Content available at: https://www.ipinnovative.com/open-access-journals

Indian Journal of Orthopaedics Surgery

Journal homepage: www.ijos.co.in

Original Research Article

Comparative study of functional and radiological outcomes between IMIL and MIPO in distal tibia fractures in adults

Saiel Anand Kumarjuvekar[1*], Rahul Gopalkrishna Puranik[1], Hitarth Jitendra Gathani[2], Rohit Machindra Jadhav[3]

[1]Dept. of Orthopaedics, Byramjee Jeejeebhoy Government Medical College, Pune, Maharashtra, India
[2]Dept. of Orthopaedics, Grant Medical College and Sir J.J. Group of Hospitals, Mumbai, Maharashtra, India
[3]Dept. of Orthopaedics, Government Medical College, Nagpur, Maharashtra, India

Abstract

Background: Distal tibia fractures are commonly seen mostly after falls, direct blows or sports injury. Multiple risk factors exist like infection, nonunion, delayed union due to its subcutaneous location. Over years both intramedullary interlocking nailing and plate osteosynthesis has been done to fix these fractures. Both having their own advantages and disadvantages have no clear implant for fixation to be chosen.
Aim & Objectives: This study aims to evaluate distal tibia fractures in adult patients using radiographic diagnosis. It also seeks to assess the effectiveness of minimally invasive plate osteosynthesis (MIPO) and intramedullary nailing in treating these fractures. Additionally, the study aims to analyse radiological parameters post internal fixation and compare the functional outcomes of intramedullary nailing and plating in treating distal tibia fractures. Furthermore, the study intends to compare complications between intramedullary nailing and MIPO in treating distal tibia fractures.
Materials and Methods: The study was prospective and retrospective in nature conducted among 54 patients. All patients fulfilling inclusion criteria and exclusion criteria were taken up for the study. Study was carried out over a period of 1 year.
Results: Majority of patients were male patients and were fixed majority by IMIL in our study with the mean age being 43.64 and 47.5 for IMIL and IPO respectively. AO type A2 being the most common fracture pattern. VAS showed no significant difference. Fracture union seen earlier in IMIL patients (12 weeks) while range showed no statistical difference. John and Wruh Scale showed no major difference while LEFS remained same in both.
Conclusion: IMIL should be considered as the gold standard in treating extra articular distal tibia fractures as patients can be mobilized earlier with weight bearing and risk of infections are less. Fracture pattern is the key in choosing the right implant, finally we conclude no functional difference in patients with distal tibia extra articular fractures treated either by IMIL or MIPO.

Keywords: Distal tibia fractures, MIPO, IMIL, John and Wruh, Lower extremity functional scale, Union time, Complications.

Received: 23-06-2024; **Accepted:** 02-08-2024; **Available Online**: 04-04-2025

1. Introduction

Distal tibia fractures, often caused by high-speed motor vehicle accidents, falls, direct blows, or sports injuries, can lead to significant disability if not properly treated.[1] These fractures account for about 10%-13% of all tibial fractures[2] and are challenging due to poor blood supply, subcutaneous location, and limited muscle cover anteriorly, often resulting in complications like delayed union, nonunion, and wound infection.[3,4] Management has shifted towards relative fixation with osteosynthesis, aiming to preserve vascularity and soft tissue integrity. Minimally invasive plate osteosynthesis (MIPO)[5-7] and intramedullary interlocking nail (IMIL)[8-10] are effective methods but historically associated with complications such as malalignment, knee pain, wound complications,[9,11] and implant prominence.[4,12] Surgical modalities range from closed intramedullary nailing to various plating techniques, but the optimal method remains uncertain. This study aims to compare functional outcomes, union rates and times, and complications between IMIL and MIPO with locking compression plates for extra-articular distal tibial fractures.

