

Comparison of Syndesmotic Malreduction Assessment Methods in a Supination-External Rotation IV Ankle Fracture Cohort

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Purpose: Multiple methods of evaluating syndesmotic reduction after surgical fixation of rotational ankle fractures have been proposed. However, no method has been shown to best correlate malreduction with patient outcomes. The purpose of this study is to evaluate syndesmotic malreduction as determined by various measurement methods and correlate them with quantitative clinical outcomes. We hypothesize that the most clinically predictive method of assessment will evaluate rotation, anteroposterior translation, and mediolateral translation of the fibula in the tibiofibular interval.

Methods: Records of 42 supination–external rotation (SER) IV ankle fractures that presented with syndesmotic disruption were reviewed. Each patient underwent postoperative bilateral CT scan and had a minimum of 12 months of postoperative clinical follow-up including Foot and Ankle Outcome Score (FAOS). Syndesmotic malreduction was assessed on postoperative bilateral axial CT scan 1 cm proximal to the tibial plafond utilizing 4 methods described in the literature: Method 1, Davidovitch et al assessed anteroposterior fibular translation, mediolateral fibular translation, and fibular rotation; Method 2, Phisitkul et al assessed anteroposterior fibular translation and mediolateral fibular translation; Method 3, hybrid method of Gardner et al and Naqvi et al assessed mediolateral fibular translation and fibular rotation; Method 4, Vasarhelyi et al assessed fibular rotation. Comparison of FAOS between ankles with and without syndesmotic malreduction was performed utilizing each method. Clinically significant differences were defined as ≥ 10 points.

Results: Syndesmotic malreduction was found in 67% of ankles utilizing Method 1, 21% of ankles utilizing Method 2, 26% of ankles utilizing Method 3, and 5% of ankles utilizing Method 4. Method 1 resulted in poorer FAOS Pain (67 vs. 89), Method 2 resulted in poorer FAOS Pain (63 vs. 85) and better FAOS Activities of Daily Living (ADL) (75 vs. 58), and Method 4 resulted in poorer FAOS Pain (63 vs. 86) and poorer FAOS Quality of Life (QOL) (28 vs. 48) scores in ankle fractures with syndesmotic malreduction compared to those without malreduction. Method 3 did not demonstrate any clinically significant differences and none of the assessment methods were found to have statistically significant differences in FAOS between ankles with and without syndesmotic malreduction.

Conclusion: Previously published methods of assessing syndesmotic malreduction poorly correlate with outcomes. Further investigation is needed to identify a clinically relevant method of assessing syndesmotic malreduction.