

LETTERS TO THE EDITOR

Fibula Pro-tibia or Tibial Pro-fibula Dilemma: Order Defines Meaning



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Dear editor,

We read the excellent article by Jain *et al*¹ with avid interest. The authors successfully managed complex distal tibia and fibula fractures with the rarely-used fibula pro-tibia fixation technique, achieving good or excellent outcomes in 29 out of 30 patients. In fact, this technique was first described by Campanacci and Zanoli in 1966 to treat non-union of the tibia by creating a fibular synostosis². Since then, a few authors have used the technique to treat ankle fractures in high-risk patients, such as those with osteoporotic bone or diabetes mellitus^{2,3}.

This intriguing title raises the question: is it termed fibula pro-tibia or tibial pro-fibula, as both are reported in the literature?¹⁻⁴. To answer this question, one must delve into basic English grammar. The term “A pro-B” means “A in favour of B” or “A supporting B”. When this principle is

applied, fibula pro-tibia means the fibula is supporting the tibia, and vice versa for tibia pro-fibula. For example, in Fig. 1a, where there is a fibula fracture, the screws are transfixed onto the metaphysis of the tibia to enhance construct stability. Hence, this construct should be called tibia pro-fibula, as the tibia supports the fibula fixation. The clinical cases are described in detail by Panchbhavi *et al*³. Confusion exists even in the literature, where Okoro *et al* incorrectly described their construct as fibula pro-tibia, instead of tibia pro-fibula⁴. In other words, it should not be based on the plate's location, but rather on the function of the supporting bone.

In contrast, in a tibial fracture model depicted in Fig. 1b, the screws are transfixed onto the distal fibula to obtain better mechanical support. In this scenario, the construct can be called fibula pro-tibia, with the clinical cases published by Said *et al*². In the article by Jain *et al*, they transfixed the

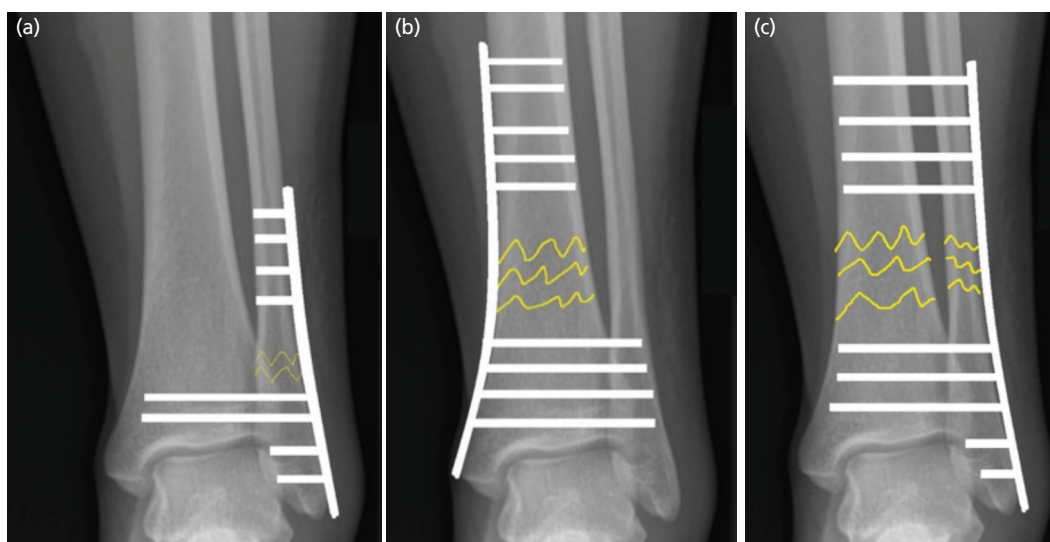


Fig. 1: (a) In this patient with fibula fracture, the screws are transfixed onto the metaphysis of the tibia to enhance construct stability. Hence, this construct should be called tibia pro-fibula, as the tibia supports the fibula fixation. (b) In patients with tibial fracture, the screws are transfixed onto the distal fibula to obtain better mechanical support. In this scenario, the construct can be called fibula pro-tibia. (c) In this case, the construct can be termed as fibula pro-tibia, as the fibula is in support of the tibia.

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screws onto the tibia from the fibula plate to address both distal tibia and fibula fractures (Fig. 1c)¹. In this case, the title is correctly termed as fibula pro-tibia, as the fibula is in support of the tibia.

Based on the suggestion by Reudi and Allgower⁵, the management of distal tibia and fibula fractures should be: (1) reduction and fixation of fibula; (2) reduction of the tibia articular surface; (3) grafting of the metaphyseal defect; and (4) medial fixation of tibia. Using this fibula pro-tibia fixation construct, steps 2 to 4 can be skipped all together. Additionally, by minimising the surgical incision, the soft tissue violation and vascular compromise can be minimised, which may help achieve bony union.

Nevertheless, any surgeon should carefully weigh the surgical options before pursuing this method for treating complex distal tibia and fibula fractures. While the authors successfully immobilise the tibia fracture during fibula fixation with Kirschner wires, it is easier said than done, especially for junior surgeons. The difficulty is compounded by intraarticular tibial fractures. Multiple attempts at manipulation and reduction may prolong the surgery and potentially damage the surrounding soft tissues and vasculature, making this method counterintuitive. On top of that, using a single plate to address both distal tibia and fibula fractures is biomechanically inferior compared to fixation using double or triple plates. Hence, this method has only been used in high-risk patients. Furthermore, prolonged post-operative immobilisation and extended duration of non-weight bearing owing to inferior biomechanics strength may lead to ankle stiffness, especially in young and active individuals. Similarly, with the transfix screws in place, ankle stiffness may occur, though this phenomenon was not observed in the series reported by Jain *et al*¹.