*Corresponding author: Saiel Anand Kumarjuvekar
Email: kumarjuvekar@gmail.com

https://doi.org/10.18231/j.ijos.2025.005

2. Materials and Methods

This study includes adult patients aged over 18 years with distal tibia fractures where the distal fragment is greater than 3 cm, the fracture is below the isthmus and does not involve the isthmus, and the fracture is classified as Anderson & Gustillo Type 1 or 2 or AO/OTA type 43A1, 43A2, or 43A3. Patients are also included if the duration of the injury is less than 2 weeks. Patients are excluded from this study if they have skeletal immaturity, intra-articular fractures, fractures involving the isthmus, compartment syndrome, fractures that were conservatively treated, neurovascular deficits, are unfit for surgery, have pathological fractures, have prior musculoskeletal abnormalities, or are not willing to undergo surgery. Comparative retrospective and prospective observational study was done in a tertiary care center using hospital source from march 2021 to september 2022 and the sample size[13,14] was calculated using the formula, wherein N is the sample size, Z is taken as 1.96 at 95% confidence interval, P1 is adverse effects ie. 3.4% chance of non-union,[15] P2 is adverse effect at 3.6% chance of nonunion, E is the absolute precision at 15%.[8,15] While 10% dropout was considered leading to sample size of 54 patients wherein operated distal tibia fracture satisfying inclusion and exclusion criteria were taken into group 1 (IMIL) and group 2 (MIPO).

Preoperative data, including information on knee and ankle pain, time from trauma to surgery, and anaesthesia details, were collected from case records. Intraoperative details, such as blood loss, its management, use of tourniquet, and complications, were also extracted from records. Postoperatively, patients were followed up at various intervals (1 week, 3 weeks, 6 weeks, 12 weeks, 6 months, 9 months, and 1 year) to assess pain using the visual analogue scale, union time, alignment, range of motion, and complications, with serial radiographs taken at each visit. Functional assessment was performed using the John and Wruh Criteria and Lower Extremity Functional Score at the same follow-up intervals. Statistical analysis was conducted, with age distribution, sex distribution, side of injury, mode of injury, fracture classification, time between injury and surgery, associated fibula fracture, time to union, complications, additional procedures for complications, and duration between injury and hospitalization considered. Results were expressed as means and standard deviations, with statistical significance set at a p-value of < 0.05.

3. Results

In our study of 54 patients, 28 (51.8%) were treated with intramedullary interlocking nail (IMIL) and 26 (48.2%) with minimally invasive plate osteosynthesis (MIPO). The mean age for IMIL patients was 43.6 years (SD±11.90) and for MIPO patients was 47.5 years (SD±13.94), with no significant difference between the groups (p=0.84). Males accounted for 85% of the patients, with no significant difference in treatment between males and females (p=0.09).(**Table 1**) Road traffic accidents were the primary mode of trauma (85%), with 86% of these patients undergoing nailing and 77% undergoing MIPO.(**Table 2**) The average time before surgery was 4.1 days (SD±2.88) for nailing and 5.4 days (SD±1.98) for plating, which was not statistically significant (p=0.06). Fracture type significantly influenced the choice of surgery (p=0.000011), with A3 fractures more often treated with MIPO than IMIL due to better fixation.(**Table 3**)

In our study, we analysed the outcomes of patients treated with intramedullary interlocking nail (IMIL) versus minimally invasive plate osteosynthesis (MIPO) for distal tibia fractures. The Visual Analog Scale (VAS) scores for pain decreased over time in both groups, with no significant difference between them at any follow-up visit (p=0.99). Union rates also showed no significant difference between the two groups, with most patients showing signs of union by 12 weeks.(**Figure 1**) Knee and ankle range of motion (ROM) also improved over time in both groups, with no significant difference between them.(**Figure 2**, **Figure 3**) Functional assessment using the John and Wruh Score and Lower Extremity Functional Score showed no significant difference between the two groups at any follow-up visit.(**Figure 4**, **Figure 5**, **Table 4**).

Table 1: Number and percent of cases of IMIL and MIPO as seen in male and female cases

Sex/Gender	IMIL	% IMIL	MIPO	% MIPO
Male	26	96	20	77
Female	2	4	6	23
Total	28	100	26	100

Table 2: Mode of trauma and modality of treatment used

Type	IMIL %	MIPO %
RTA	86	77
FALL	7	20
ASSAULT	7	3

Table 3: AO fracture pattern and type of fixation ustilised

Fracture Pattern	IMIL	% IMIL	MIPO	% MIPO
A1	13	72	5	28
A2	13	54	11	46
A3	2	16	10	84

