

Syndesmotic Overcompression After Fixation of Acute Syndesmotic Injuries

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Background/Purpose: Syndesmotic injuries are a common component of malleolar ankle fractures. Prior research has demonstrated that malreduction of the syndesmosis is one of the strongest predictors of poor outcome. Of the possible malreductions of the syndesmosis, excessive medialization (“overcompression”) has not been studied clinically, although cadaver data have variably reported whether this phenomenon is possible. Overcompression may compromise ankle motion and functional outcomes. Our hypothesis was that overcompression is common using standard reduction forceps in treating syndesmotic injuries.

Methods: At a single institution, a prospective cohort with an acute traumatic injury to the syndesmosis was treated with clamp reduction and screw fixation with the ankle in neutral. The cohort consisted of 27 patients (16 male and 11 female). Most (24/27) patients sustained their injury in a twisting, low-energy fall from standing height. Posterior malleolar injury occurred in 14/27 patients (52%), three of whom were treated operatively. Bilateral postoperative CT scans were obtained to assess the reduction accuracy by comparing the operative to the uninjured ankle. Multiple standardized measurements were made based on previously published protocols, and included sagittal translation, coronal plane translation, and rotation of the malleoli. Student *t*-tests were used to compare each measurement between injured and uninjured ankles from each subject. Furthermore, for a subset of seven of the patients, inter-rater reliability of the CT measurements was calculated.

Results: The fibula was translated medially (overcompressed) within the incisura an average of 1.02 mm compared to the uninjured side ($P < 0.001$). There was significant overcompression in both the group with and without posterior malleolar injuries, and the amount of overcompression was similar between groups. There were also a substantial number of malrotations through the syndesmosis. At the level of the talar dome, the fibula was externally rotated by more than 5° compared to the uninjured side in 10/27 patients (37%) (mean, 4.48°; $P = 0.002$). There was no significant malrotation in patients without an injury to the posterior malleolus. Inter-rater reliability was good to excellent in the aforementioned measurements.

Conclusion: In this clinical series, we found a statistically significant overcompression of the syndesmosis in patients with operatively fixed syndesmotic injuries. Malrotation of the fibula in the incisura was noted only in the group with a posterior malleolar injury. These malreductions may be avoided by decreasing clamp compression of the syndesmosis and accurate clamp vector positioning. The functional sequelae of overcompression and rigid fixation of the syndesmosis remains to be determined, but given the physiologic widening of the distal tibiofibular articulation with ankle dorsiflexion, it is possible that overcompression affects ankle motion and function.