(e) ISSN Online: 2321-9599

(p) ISSN Print: 2348-6805

ORIGINAL ARTICLE

Plating versus nailing in the treatment of fibular fractures

Devendra Pratap Yadav

Assistant Professor, Department of Orthopaedic, Hind Institute of Medical Sciences, Safedabad, Barabanki, UP, India

ABSTRACT:
Background: The most prevalent causes of tibia and fibula fractures are athletes, particularly runners, or non-athletes who abruptly increase their level of activity. The present study was conducted to compare plating with nailing in the treatment of fibular fractures. **Materials & Methods:** 80 patients of fibular fractures of both genderswere divided into 2 groups of 40 each. Group I patients were managed with plating and group II patients were managed with nailing. Kitaoka score and complications were compared between both groups. **Results:** Group I had 20 males and 20 females and group II had 18 males and 22 females. Left side was involved in 12 in group I and 14 in group II, right in 20 in group I and 15 in group II and both sides in 8 in group I and 11 in group II. Fracture was lateral malleolar in 18 and 17, bimalleolar in 15 and 14 and trimalleolar in 7 and 9 in group I and II respectively. The mean Kitaoka score was 95.2 in group I and 83.6 in group II. The difference was significant (P< 0.05). Common complications were wound dehiscence 1 in group II, ankle stiffness 2 in group I and 1 in group II, screw breakage in 1 in group I and 2 in group II, wound infection seen 3 in group I and 4 in group II, non- union 1 in group I and 2 in group II and delayed union 2 in group II. The difference was non- significant (P> 0.05). **Conclusion:** When treating fibular fractures, plating has been shown to be superior to nailing in terms of fewer post-operative problems.
Keywords: Fibular, Kitaoka score, nailing

Corresponding author: Devendra Pratap Yadav, Assistant Professor, Department of Orthopaedic, Hind Institute of Medical Sciences, Safedabad, Barabanki, UP, India

This article may be cited as: Yadav DP. Plating versus nailing in the treatment of fibular fractures. J Adv Med Dent Scie Res 2014;2(4):294-297.

INTRODUCTION

The most prevalent causes of tibia and fibula fractures are athletes, particularly runners, or non-athletes who abruptly increase their level of activity. These fractures seem to be caused by a variety of reasons, such as illnesses, altered sports training, particular anatomical traits, and decreasing bone density. Severe ankle sprains can occasionally result in fibula fractures. The fibula may fracture anywhere along its length. These fractures, while substantial, are not as severe as those in bones holding a bigger proportion of body weight because, despite its contribution to weight bearing, the fibula only bears a small portion of the total weight—estimates range from 5 to 17%.[1]
Depending on the energy involved, the mechanisms of injury for tibia-fibula fractures can be broadly classified into two groups: low-energy- These usually include sports injuries and falls at ground level. In these situations, stress or overuse frequently affects the fibula, especially during occupations involving repeated motion or abrupt increases in activity. These injuries, which are frequently observed in runners or sportsmen, can cause stress fractures or small fibula breaks.How-energy- These are connected to more serious trauma, like car crashes, pedestrians hit by cars, or gunshot wounds. In these situations, the fibula is exposed to abrupt, powerful blows that may result in more serious fractures. These fractures are often complex and may be accompanied by additional injuries to the surrounding soft tissues and other bones."[2]

To reduce the likelihood of posttraumatic arthritis, open reduction internal fixation (ORIF) is necessary for ankle fractures that are considered unstable. It is believed that the quality of reduction is crucial and most directly correlates with the likelihood of developing arthritis later on. To reduce the complication rate, indications include smokers, patients who are noncompliant, and those who have serious medical or social issues.[3] Minimally comminuted transverse oblique fractures had the lowest risk of complications. Currently, the most popular method for internal fixation of these injuries is plate fixation, either with or without an interfragmentary compression screw. The track record of plate fixation is quite good, as the rate of both non-union and hardware-related complications is quite low, although hardware removal rates are relatively high. The notion of intramedullary fibular nailing with possible screw fixation has not been extensively developed.[4] The present study was conducted to compare plating with nailing in the treatment of fibular fractures.