While we applaud the excellent work by Jain *et al*¹, whether this “internal external fixator” is superior to conventional plating or traditional external fixation requires further research.

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AUTHORS' REPLY TO THE LETTERS TO THE EDITOR

Thanks for reading our article and appreciating it. Our study demonstrated good to excellent outcomes of fibula pro-tibia plating in complex distal tibia fractures. The study was conducted on 30 patients between patients of age 18 to 60 years in cases of distal tibia fibula fractures with tibial fracture line extending within 5cm from the tibial plafond with or without the involvement of articular surface presenting within a week of injury. It was further stated that patients with open tibial fractures i.e. wound over medial or anterior part of leg, were included whereas patients having open fibular fractures of Gustilo Anderson grade 3B and above not amenable to fibular plate fixation were excluded from the study. Hence to summarise, inclusion criteria in our study particularly included patients of distal tibia and fibula fractures with open wound on medial/anterior (tibial) side which were relatively unfit for medial tibia plating¹.

These patients of distal tibia fibula fractures having wound on medial or anterior side were managed with fibula pro-tibia plating. In this technique, the first step involved was same as given by Ruedi and Allgower i.e. fibular reduction and plate fixation². It is same standard step as done in any other treatment protocol of distal tibial fractures, not requiring anything new or deviation from basic principles. But this does not mean that other steps as suggested by Ruedi and Allgower which are equally important, were skipped by the fibula pro-tibia plating technique. Technique still follows

the principles and other steps of the management, as it involves the reduction of distal tibial articular surface via indirect means and provisional fixation with k wires. Since these patients had medially or anteriorly open wound on tibia, bone grafting was not done for these cases. Further the tibia fixation was achieved indirectly via the fibular cortical strut, locking fibular plate and fibula pro-tibia screws with each screw having four cortical hold (both fibula and tibia) providing very high strength to the construct which can very well hold the tibial fracture fragments in reduced and aligned position. Thus, fibula pro-tibia plating has advantage of stabilising the both lateral and medial pillar by a single plate and leaving the medial tibial soft tissue sleeve and periosteum intact and preventing any surgical injury to the tenuous tibial blood supply, skin and soft tissue surroundings on the tibia medially, which will help in early union avoiding wound related complications associated with medial plating. Further application of just one plate laterally on fibula in comparison to two plates for both fibula and tibia, will also decrease the surgical time, blood loss, radiation exposure, infection rate and cost¹.

The longer screws fixing fibula and tibia are almost the same as syndesmotic screws. With fibula pro-tibia plating, theoretically there is risk of limitation of ankle range of motion and screw breakage like syndesmotic screws failure occurs if not removed. But since all the screws in the technique are fibula pro-tibia screws, the stresses on the individual screws are distributed unlike the syndesmotic single screw and thus it prevents breakage. Further placing these screws with ankle in maximal dorsiflexion prevents the narrowing of ankle mortise and hence preserves ankle mobility. We believe that ankle stiffness is not due to the technique of fibula pro-tibia plating, but primarily due to complication arising due to initial trauma and involvement of the articular margin per se.

We agree with the concern of the authors that the reduction of the distal tibia fracture is difficult, and this technique has a learning curve. Maybe we have gained experience and expertise after some initial cases which might have helped us in reducing the fracture and treating these patients with ease. We suggest surgeons to gain expertise and experience before attempting to treat these cases with the technique of fibula pro-tibia plating.

We also accept the fact that the single plate fixing both the tibia and fibula may be biomechanical weaker construct than dual plate construct of fixing both fibula and tibia by lateral fibular and medial tibial plates respectively. But we advocate the technique of fibula pro-tibia plating specially in cases of distal tibia and fibula fractures with open wound on tibial side, who are relatively contraindicated for medial tibial plating due to high risk for infection if plated on tibia. We do not propagate the technique as superior or alternative to medial tibia plating, but we propose it to be a treatment option for cases, where the medial plating cannot be done. Further comparative studies or higher level of evidence studies are needed to evaluate this further.

Regarding the authors concern of using the term “fibula – pro-tibia”, we are of the opinion that ‘fibula pro-tibia’ is a better term to describe the technique as mentioned by Said *et al*³ and DeOrio *et al*⁴ compared to the term ‘tibia pro-fibula’ as stated by Panchbhavi *et al*⁵. As the authors have delved into the literature and stated that term “A pro-B” means “A in favour of B” or “A supporting B”. But the authors have misinterpreted the concept by mentioning it as tibia supporting fibula, whereas actually it is the fibula that is supporting the tibia. In the technique used in our study, there is no fixation done on tibia side and the tibia is being supported by the fibula via fibula plate fixation and all screws of the fibula plate passing and holding the tibia fracture also, thus supporting tibia. Hence fibula pro-tibia plating seems to be a more appropriate term rather than tibia pro-fibula.

Lastly, we agree to the fact that further research is required to validate the results and generate a higher level of evidence; hence we have added the term, a pilot study in the title itself. We hope that further multicentre studies, with larger cohort and longer follow-ups can answer the controversies aroused.

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