Malunion following Bi-Plane Chevron Medial Malleolar Osteotomy: The Influence of Fixation

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Abstract

Background: Access to medial half of the talus, for osteoarticular procedures or fracture fixation, can be challenging. Although there are several techniques presented in the literature, a critical evaluation of fixation, union, and alignment is lacking. The Chevron medial tibial osteotomy has the advantage of providing perpendicular instrumentation access to the medial talus and wide exposure to the talus. Post-operative osteotomy displacement resulting in mal-union and possibly provoking ankle osteoarthritis is a known and potentially devastating medial malleolar osteotomy complication. The present study seeks to describe our experience with the osteotomy technique using a large patient cohort.

Materials and Methods: A consecutive series cohort of sixty bi-plane Chevron osteotomies that were performed from January 2003 to December 2013 was evaluated. Internal fixation was used in all patients with 46 secured using two lag screws and four were secured using two lag screws and a medial buttress plate. Radiographic studies (3 standard ankle views) of all osteotomies performed at 2, 6, 12 weeks and at one year were analyzed for mal-reduction, post-operative displacement, and hardware complications. Initial reduction was evaluated on the 2-week film and osteotomy displacement was measured with this initial postoperative x-ray as the basis for comparison.

Results: At initial post-operative follow-up, of the 46 Chevron bi-planar chevron medial osteotomies secured with two lag screws, 18 (38%) showed some degree of displacement when compared to the initial position set in the operative theatre. On final follow-up radiographs, 15 (30%) had continued measurable displacement. The average displacement was 1.8mm proximal and 1.2mm medial. The addition of buttress plate fixation eliminated osteotomy site post-operative displacement, but our plate cohort was too small to perform a proper statistical comparison.

Conclusion: Standard medial malleolar screw fixation of the bi-plane Chevron osteotomy is associated with an unacceptably high rate of post-operative
displacement and malunion. The addition of a distal tibial buttress plate to the osteotomy fixation construct should be considered. This 30% mal-union rate is higher than reported in the literature and its association with long-term complications is unknown.

Level of Evidence: IV, Retrospective Case Study