MATERIALS & METHODS

The present study was carried out on 80 patients of fibular fractures of both genders. All patients were informed regarding the study and their written consent was obtained.
Data of patients such as name, age, gender etc. was recorded. All patients were divided into 2 groups of 40 each. Group I patients were managed with plating

and group II patients were managed with nailing. Kitaoka score and complications were compared between both groups. Results thus achieved were statistically analysed. P value less than 0.05 was considered significant.

RESULTS

Table I Distribution of patients

Groups	Group I	Group II
Method	Plating	Nailing
M:F	20:20	18:22

Table I shows that group I had 20 males and 20 females and group II had 18 males and 22 females.

Table II Comparison of parameters

Parameters	Variables	Group I	Group II	P value
Side	Left	12	14	0.05
	Right	20	15	
	Both	8	11	
Fracture	Lateral malleolar	18	17	0.75
	Bimalleolar	15	14	
	Trimalleolar	7	9	
Kitaoka score		95.2	83.6	0.01

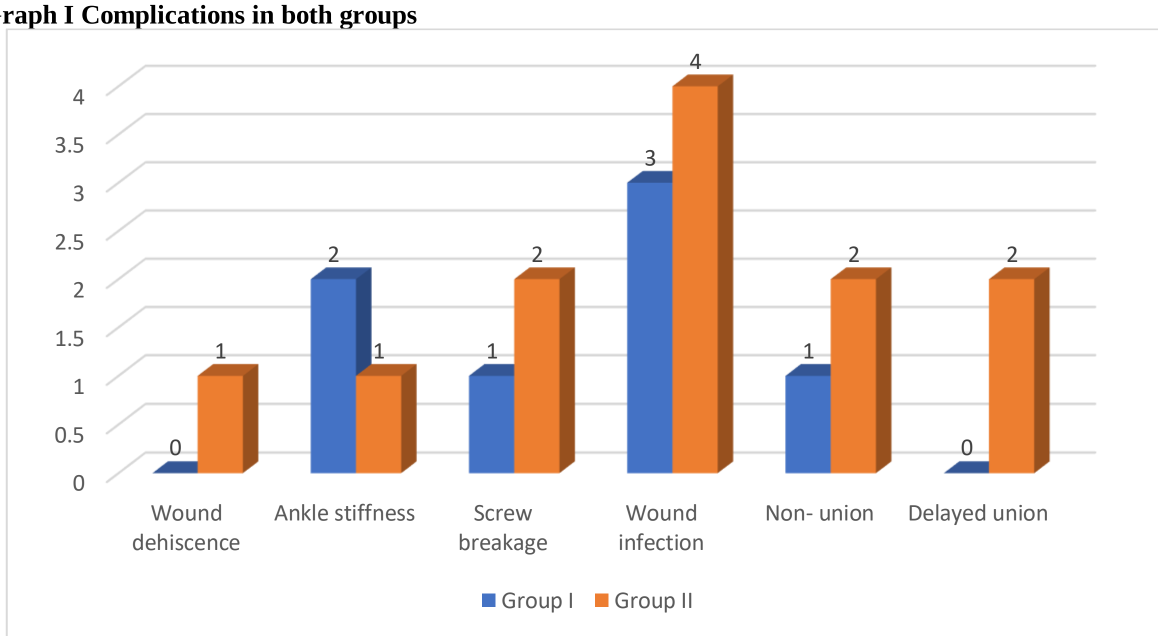
Table II shows that left side was involved in 12 in group I and 14 in group II, right in 20 in group I and 15 in group II and both sides in 8 in group I and 11 in group II. Fracture was lateral malleolar in 18 and 17, bimalleolar in 15 and 14 and trimalleolar in 7 and 9 in group I and II respectively. The mean Kitaoka score was 95.2 in group I and 83.6 in group II. The difference was significant ($P < 0.05$).

Table III Complications in both groups

Complications	Group I	Group II	P value
Wound dehiscence	0	1	0.73
Ankle stiffness	2	1	
Screw breakage	1	2	
Wound infection	3	4	
Non- union	1	2	
Delayed union	0	2	

Table III, graph I shows that common complications werewound dehiscence 1 in group II, ankle stiffness 2 in group I and 1 in group II, screw breakage in 1 in group I and 2 in group II, wound infection seen 3 in group I and 4 in group II, non- union 1 in group I and 2 in group II and delayed union 2 in group II. The difference was non- significant ($P > 0.05$).

