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Deltoid all-inside repair in SER IV bimalleolar-equivalent ankle fractures

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Introduction: Ankle fractures are the second most common fractures of the lower limb. In supination-external rotation (SER) stage 4 injuries, the medial malleolus or the deltoid ligament is disrupted. The stability of the deltoid ligament is essential for functionality; however, the need for surgical repair remains debated. The aim of this study is to assess deltoid stability in 12 ankle fractures treated with an all-inside repair technique.

Methods: A prospective case series of 12 patients (8 male, 4 female aged between 25 and 53 years who had a stage 4 Lauge-Hansen SER ankle fracture with unstable deltoid ligament injury between September 2023 and February 2024. No patients in this study had an associated posterior malleolus fracture. All patients underwent deltoid all-inside repair at the time of fracture fixation. Outcomes were measured using the VAS scale, radiographic and magnetic resonance imaging (MRI), and AOFAS scores, which are reported exclusively in the Supplementary Material for historical comparability. Stability was assessed using stress and weight-bearing radiographs to measure talar tilt (TT) and medial clear space (MCS).

Results: Clinically, the patients had good results, with a mean VAS of 1.5 and an AOFAS score of 87 at 6-month follow-up. There were no complications observed during the study period. MCS remained stable ($p = 0.125$), with means of 3.03 mm (postoperative), 2.87 mm (weight-bearing), and 3.38 mm (stress). Similarly, TT remained consistent ($p = 0.597$), with means of 1.17º (postoperative), 0.87º (weight-bearing), and 1.14º (stress). These findings confirm the preservation of joint alignment and ligament integrity post-repair.

Conclusion: To the best of our knowledge, all-inside deltoid repair has been described; however, reports specifically within SER IV bimalleolar-equivalent fractures and short-term radiographic stability remain limited. The technique demonstrated favorable short-term functional outcomes and radiographic stability.

Keywords: Ankle fractures; Arthroscopic surgical procedures; Ligaments, articular.

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