Table 4: Various parameters checked at followups and their value

Visit	Visual Analogue Scale (IMIL)	Visual Analogue Scale (MIPO)	Fracture Union (Weeks)	Fracture Union (% IMIL)	Fracture Union (% MIPO)	Ankle Flexion (IMIL)	Ankle Flexion (MIPO)	Ankle Extension (IMIL)	Ankle Extension (MIPO)	John & Wruh Scale (Plating)	John & Wruh Scale (Nailing)	Lower Extremity Functional Scoring (Plating)	Lower Extremity Functional Scoring (Nailing)
1 Week	8.35 (±0.91)	8.91 (±0.95)				11.1 (±2.54)	3.76 (±1.06)	40.67 (±2.19)	17.46 (±1.58)	2.53 (±0.50)	2.5 (±0.50)	19.7 (±4.07)	19.2 (±3.95)
3 Weeks	6.57 (±1.24)	6.53 (±1.19)				18.03 (±1.31)	5.92 (±0.62)	46.75 (±1.37)	24.07 (±3.08)	2.57 (±0.50)	2.57 (±0.50)	29 (±2.87)	29.8 (±3.57)
6 Weeks	4.96 (±0.74)	4.82 (±0.83)	6 Weeks	0	0	19 (±1.31)	7.96 (±0.82)	52.39 (±1.81)	34.88 (±2.12)	1.69 (±0.47)	1.92 (±0.48)	39.7 (±3.31)	38.7 (±2.33)
9 Weeks	4.57 (±1.01)	4.65 (±1.13)	9 Weeks	60	35	22.53 (±1.10)	10.46 (±1.06)	56.17 (±1.21)	40.5 (±2.30)	1.65 (±0.48)	1.89 (±0.32)	49.6 (±3.39)	49 (±3.27)
3 Months	2.82 (±0.74)	3 (±0.86)				25.82 (±1.33)	14 (±1.32)	58.42 (±0.50)	47.88 (±1.47)				
6 Months	2.07 (±0.89)	2.07 (±0.97)	6 Months	100	96	25.82 (±1.33)	19.23 (±1.14)	59.5 (±0.50)	51.3 (±1.12)	1.61 (±0.69)	1.57 (±0.40)	63.9 (±5.17)	65.6 (±2.43)
12 Months	0.92 (±0.80)	0.8 (±0.85)	12 Months	100	96	25.82 (±1.33)	23.61 (±0.75)	59.59 (±0.50)	54.5 (±1.14)	1.5 (±0.70)	1.21 (±0.40)	72.5 (±5.96)	74.5 (±2.68)

