Distal tibial metaphyseal fractures: does blocking screw extend the indication of intramedullary nailing?

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Abstract

Aim. To evaluate the clinical use of blocking screws as a supplement to stability in distal tibial metaphyseal fractures treated with statically locked intramedullary nail. Main Outcome Measurement. Alignment and reduction preoperatively, postoperatively, and at healing were the main outcome measured with an emphasis on maintenance of initial reduction on followup. Patients and Methods. This was a prospective study of 20 consecutive cases of distal tibial metaphyseal fractures treated with statically locked intramedullary nailing with supplementary blocking screw between August 2006 and September 2007 with a maximum followup of 3 years. Medullary canal diameter was measured at the levels of fracture and isthmus. Results. The mean diameter of tibia at the level of isthmus was 11.9 mm and at the fracture site was 22.9 mm. Mean length of distal fracture segment was 4.6 cm. Mean varus/valgus alignment was 10.3 degrees preoperatively and 1.7 degrees immediately postoperatively and was maintained till union. Using Karlstrom-Olerud score the outcome was excellent to good in 90%. Conclusion. We conclude that the use of blocking screw as a supplement will aid in achieving and maintaining the reduction of distal tibial metaphyseal fractures when treated with intramedullary nailing thereby extending the indication of intramedullary nailing.
Evaluate whether supplementary fibular fixation helped maintain axial alignment in distal metaphyseal tibia-fibula fractures treated by locked intramedullary nailing.

**DESIGN:**
Retrospective chart and radiographic review.

**SETTING:**
Three, level 1, trauma centers.

**PATIENTS:**
Distal metaphyseal tibia-fibula fractures were separated into 2 groups based on the presence of adjunctive fibular plating. Group 1 consisted of fractures treated with small fragment plate fixation of the fibula and intramedullary (IM) nailing of the tibia, whereas group 2 consisted of fractures treated with IM nailing of the tibia without fibular fixation.

**OUTCOME MEASURES:**
Malalignment of the tibial shaft was defined as 1) >5 degrees of varus/valgus angulation, or 2) >10 degrees anterior/posterior angulation. Measures of angulation were obtained from radiographs taken immediately after the surgery, a second time 3 months later, and at 6-month follow-up. Leg length and rotational deformity were not examined.

**RESULTS:**
Seventy-two fractures were studied. In 25 cases, the associated fibula fracture was stabilized, and in 47 cases the associated fibula fracture was not stabilized. Cases were more likely to have the associated fibula fracture stabilized where the tibia fracture was very distal. In multivariate adjusted analysis, plating of the fibula fracture was significantly associated with maintenance of reduction 12 weeks or later after surgery (odds ratio = 0.03; P = 0.036). The use of 2 medial-lateral distal locking bolts also was protective against loss of reduction; however, this association was not statistically significant (odds ratio = 0.29; P = 0.275).

**CONCLUSIONS:**
In this study, the proportion of fractures that lost alignment was smaller among those receiving stabilization of the fibula in conjunction with IM nailing compared with those receiving IM nailing alone. Adjunctive fibular stabilization was associated significantly with the ability to maintain fracture reduction beyond 12 weeks. At the present time, the authors recommend fibular plating whenever IM nailing is contemplated in the unstable distal tibia-fibular fracture.


**Blocking screws for the treatment of distal femur fractures.**
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Abstract
Intramedullary nailing is one of the most convenient biological options for treating distal femoral fractures. Because the distal medulla of the femur is wider than the middle diaphysis and intramedullary nails cannot completely fill the intramedullary canal, intramedullary nailing of distal femoral fractures can be difficult when trying to obtain adequate reduction. Some different methods exist for achieving reduction. The purpose of this study was determine whether the use of blocking screws resolves varus or valgus and translation and recurvatum deformities, which can be encountered in antegrade and retrograde intramedullary nailing. Thirty-four patients with distal femoral fractures underwent intramedullary nailing between January 2005 and June 2011. Fifteen patients treated by intramedullary nailing and blocking screws were included in the study. Six patients had distal diaphyseal fractures and 9 had distal diaphyseo-metaphyseal fractures. Antegrade nailing was performed in 7 patients and retrograde nailing was performed in 8. Reduction during surgery and union during follow-up were achieved in all patients with no significant complications. Mean follow-up was 26.6 months. Mean time to union was 12.6 weeks. The main purpose of using blocking screws is to achieve reduction, but they are also useful for maintaining permanent reduction. When inserting blocking screws, the screws must be placed 1 to 3 cm away from the fracture line to avoid from propagation of the fracture. When applied properly and in an adequate way, blocking screws provide an efficient solution for deformities encountered during intramedullary nailing of distal femur fractures.


