

Corrective Osteotomies for Malunited Malleolar Fractures



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KEYWORDS

• Ankle fracture • Ankle malunion • Osteotomy malleolus

KEY POINTS

- Malunions after malleolar fractures lead to joint instability and result in abnormal weight transfer that can cause arthritic joint destruction.
- The initial morphology of the instability caused by the fractures and the ligamentous lesions will also be found in the malunion.
- After documentation of the malunion a treatment plan has to be drawn up addressing soft tissues, osteotomies, osteosynthesis, implants, and rehabilitation.
- Correction includes the malunited medial and lateral malleolus as well as the posterior tibial rim.

INTRODUCTION: NATURE OF THE PROBLEM

The primary goal of ankle fracture treatment is reconstruction of a congruent joint surface and restoration of stability and anatomic alignment. Ankle fractures are very common and most of these injuries heal very well. However, some of these fractures fail to consolidate and become nonunions (see [Capogna BM, Egol KA: Treatment of Nonunions After Malleolar Fractures](#), in this issue). Others heal in nonanatomic positions and are called malunions. Malunions can occur in diaphyseal and articular fractures. In diaphyseal malunions shortening, angulation, and/or malrotation can be present.

Irregularities of the joint surface are present in malunions of articular fractures. Both types of malunions result in abnormal weight transfer and can cause arthritic joint destruction. The instability in a fracture is defined by the loss of bony guidance, ruptured ligaments, and disturbed coaptation ([Figs. 1–4](#)). Even a minor lateral

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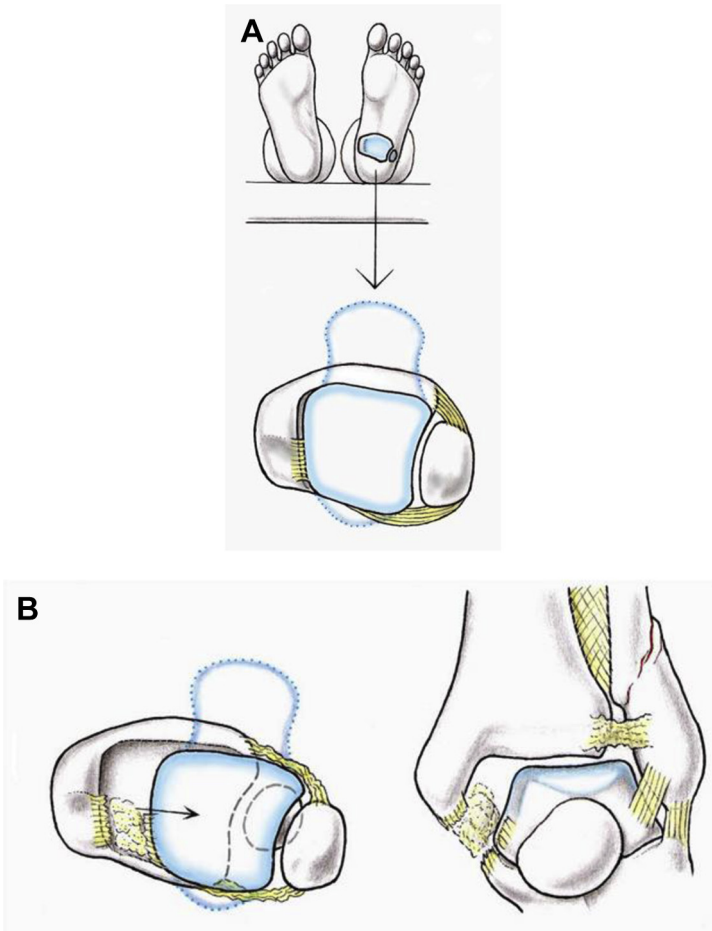


Fig. 1. (A, B): The left ankle. (A) View from below. (B) Anterior view. Rupture of the deltoid ligament, widened joint space, rupture of the anterior tibiofibular ligament, fracture of the lateral malleolus with shortening and external rotation, translation of the talus. (From Weber D, Borisch N, Weber M. Treatment of malunion in ankle fractures. *Eur J Trauma Emerg Surg* 2010;36:522; with permission.)

translation of the talus of 1 mm leads to a decrease of the articular contact surface of 42%¹ (Fig. 5). Translation and rotation of the talus increase this phenomenon.

Malunions are caused by misjudged fracture instability and therefore inadequate fixation, inappropriate surgical technique, inaccurate reduction, and/or secondary dislocation of fracture fragments. This applies to both surgical and nonsurgical fracture treatment.

Clinically, malunions lead to joint instability. This instability can be managed in minor deformities by strengthening of the extrinsic muscles and proprioceptive training. In cases with severe deformity, arthritic changes, poor muscular performance, and in high-demand patients, symptoms such as pain, swelling, and functional impairment are present in various degrees. In these cases, correction of the malunion may be indicated. The patient's age, occupation, and range of motion have to be evaluated when

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