

Medial malleolar osteotomy – the influence of two types of osteotomies and two fixation methods on articular displacement in freshfrozen cadaveric specimens

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Introduction: The medial malleolar osteotomy is required in some cases of osteochondral lesions, bone tumors, and fractures of the medial talar dome for surgical access. The literature is uncertain about which type of osteotomy and fixation is best. The objective of this study was to compare, in cadaveric specimens, the oblique and chevron medial malleolar osteotomies and their fixation with two or three screws, and to evaluate the potential for articular displacement. We hypothesize that the chevron osteotomy results in a lower chance of articular displacement at the end of the procedure than the oblique osteotomy. Our second hypothesis is that fixation with three screws also reduces the risk of articular displacement compared with two screws.

Methods: Forty anatomical freshfrozen specimens were analyzed and divided into four groups (10 per group): oblique osteotomy fixed with two or three screws, and chevron osteotomy fixed with two or three screws. One fracture occurred in the chevron osteotomy group with three screws, leaving thirty-nine specimens for analysis. After osteotomies and fixation, the talus was removed, and articular displacement (stepoff) of the distal tibia was assessed using a digital caliper.

Results: The results indicated a lower incidence of articular displacement in chevron osteotomy (21.1%) compared to oblique osteotomy (50%). Fixation with three screws showed a lower rate of incongruence (21.1%) compared to two screws (50%). When the type of osteotomy and fixation were combined, the chevron osteotomy fixed with three screws had no measurable articular displacement in this cadaveric model.

Conclusion: In this cadaveric surgical technique model, a chevron medial malleolar osteotomy fixed with three screws showed no measurable articular displacement and overall had a lower risk of articular stepoff compared with oblique osteotomy and twoscrew fixation.

Keywords: Osteotomy; Ankle joint; Fracture fixation.

DOI: <https://doi.org/10.30795/jfootankle.2026.v20.2049>

This abstract was presented at the XXII Brazilian F&A Meeting 2026, held in São Paulo, Brazil, from April 18 to 21, 2026.