

Shen Research Day Abstract

Long, single screw fixation of the medial malleolus: A novel and successful technique

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Introduction: Medial malleolus fractures represent a common entity treated by the orthopaedic trauma surgeon. While there are various methods of definitive fixation, standard of care is two 3.5 or 4.0 cannulated or solid screws across the fracture site to achieve compression and avoid rotational displacement. However, situations exist in which placement of 2 screws is challenging. We propose the use of a single, long fully threaded screw without specific lag technique for medial malleolus fixation with the goal of demonstrating successful fracture fixation in the setting of encouraging biomechanical studies.

Methods: A retrospective chart review study was performed at a single institution and evaluated all skeletally mature patients who underwent surgical fixation of their medial malleolus with a single, long fully threaded screw in the medial malleolus between 2018-2022. Electronic medical record charts were reviewed for demographic information and medical comorbidities while operative reports and intraoperative fluoroscopy were reviewed to assess screw size, engagement of the screw in the far cortex, intraoperative fracture displacement, degree of intraoperative fracture angulation and success of anatomic reduction. Follow up data assessed patient pain level as well as fracture union and/or displacement as well as the need for a second surgery.

Results: Seventy-three patients underwent fixation of their medial malleolus with a 3.5 mm screw. Average intraoperative displacement of the fracture was 0.007mm +/- 0.059mm whereas average intraoperative angulation of the fracture was 0.151 degrees +/- 0.638 mm. At the 6-week visit, patient reported pain scores were low. At the 12-week visit, 0% of patients had interval displacement of their fracture site on radiographs and 98.5% of patients demonstrated radiographic evidence of bony union. Nine patients underwent a secondary surgery, 7 of which were for hardware removal.

Conclusion: The present analysis demonstrates successful use of a single 3.5mm cortical screw as novel, straightforward, technique for medial malleolar fixation, with excellent radiographic and clinical outcomes. A single screw construct not only does not lead to increased rotational displacement, but also avoids the challenge of positioning 2 screws in the medial malleolus given its limited surface area distally without an unacceptable rate of fracture displacement or nonunion.