Dual Plate Fixation for Vertical, Impacted Medial Malleolar Fractures: A Novel Technique and Case Report

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PURPOSE

Vertical medial malleolar fractures have been found to have high rates of marginal impaction, and proper anatomic plafond reduction is paramount to outcomes. We present a case of bilateral bimalleolar ankle fractures treated with dual plate fixation and fracture specific fixation of the medial malleolus.

CASE STUDY

A 19-year-old female with no significant past medical history presented as a polytrauma from a motor vehicle collision. She was found to have bilateral supination-adduction bimalleolar ankle fractures. Advanced imaging of the right ankle was performed, and she was found to have a marginally impacted, vertical medial malleolar fracture with anterior and posterior extension of the tibial plafond. She underwent a right ankle open reduction internal fixation, and the medial malleolar fracture was fixated with dual radial styloid plates, one plate to reduce each the anterior and posterior impacted portions. She had an uneventful postoperative course with fracture healing at 6 weeks. She had no evidence of hardware failure or clinical/radiologic signs of post-traumatic arthritis at 1 year follow-up.

IMAGING

Figure 1: Pre-operative CT scan demonstrating vertical, impacted medial malleolar fracture with anterior and posterior extension.

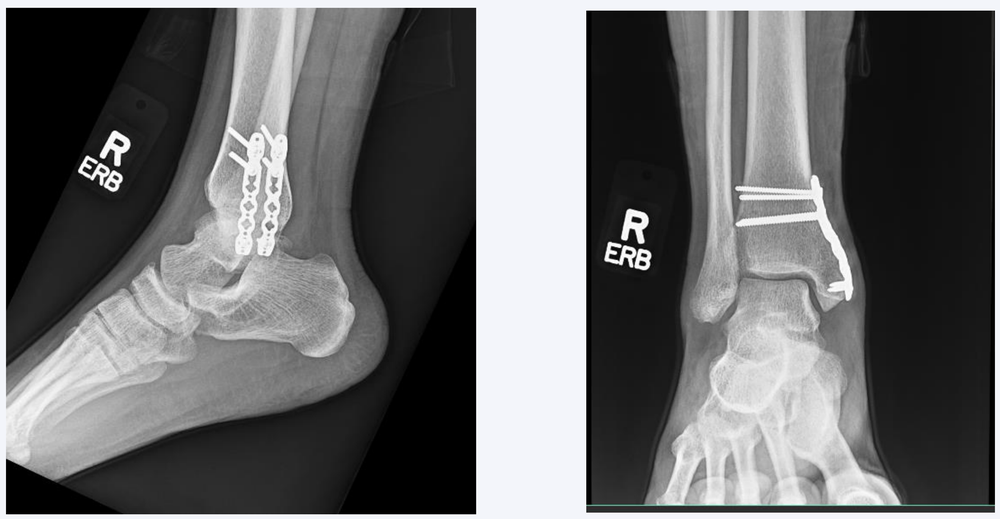

Figure 2: Final post-operative radiographs demonstrating healed medial malleolar fracture with the use of dual plate fixation without evidence of hardware failure or joint arthrosis

DISCUSSION

Supination-adduction ankle fractures are uncommon rotational fractures, with rates varying from 5-20%[1]. With these fractures, joint impaction is common which is associated with cartilage injury and worse joint survivorship. Historically, these fractures have been described as pilon fracture variants[1]. With this, anatomic reduction is paramount, and fracture specific fixation could mitigate the risk of post traumatic arthritis.

Dual plate fixation in lower extremity trauma has been described in femur, tibial and distal fibular fractures, however, there is no current literature of the use in medial malleolar fractures. Vance et. al reported on 12 fibula fractures treated with double 1/3rd tubular plates with 10/12 patients having no hardware related pain with improved functional outcomes[2]. Interestingly, in biomechanical studies, dual non-locking plates were biomechanically equivalent to standard single locking plate technology[3].

CONCLUSION

With high rates of marginal impaction, vertical medial malleolar fractures can be a challenging pathology to treat. With fracture specific fixation, this technique could potentially mitigate the chance of arthrosis and provide stable anatomic reduction.

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