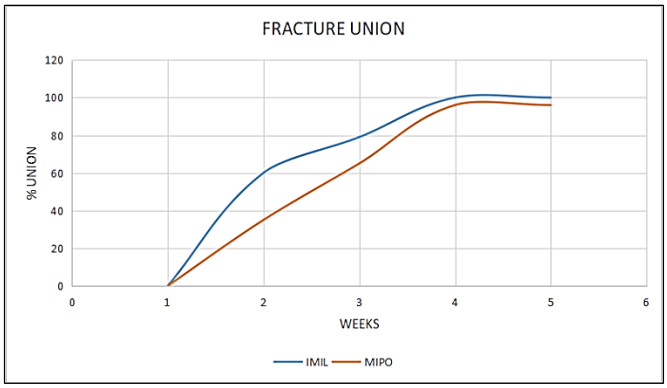

Figure 1: Showing correlation between fracture union and time in weeks

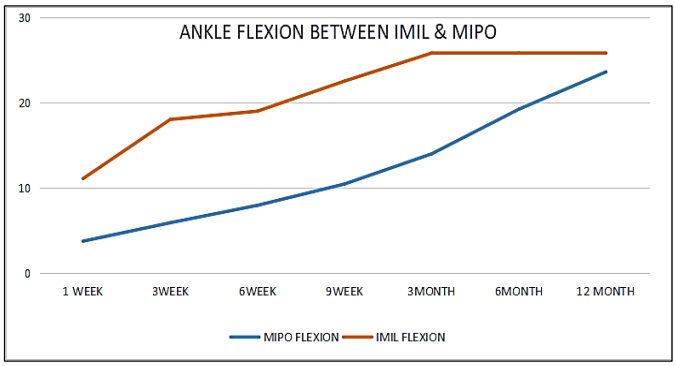

Figure 2a: Showing ankle flexion relation between IMIL and MIPO at followup

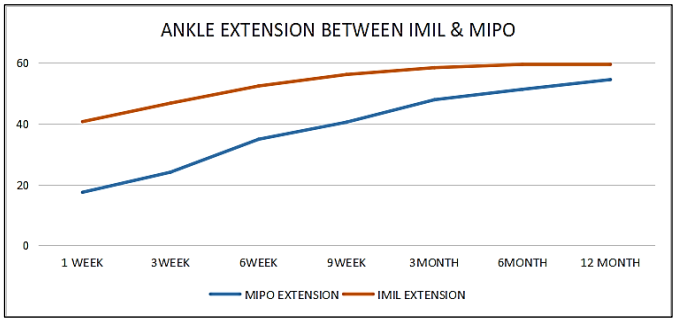

Figure 3: Showing ankle extension relation between IMIL and MIPO at followup

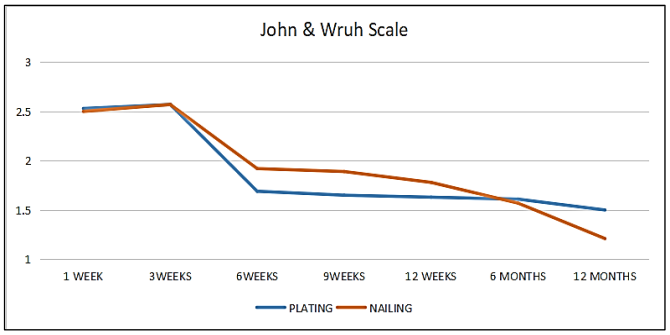

Figure 4: Shows John and Wruh Scale correlation between IMIL and MIPO

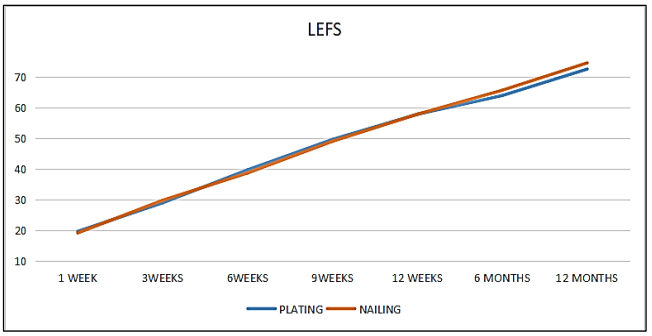

Figure 5: Shows lower extremity functional score compared between IMIL and MIPO

4. Discussion

In the management of extra-articular distal tibia fractures, surgeons aim for decent reduction with good functional outcomes. Minimal invasive plating and multidirectional locked intramedullary nailing are two viable options. Multidirectional locked nailing has advantages over plating in terms of surgery duration, union time, complications like wound infection, early weight-bearing capacity, and ankle joint range of motion.[10,7] Conventional intramedullary nailing has long been favoured for its early weight-bearing and union rates, despite challenges in stabilizing the distal fragment and risks of malunion. Techniques like Poller screws[16,17] and angle-stable locking screws[16,18] have been developed to address these issues. Minimally invasive plate osteosynthesis (MIPO) techniques, with realignment of the tibial mechanical axis without fracture exposure, claim earlier union and lower complication risks.[19] Percutaneous plating, with locked plate designs, challenges interlocking nailing by preserving periosteal blood supply and providing stable fixation.[20,21]

By introducing newer generation of intramedullary nails locked use of nailing has been increased in distal tibia fractures management. Both proximal and distal ends of multidirectional locked nailing system has various locking options are available in different planes.[25]**Error! Reference source not found.** Stability of the fracture fragments both axial and lateral will be augmented by angular stability locking system where there are four locking options available at distal end: one oblique (distal most), two mediolateral and one anteroposterior locking options, which will increase the bone purchase and distal fragment stability.[26] In our study, the patients were in the range of 18–75 years, with mean age being 43.6 ± 11.90 years in IMIL group and 47.5 ± 113.94 years in MIPO group. Of the 54 patients, 46 were males and 8 were females. Predominant male involvement in our study was probably due to more outdoor activities. The result were comparable to that of Kumar et al.,[27] Ram et al.,[28] Li et al.[29] and Vallier et al.[30] In our study, most common cause for these fractures was RTA (85%) followed by fall (10%) and assault (5%). Our results were comparable to other studies by Kumar et al.,[27] Ram et al.,[28] Pawar et al.[10] which also showed that RTA is the most common mode of injury as modernization and industrialization have intruded our lives. Distal Tibia

