

# Chapter 13

## Tibia Shaft Fractures of the Distal Third Treated with Plate Fixation of Tibia and Fibula

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### Case Presentation

This is a 28-year-old female who sustained a closed left distal tibial shaft fracture with an associated fibular fracture following a twisting injury to her leg. Initially the patient was placed in a long leg splint in the Emergency Department to stabilize her fractured tibia and fibula, with plans to conduct operative fixation. Upon presentation, the physical exam demonstrated that the patient was neurovascularly intact and did not have any evidence of compartment syndrome.

### Injury Films

AP, lateral, and oblique radiographs of the left ankle reveal an extra-articular spiral fracture of the distal third of the tibia with an associated fibular fracture (Fig. 13.1).

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**Fig. 13.1** Injury Radiographs

## **Treatment and Timing of Surgery**

Given the fact that this is an unstable injury pattern in an active individual, the decision was made to treat the injury with open reduction and internal fixation. Due to the low energy nature of the injury, there was no significant soft tissue swelling and the surgery was performed the day after initial evaluation.

## **Surgical Tact**

### *Position*

Supine on a radiolucent table, with a small bump under the ipsilateral hip to allow neutral positioning of the leg. Fluoroscopy was done throughout the case with the machine coming in from the same side to allow for medial approach to the tibia.

### *Approach*

Direct lateral over the fibula for the lateral incision.

A small incision was made over the distal medial tibia with percutaneous incisions made for the tibial shaft screws of the plate.

## Fracture Reduction

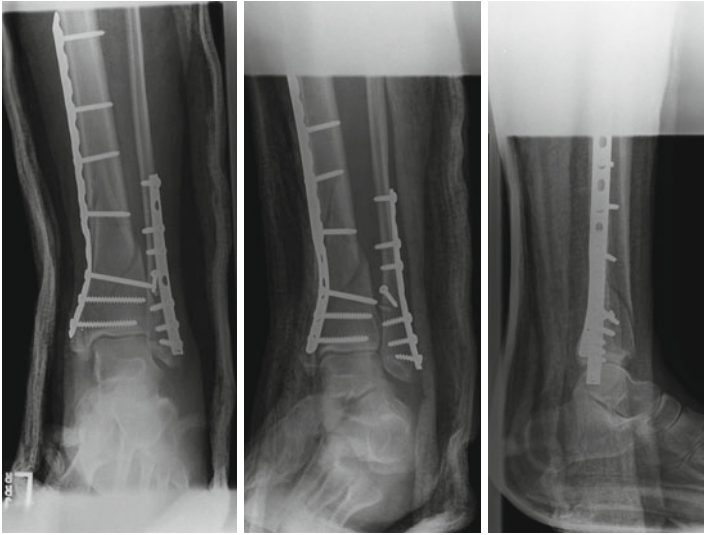
The fibular reduction and fixation was conducted initially in order to facilitate reduction and alignment of the tibia through intact ligaments and soft tissue. Initial reduction of the fibular fracture was obtained using a point-to-point reduction clamp. A screw was then placed using lag technique in order to obtain and maintain compression across the fracture. A one-third tubular plate (8-hole) was placed along the lateral aspect of the fibula to serve as a neutralization plate.

After the fixation of the fibula, the reduction of the tibia was assessed. The reduction can be fine-tuned using reduction techniques including reduction clamps, Shanz pins, and possibly a femoral distractor. After the reduction of the tibia was confirmed, a small (4 cm) incision was made over the distal medial aspect of the tibia. A precontoured distal tibial plate was inserted percutaneously along the medial aspect of the tibia. The position of the plate and the reduction of the fracture were checked using fluoroscopy. Point-to-point reduction clamps can be used to aide with reduction. A cortical screw was initially placed in the most distal screw hole proximal to the fracture in order to buttress the plate to the bone, and assist in the reduction of the fracture. After this screw was placed, screws were placed in the distal tibial segment in order to secure the plate to the tibia. Once the reduction, length, alignment, and rotation of the tibia was confirmed, a total of four bicortical screws were placed in the tibial shaft using percutaneous technique, and a total of three screws were placed in the distal tibia.

Final radiographs were obtained to ensure proper reduction of the fracture before irrigating wounds and final closure (Fig. 13.2).

## Postoperative Plan

The patient was initially placed in a short-leg splint with non-weight-bearing precautions. The patient's first postoperative clinic visit was 2 weeks after surgery. At this point, the patient was

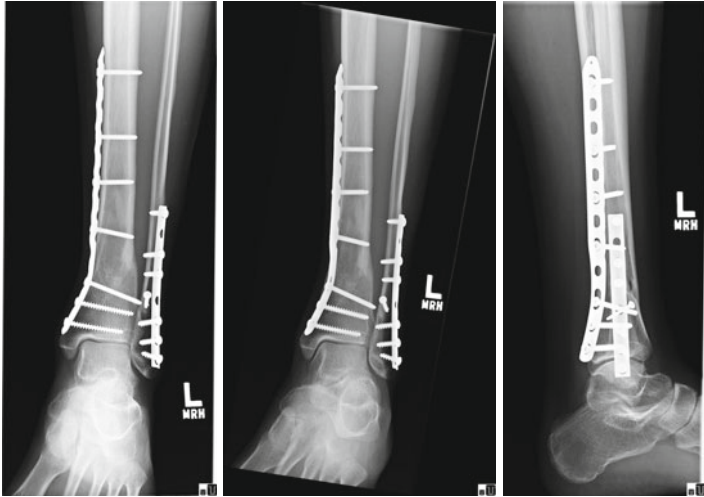


**Fig. 13.2** Immediate post-operative Radiographs

transitioned into a removable splint or walking boot in order to begin ROM exercises but still remained non-weight bearing. The patient was transitioned to weight bearing as tolerated at the eight-week time frame, determined by both the clinical exam and radiographic evidence of healing.

## **Outcome**

Approximately 6 months after her injury and surgery, radiographic imaging showed the fracture to be well healed (Fig. 13.3). The patient returned to full weight bearing without limitations and did not require any pain medications. She did, however, complain of dull “achy” pain overlying her hardware and had requested subsequent hardware removal 16 months after her initial fixation. She underwent hardware removal and did well postoperatively and was satisfied with her outcome.



**Fig. 13.3** 5-month post-operative radiographs

## Complications

Subsequent hardware removal 16 months postoperatively secondary to irritation from underlying hardware.

## Salient Points/Pearls

- Initial fixation of the fibula fracture is useful to help with initial reduction and to regain length prior to fixation of the tibia.
- It is critical that the fibular reduction and fixation is correct, or one may have difficulty obtaining the reduction of the tibia fracture. For this reason, one may consider obtaining temporary reduction and stabilization but delaying definitive fixation of the fibula until after the tibia is reduced and stabilized.
- Point-to-point reduction clamps are a useful tool to help maintain reduction prior to plate fixation.
- Intramedullary nailing is another option for operative fixation of extra-articular distal tibia fractures that provides comparable outcomes.

- Intramedullary nailing may prove to be a better option if there is significant soft tissue injury and concern for wound complications with incisions in the zone of injury.
- Complications to consider with these specific injuries outside of nonunion, malunion, and hardware infection include prominent hardware and associated pain which lead to reoperation for hardware removal.

## References

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