Graph I Complications in both groups



DISCUSSION

Ankle fractures are classified according to the Danis-Weber classification system. Type A is a transverse fibular fracture caused by adduction and internal rotation.Type B, is caused by external rotation, it is shown as a short oblique fibular fracture directed mediolaterally upward from the tibial plafond.[5]There are two type C fractures: Type C 1 is an oblique medial-to-lateral fibular fracture which is caused by abduction. Type C 2 fractures result from a combination of abduction and external rotation, producing more extensive syndesmotic injury and a higher fibular fracture.Ankle fractures are frequent, with an estimated 125/100000 per year. Although conservative treatment was used for many years, internal fixation has now become the gold standard treatment for these fractures. Management of these fractures in elderly subjects is still challenging because of a fairly high risk of wound complications, sepsis and hardware failures.[6]Almost one-fourth of all lower-limb fractures are ankle fractures, which are incredibly prevalent. In recent decades, the methods for fixing displaced lateral malleolar fractures have virtually not changed. In the case of extra medullary guidance for the tibia piece in TKR, from which the mechanical axis of the lower limb passes, the center of the ankle joint is 3–4 mm lateral to the center of the inter malleolar axis. An intramedullary device for fibular fixation may have the benefit of being able to be implanted with less hardware and a smaller incision.7 These differences could certainly hold advantages in patients in whom wound healing can be an issue, especially in diabetics and the elderly, and it is possible that a smaller incision and less dissection could elicit less postoperative pain in all patients.[8]The present study was conducted to compare plating with nailing in the treatment of fibular fractures.

We found that group I had 20 males and 20 females and group II had 18 males and 22 females. Seyhan et al[9]compared distal tibial fractures (4-10 cm proximal to the plafond) treated by intramedullary nailing with those treated by percutaneous locked plating and to assess the clinical and radiographic results, complication rates, and the need for secondary procedures. Thirty-six patients received percutaneous locked plate treatment and 25 patients received intramedullary nail treatment. The results obtained from these two treatment methods were assessed by comparing infection rates, starting time for wight-bearing, local implant irritation, union and malunion rates and along with secondary procedures. In the percutaneous locked plate group, two deep infections, four superficial infections, two non-unions, one malunion and 10 local implant irritations were observed. In the intramedullary nail group, one non-union, four malunions and two local implant irritations were observed. The incidence of deep and superficial infections, local implant irritations and secondary procedures in the percutaneous locked plate group was greater than those in the intramedullary nail group. The time to full weight bearing was shorter in the intramedullary nail group. There was no significant statistical difference in malunion and nonunion rates between the two groups.

We found that left side was involved in 12 in group I and 14 in group II, right in 20 in group I and 15 in group II and both sides in 8 in group I and 11 in group II. Fracture was lateral malleolar in 18 and 17, bimalleolar in 15 and 14 and trimalleolar in 7 and 9 in group I and II respectively. The mean Kitaoka score was 95.2 in group I and 83.6 in group II. Vallier et al[10] studied one hundred four patients with extra-articular distal tibia shaft fractures (OTA 42), mean age of 38 years (range, 18-95), and mean Injury Severity Score of 14.3 (range, 9-50).Patients were randomized to treatment with a reamed intramedullary nail (n = 56) or standard large fragment medial plate (n = 48). The mean MFA was 27.5, and mean total FFI was 0.26; P < 0.0001 versus an uninjured reference population. Sixty-one of 64 patients (95%) employed at the time of injury had returned to work, although 31% had modified their work duties because of injury. Three patients were unable to find work. None reported unemployment secondary to their tibial fracture. Forty percent of all patients described some persistent ankle pain, and 31% had knee pain after nailing, versus 32% and 22%, respectively after plating. Both knee and ankle pain were present in 27% with nails and 15% with plates (P = 0.08), and rates of implant removal were similar after nails versus plates. Patients with malunion ≥5 degrees were more likely to report knee or ankle pain (36% vs 20%, P < 0.05). Except 1 patient with knee pain when kneeling, none reported modifying activity because of persistent knee or ankle pain, although knee and ankle pain were more frequent in the unemployed (P = 0.03). Unemployed patients requested implant removal more frequently (24% vs 9.2%, P = 0.07) and continued to report pain afterward. Although FFI and MFA scores were not related to plate or nail fixation, open fracture, fracture pattern, multiple injuries, Injury Severity Score, or age, both MFA and FFI scores were worse when knee pain or ankle pain was present (all Ps < 0.004) and in patients who remained unemployed (P < 0.0001). All 4 patients with work-related injuries had returned to employment but had worse FFI scores (P = 0.01).Mean MFA and FFI scores suggest substantial residual dysfunction after distal tibia fractures when compared with an uninjured population. Mild ankle or knee pain was reported frequently after plate or nail fixation but was not limiting to activity in most. Angular malunion was associated with both knee and ankle pain, and there was a trend toward more patients with knee and ankle pain after tibial nailing. No patients reported unemployment because of their tibia fracture, but unemployed people described knee and ankle pain more frequently and had the worst functional outcome scores.

