finding reinforces the need for close follow-up and early intervention when managing open tibial fractures treated with intramedullary nailing.

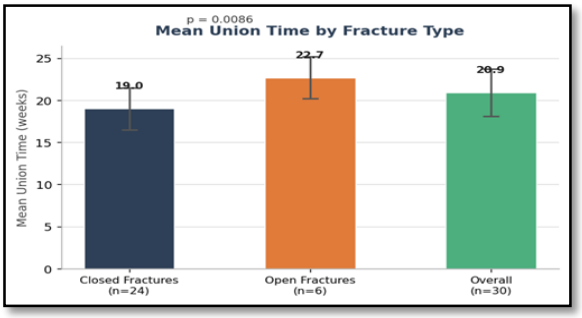

Figure 18: Bar diagram with error bars comparing mean union time between closed and open fracture types

Table 12: AOFAS Score Comparison by Complication Status

Complication Status	N	Mean AOFAS ± SD	P-value (t-test)
No Complications	24	89.4 ± 4.2	< 0.0001 (Sig)
Delayed Union Only	6	77.9 ± 5.8	—
Total	30	84.8 ± 7.5	—

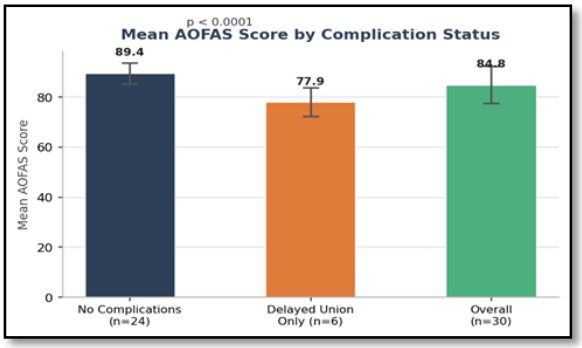

Figure 19: Bar diagram with error bars comparing mean AOFAS scores between patients with no complications and those with delayed union

[Table 12] compares the mean AOFAS functional scores between patients with no complications and those who developed delayed union. Patients without complications achieved a significantly higher mean AOFAS score (89.4 ± 4.2) compared to those with delayed union (77.9 ± 5.8), and this difference was highly statistically significant ($p < 0.0001$). The overall mean AOFAS score for all patients was 84.8 ± 7.5, reflecting good functional outcomes. These results confirm that delayed union has a meaningful negative impact on functional recovery and that early detection and management of delayed union is essential to optimise patient outcomes.

DISCUSSION

The present prospective study evaluated the functional outcome of patients with segmental fractures of the tibia treated with Intramedullary Interlocking Nailing. The study assessed fracture union, functional outcome using the American Orthopaedic Foot and Ankle Society (AOFAS) Score and Johner and Wruhs criteria, return to work, and postoperative complications. The results demonstrated that Intramedullary Interlocking Nailing provided stable fixation, satisfactory fracture union, and excellent functional recovery with an acceptable complication rate.

Distribution by Age: The majority of patients belonged to the young and middle-aged adult population. This finding is consistent with the epidemiological pattern reported in previous studies, where segmental tibial fractures predominantly occur in economically productive individuals because of their greater exposure to high-energy trauma and road traffic accidents.

Distribution by Gender: A clear male predominance was observed in the present study. This observation is comparable with previous literature and reflects the increased occupational exposure, outdoor activities, and higher incidence of high-velocity trauma among males.

Mode of Injury: Road traffic accidents constituted the most common mechanism of injury, followed by falls from height and industrial accidents. The predominance of high-energy trauma explains the severe soft tissue injury and complex fracture configuration commonly encountered in segmental tibial fractures.

Fracture Characteristics: Both closed and Grade I open segmental tibial fractures were included in the study. High-energy trauma frequently resulted in significant displacement and soft tissue injury, making stable internal fixation essential for restoration of alignment and fracture healing.

Time to Surgery and Duration of Surgery: Most patients underwent surgical stabilization within an appropriate time after injury following adequate preoperative evaluation and optimization. The average operative duration remained within acceptable limits, reflecting careful preoperative planning and familiarity with the surgical technique.

Fracture Union: Clinical and radiological union was achieved in the majority of patients following Intramedullary Interlocking Nailing. Stable fixation, preservation of fracture biology, and maintenance of alignment contributed to satisfactory fracture healing. Delayed union was observed in a small number of patients, particularly in those with severe soft tissue injury and open fractures.

Functional Outcome: Functional assessment using the American Orthopaedic Foot and Ankle Society (AOFAS) Score and Johner and Wruhs criteria demonstrated excellent or good outcomes in most patients. Early mobilization, restoration of knee and ankle movements, satisfactory limb alignment, and pain relief contributed to improved functional recovery.

Return to Work: Most patients resumed their pre-injury occupation and daily activities after fracture union. Early stabilization with Intramedullary Interlocking Nailing facilitated rehabilitation and reduced the duration of disability.

Complications: The overall complication rate was low. Delayed union occurred in a few patients and was managed successfully with continued follow-up or secondary procedures where indicated. Superficial wound complications resolved with appropriate treatment. No significant implant failure, deep infection, or permanent neurovascular deficit was encountered. Stable fixation and adherence to biological principles minimized the incidence of major complications.

Overall Functional Outcome: The majority of patients achieved satisfactory clinical, radiological, and functional outcomes following Intramedullary Interlocking Nailing. Stable fixation, preservation of fracture biology, early mobilization, and structured rehabilitation contributed to excellent recovery. These findings support Intramedullary Interlocking Nailing as a reliable treatment modality for segmental fractures of the tibia.

Summary:

1. Segmental fractures of the tibia commonly affected young adult males and were predominantly caused by high-energy road traffic accidents.
2. Intramedullary Interlocking Nailing provided stable biological fixation while preserving fracture biology.
3. Clinical and radiological union was achieved in the majority of patients within an acceptable period.
4. Functional outcome assessed using the American Orthopaedic Foot and Ankle Society (AOFAS) Score and Johner and Wruhs criteria was excellent or good in most patients.
5. Early mobilization and rehabilitation facilitated restoration of knee and ankle range of motion and early return to work.
6. Delayed union occurred in only a small proportion of patients and was managed successfully.
7. The incidence of postoperative complications remained low, with no significant implant failure or deep infection.
8. Intramedullary Interlocking Nailing proved to be an effective and reliable method for the management of segmental tibial fractures, providing satisfactory clinical, radiological, and functional outcomes.

CONCLUSION

The present prospective study evaluated the functional outcome of segmental fractures of the tibia treated with Intramedullary Interlocking Nailing. The results demonstrated that Intramedullary Interlocking Nailing provides stable fixation, satisfactory fracture union, and excellent functional recovery with a low incidence of complications.

Intramedullary Interlocking Nailing preserves fracture biology while providing excellent mechanical stability, thereby facilitating early mobilization, restoration of limb alignment, and timely return to daily activities and work. Functional assessment using the American Orthopaedic Foot and Ankle Society (AOFAS) Score and Johner and Wruhs criteria showed favourable outcomes in the majority of patients.

Based on the findings of the present study, Intramedullary Interlocking Nailing is a safe, reliable, and effective treatment modality for segmental fractures of the tibia and should be considered the preferred method of fixation for appropriately selected patients, providing predictable fracture union, satisfactory functional outcomes, and a low rate of complications.

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