Extra-articular fracture patterns were classified as AO Classification into A1, A2 and A3. Our study showed that the type of fracture pattern governed the method of fixation as most of A1 (72%) and A2(54%) were fixed with IMIL while A3(84%) were fixed by MIPO as the choice of surgery. Our results were comparable to that of PNVSV Prasad et al.[33] Pain was assessed using the Visual Analogue Scale at each visit of patient and show steady decrease in pain at each visit in IMIL and MIPO group giving a p value of more than 0.05 hence pain could not be used a factor to favour either IMIL or MIPO. A meta-analysis study of 354 patients managed with intramedullary nailing versus plating were analysed which shows Six of the 8 studies, reported postoperative union time with using the different units of time; therefore, the standard mean difference (SMD) was used.59 Of the 354 patients, 177 were treated with intramedullary nailing and the other 177 were treated with distal tibial plate. Random-effect analysis, with an I2 of 67%, showed the difference between two groups did not differ significantly. Guo JJ[31] and others have done a study in 85 patients with distal metaphyseal tibia fractures treated with either plating or nailing and they have not found any significance difference in union time. The mean time of union in our study was 9 weeks for IMIL and 12 weeks for MIPO. In our study, 40 fractures (74%) united between 9-12 weeks. Of these 40 fractures, 22 cases were treated with IMIL nail and 18 with MIPPO. Of the total patients treated by nailing, 100% union was shown by IMIL group at 6 months post op while 96% of MIPO showed union at 6 months. Our study showed that intramedullary nailing led to faster average time for union compared to locking plate by MIPPO, which can be compared with the above study. Other studies done by Li et al.,[29] Pawar et al.[10] Yao et al.[34] also are comparable to the results found in our study regarding faster union in IMLN. In our study patients from nailing group had better and faster range of motion than patients from plating group in terms of Flexion and Extension Ankle joint at all post-operative visits while there was delayed full range flexion (9 weeks) and extension (6 weeks) at Knee joint in IMIL group due to operative site involvement and anterior knee pain. Average range of motion in terms of Flexion and Extension at Knee and Ankle joints showed there is no significant difference in the average values of plating and nailing. Our results were comparable to that of the study by Guo et al[31] done a prospective randomized control study in 85 patients with distal tibia fractures treated with either MIPO or intramedullary nailing (41 patients with plating and 44 patients with nailing) and observed that all are united without any significant difference in functional score. Our study results are comparable with above study. There is no significant change seen in functional outcome (John and Wruh criteria) between two groups (p=0.695). The difference in Lower Extremity Functional Scale Score showed mean score of 47.80 ± 19.81 in IMIL group where as in MIPPO group it is 47.45 ± 19.02, having p value p = 0.856 these differences were not found to be statistically significant. Even though there is no statistical significance but clinically there is significant difference in the functional outcome comparatively which was similar to studies by Guo et al.[31] and Collinge et al.[32]

In a study comparing intramedullary nailing versus plating in distal tibia fractures, no significant statistical difference was found in postoperative union time. In the study, the mean union time was 9 weeks for intramedullary nailing and 12 weeks for plating, with faster union rates in the intramedullary nailing group. Patients treated with intramedullary nailing showed better and faster range of motion at the ankle joint compared to those treated with plating, but experienced delayed full range flexion and extension at the knee joint due to operative site involvement and anterior knee pain. Overall, there were no significant differences in functional outcomes between the two groups, as measured by the John and Wruh criteria and Lower Extremity Functional Scale Score. These findings were consistent with previous studies, highlighting the effectiveness of both techniques in treating distal tibia fractures.