We found that common complications was wound dehiscence 1 in group II, ankle stiffness 2 in group I

and 1 in group II, screw breakage in 1 in group I and 2 in group II, wound infection seen 3 in group I and 4 in group II, non- union 1 in group I and 2 in group II and delayed union 2 in group II. Bonnevialle P et al[11] found that there was no statistical relation between the anatomic situation of the diaphysis and the anatomic type of the fibular fracture or between the anatomic type of the fibular fracture and its situation compared to the tibial fracture line. The intertubercular and neck fractures were type A1 or B1 (P<0.001) and were combined to a tibia fracture with a torsional component; the medial-diaphyseal and subtubercular fractures were associated with tibial fracture lines with a simple transversal or comminution or metaphyseal-diaphyseal component (P<0.032). The rate of pseudarthrosis of the fibular fracture was 4.7% at 1 year; in all these cases, fibular treatment had been conservative. All treatments combined, the tibial axes were statistically better corrected when the fibula was treated with fixation. In four of the 11 cases of axial tibial malunion, the primary fibular fixation caused or worsened them.
The limitation the study is small sample size.

CONCLUSION

Authors found that when treating fibular fractures, plating has been shown to be superior to nailing in terms of fewer post-operative problems.

REFERENCES

1. Barnett CH, Napier JR. The axis of rotation at the ankle joint in man; its influence upon the form of the talus and the mobility of the fibula. J Anat. 1952;86(1):1–9.
2. Burwell HN, Charnley AD. The treatment of displaced fractures of ankle by rigid internal fixation and early joint movement. J Bone Joint Surg Br. 1965;47(4):634–60.
3. Olerud C, Molander H. A scoring scale for symptom evaluation after ankle fracture. Arch Orthop Trauma Surg. 1984;103(3):190–4.
4. Pott P. Some few general remarks on fractures and dislocations. Clin OrthopRelat Res. 2007;(458):40–1.
5. Miller AJ. Posterior malleolar fractures. J Bone Joint Surg Br 1974;56:508-12.
6. Ponzer S, Nåsell H, Bergman B, Törnkvist H. Functional outcome and quality of life patients with Type B ankle fractures. J Orthop Trauma. 1999;13(5):363–8.
7. Hansen NL. Fractures of the ankle II: combined experimental surgical and experimental-roentgenologic investigations. Arch Surg. 1950;60(5):957–85.
8. Lamontagne J, Blachut PA, Broekhuyse HM, O'Brien PJ, Meek RN. Surgical treatment of a displaced lateral malleolus fracture: the antiglide technique versus lateral plate fixation. J Orthop Trauma 2002;16:498-502.
9. Seyhan M, Unay K, Sener N. Intramedullary nailing versus percutaneous locked plating of distal extra-articular tibial fractures: A retrospective study. Eur J OrthopSurgTraumatol. 2013;23:595–601. doi: 10.1007/s00590-012-1016-x.
10. Vallier HA, Cureton BA, Patterson BM. Factors influencing functional outcomes after distal tibia shaft fractures. J Orthop Trauma. 2012;26:178–83.
11. Bonnevialle P, Lafosse JM, Pidhorz L, Poichotte A, Asencio G, Dujardin F, et al. Distal leg fractures: How critical is the fibular fracture and its fixation? OrthopTraumatolSurg Res. 2010;96:667–73. doi: 10.1016/j.otsr.2010.07.002.