Controversies in the intramedullary nailing of proximal and distal tibia fractures.
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Abstract
Management of tibia fractures by internal fixation, particularly intramedullary nails, has become the standard for diaphyseal fractures. However, for metaphyseal fractures or those at the metaphyseal-diaphyseal junction, choice of fixation device and technique is controversial. For distal tibia fractures, nailing and plating techniques may be used, the primary goal of each being to achieve acceptable alignment with minimal complications. Different techniques for reduction of these fractures are available and can be applied with either fixation device.
Overall outcomes appear to be nearly equivalent, with minor differences in complications. Proximal tibia fractures can be fixed using nailing, which is associated with deformity of the proximal short segment. A newer technique-suprapatellar nailing-may minimize these problems, and use of this method has been increasing in trauma centers. However, most of the data are still largely based on case series.


**Semiextended intramedullary nailing of the tibia using a suprapatellar approach: radiographic results and clinical outcomes at a minimum of 12 months follow-up.**
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**Abstract**

**OBJECTIVE:**
To evaluate the clinical and radiographic results associated with the use of a percutaneous suprapatellar (SP) portal and accompanying instrumentation for tibial intramedullary nail (IMN) insertion using a semiextended approach.

**DESIGN:**
Prospective, nonrandomized, nonconsecutive study.

**SETTING:**
Level 1 trauma center.

**PATIENTS AND METHODS:**
From June 2007 to January 2011, 56 fractures (55 patients) underwent intramedullary nailing of a tibia fracture with a semiextended approach through a SP portal. Radiographic and clinical follow-up examinations were performed at a minimum of 1 year after the index procedure. Measurements included bone healing, tibial alignment, knee range of motion, pain drawings, pain scoring (visual analogue scale), functional outcome (Lysholm and SF-36 scoring), evaluation of prenail and postnail insertion arthroscopic images of the patella-femoral (PF) joint (subgroup of study patients), and 1-year follow-up magnetic resonance imaging (MRI) scans (STIR and T2 gradient echo) of the knee to evaluate the PF joint cartilage. MRI scans were reviewed by an independent bone radiologist, whereas arthroscopic images were evaluated by an independent sports medicine fellowship-trained orthopaedic surgeon.

**RESULTS:**
Thirty-six patients (37 fractures) were available for follow-up at a minimum of 1 year (range: 12-49 months) after the index procedure. All but 2 fractures healed after the index procedure (94.6%). There was 1 radiographic malunion (2.7%). The mean Lysholm knee score was 82.14. Mean SF-36 physical and mental scores were 40.8 and 46.0, respectively. Mean arc of knee motion was 124.4 degrees for the affected extremity compared with 127.2 degrees for the contralateral knee. One patient (2.7%) complained of mild pain at the scar, but no patient complained of anterior knee pain either at the PF joint or at the anterior proximal tibia. In 13 of 15 patients undergoing an arthroscopic assessment of the PF joint, prenail and postnail insertion, no cartilage changes, or pressure points were seen either at the patella or at the trochlea groove. Two patients had grade II chondromalacia of the trochlea immediately after the procedure, but these did not correspond with either MRI scans or clinical findings at 1 year. When the remainder of the 1-year MRI scans were reviewed, 1 knee (2.7%) in a patient that did not have an arthroscopic examination was found to have grade II chondromalacia in the PF joint, but this did not correlate with the clinical examination, which was normal.

**CONCLUSIONS:**
This is the first paper to critically document clinical and radiographic results using the percutaneous SP portal with the semieextended approach for IMN of the tibia. Our 1 year results indicate that the procedure resulted in excellent tibial alignment, union, and knee range of motion, with rare sequelae in the PF joint based on immediate arthroscopy and 1-year MRI scans and clinical examinations. Even more interesting was the absence of anterior tibial pain often found when a tibial nail is inserted in a standard fashion.


**Nailing proximal femur fractures: how to choose starting point and proximal screw configuration.**
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**Abstract**
Fractures of the proximal femur can be a challenging treatment dilemma for the orthopaedic surgeon. Complex mechanical forces and anatomic variables in this region combine to make treatment of these injuries difficult and can often result in serious complications. The decision to treat this fracture with an intramedullary device requires the surgeon evaluate many variables in the context of the specific fracture pattern. These include the
choice of implant, starting portal location, and positioning of the patient. Assessment of the fracture pattern and its 3 dimensional orientation is usually accomplished with the aid of advanced imaging. The patient's physiological status, body habitus and bone quality must also be incorporated into the treatment algorithm. We review these issues and how they factor into the decision making process in order to develop a successful operative plan for these injuries. We will review the starting portal selection, reduction and insertion techniques and examine options for proximal locking screw configurations.