5. Conclusion

This study found that while there was a slight advantage in average time to full weight bearing and mobilization with intramedullary interlocking nail (IMIL) compared to minimally invasive plate osteosynthesis (MIPO) for distal tibia fractures, this difference was not significant at one year follow-up. Both IMIL and MIPO showed similar functional outcomes, indicating that they are equally effective for treating these fractures. The choice between the two methods should consider the fracture pattern, with MIPO being preferred for extra-articular comminuted fractures. Ultimately, while IMIL may offer some advantages such as shorter preoperative waiting time, faster union, and early weight bearing, both techniques show excellent functional outcomes, and the fracture pattern should guide treatment decisions.

6. Source of Funding

None.

7. Conflict of Interest

None.

8. Ethical Clearance

BJMC/IEC/PharmaC/D- 0322031-031.

References

1. Schatzker J, Tile M. The rationale of operative fracture care. 3rd ed. Berlin: Springer-Verlag; 2005. p. 475-6
2. Bucholz RW, Court-Brown CM, Rockwood CA. Rockwood and Green's fractures in adults. New York: Lippincott; 2015. p. 98.
3. Müller ME, Nazarian S, Koch P, Schatzker J. The comprehensive classification of fractures of long bones. Berlin: Springer-Verlag; 1990.

4. Duda GN, Mandruzzato F, Heller M, Goldhahn J, Moser R, Hehli M, et al. Mechanical boundary conditions of fracture healing: Borderline indications in the treatment of unreamed tibial nailing. *J Biomech*. 2001;34(5):639–50.
5. Redfern DJ, Syed SU, Davies SJ. Fractures of the distal tibia: minimally invasive plate osteosynthesis. *Injury*. 2004;35(6):615–20
6. Borg T, Larsson S, Lindsjö U. Percutaneous plating of distal tibial fractures. Preliminary results in 21 patients. *Injury*. 2004;35(6):608–14.
7. Pai V, Coulter G, Pai V. Minimally invasive plate fixation of the tibia. *Int Orthop*. 2006;31(4):491–6.
8. Vaienti E, Schiavi P, Ceccarelli F, Pogliacomi F. Treatment of distal tibial fractures: prospective comparative study evaluating two surgical procedures with investigation for predictive factors of unfavourable outcome. *Int Orthop.* 2019;43(1):201–7.
9. Kariya A, Jain P, Patond K, Mundra A. Outcome and complications of distal tibia fractures treated with intramedullary nails versus minimally invasive plate osteosynthesis and the role of fibula fixation. *Eur J Orthop Surg Traumatol*. 2020;30(8):1487–98
10. Pawar ED, Agrawal SR, Patil AW, Choudhary S, Asadi G. A comparative study of intramedullary interlocking nail and locking plate fixation in the management of extra articular distal tibial fractures. *J Evol Med Dent Sci*. 2014;3(24):6812–26.
11. Lau TW, Leung F, Chan CF, Chow SP. Wound complication of minimally invasive plate osteosynthesis in distal tibia fractures. *Int Orthop*. 2008;32(5):697–703.
12. Habernek H, Kwasny O, Schmid L, Ortner F. Complications of interlocking nailing for lower leg fractures: a 3-year follow up of 102 cases. J Trauma. 1992;33(6):863–9.
13. Janssen KW, Biert J, van Kampen A. Treatment of distal tibial fractures: plate versus nail: a retrospective outcome analysis of matched pairs of patients. *Int Orthop*. 2007;31(5):709–14.
14. Dogra AS, Ruiz AL, Thompson NS, Nolan PC. Dia-metaphyseal distal tibial fractures treatment with a shortened intramedullary nail: a review of 15 cases. *Injury*. 2000;31(10):799–804.
15. Zelle BA, Bhandari M, Espiritu M, Koval KJ, Zlowodzki M. Treatment of distal tibia fractures without articular involvement: a systematic review of 1125 fractures. *J* Orthop Trauma. 2006;20(1):76–9.
16. Tarr RR, Resnick CT, Wagner KS, Sarmiento A. Changes in tibiotalar joint contact areas following experimentally induced tibial angular deformities. *Clin Orthop Relat Res*. 1985;(199):72–80.
17. Newman SDS, Mauffrey CPC, Krikler S. Distal metadiaphyseal tibial fractures. *Injury*. 2011;42(10):975–84.
18. Horn J, Linke B, Höntzsch D, Gueorguiev B, Schwieger K. Angle stable interlocking screws improve construct stability of intramedullary nailing of distal tibia fractures: a biomechanical study. *Injury*. 2009;40(7):767–71.
19. Oh CW, Kyung HS, Park IH, Kim PT, Ihn JC. Distal tibia metaphyseal fractures treated by percutaneous plate osteosynthesis. *Clin Orthop Relat Res*. 2003;(408):286–91.
20. Costa ML, Achten J, Griffin J, Petrou S, Pallister I, Lamb SE, et al.; FixDT Trial Investigators. Effect of Locking Plate Fixation vs Intramedullary Nail Fixation on 6-Month Disability Among Adults With Displaced Fracture of the Distal Tibia: The UK FixDT Randomized Clinical Trial. *JAMA*. 2017;318(18):1767–76.
21. Mushtaq A, Shahid R, Asif M, Maqsood M. Distal tibial fracture fixation with locking compression plate (LCP) using the minimally invasive percutaneous osteosynthesis (MIPO) technique. Eur J Trauma Emerg Surg 2009;35:159-64.
22. Tyllianakis M, Megas P, Giannikas D, Lambiris E. Interlocking intramedullary nailing in distal tibial fractures. *Orthopedics*. 2000;23(8):805–8.
23. Fan CY, Chiang CC, Chuang TY, Chiu FY, Chen TH. Interlocking nails for displaced metaphyseal fractures of the distal tibia. *Injury.* 2005;36(5):669–74.
24. Court-Brown CM, Christie J, McQueen MM. Closed intramedullary tibial nailing. Its use in closed and type I open fractures. *J Bone Joint Surg Br*. 1990;72(4):605–11.
25. Joveniaux P, Ohl X, Harisboure A, Berrichi A, Labatut L, Simon P, et al. Distal tibia fractures: management and complications of 101 cases. *Int Orthop*. 2010;34(4):583–8.
26. Gueorguiev B, Ockert B, Schwieger K, Wähnert D, Lawson-Smith M, Windolf M, et al. Angular stability potentially permits fewer locking screws compared with conventional locking in intramedullary nailed distal tibia fractures: a biomechanical study. *J Orthop Trauma*. 2011;25(6):340–6.
27. Kumar D, Ram GG, Vijayaraghavan PV. Minimally invasive plate versus intramedullary interlocking nailing in distal third tibia fractures. *IOSR J Dent Med Sci.* 2014;13:15–7.
28. Ram GG, Kumar D, Phagal VV. Surgical dilemma's in treating distal third leg fractures. *Int Surg J*. 2016;1(1):13–6.
29. Li Y, Liu L, Tang X, Pei F, Wang G, Fang Y, et al. Comparison of low, multidirectional locked nailing and plating in thetreatment of distal tibial metadiaphyseal fractures. Int Orthop 2012;36:1457-62.
30. Vallier HA, Cureton BA, Patterson BM. Randomized, prospective comparison of plate versus intramedullary nail fixation for distal tibia shaft fractures. *J Orthop Trauma*. 2011;25(12):736–41.
31. Guo JJ, Tang N, Yang HL, Tang TS. A prospective, randomised trial comparing closed intramedullary nailing with percutaneous plating in the treatment of distal metaphyseal fractures of the tibia. *J Bone Joint Surg Br*. 2010;92(7):984–8.
32. Teitz CC, Carter DR, Frankel VH. Problems associated with tibial fractures with intact fibulae. *J Bone Joint Surg Am*. 1980;62(5):770–6.
33. Prasad P, Nemade A, Anjum R, Joshi N. Extra-articular distal tibial fractures, is interlocking nailing an option? A prospective study of 147 cases. *Chin J Traumatol*. 2019;22(2):103–7.
34. Yao Q, Ni J, Peng LB, Yu DX, Yuan XM. Locked plating with minimally invasive percutaneous plate osteosynthesis versus intramedullary nailing of distal extraarticular tibial fracture: A retrospective study. *Zhonghua Yi Xue Za Zhi.* 2013;93(47):3748–51.

Cite this article: Kumarjuvekar SA, Puranik RG, Gathani HJ, Jadhav RM. Comparative study of functional and radiological outcomes between IMIL and MIPO in distal tibia fractures in adults. *Indian J Orthop Surg*. 2025;11(1):20–25.