

Overtightening of the Syndesmosis Revisited and the Effect of Syndesmotic Malreduction on Ankle Dorsiflexion

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Introduction/Purpose: Ankle syndesmotic injuries are a significant source of morbidity and require anatomic reduction to optimize outcomes. Although a previous study concluded that maximal dorsiflexion during syndesmotic fixation was not required, methodologic weaknesses existed and several studies have demonstrated improved ankle dorsiflexion after removal of syndesmotic screws.

The purposes of the current investigation are:

- (1) To assess the effect of syndesmotic screw fixation on ankle dorsiflexion utilizing a controlled load and instrumentation allowing for precise measurement of ankle dorsiflexion.
- (2) To assess the effect of anterior & posterior syndesmotic malreduction after syndesmotic screw fixation on ankle dorsiflexion.

Methods: Fifteen cadaveric leg specimens were utilized for the study. Ankle dorsiflexion was measured utilizing a precise micro-sensor system after application of a consistent load in the intact state, after compression fixation with a syndesmotic screw and after anterior & posterior malreduction of the syndesmosis.

Results: Following screw compression of the nondisplaced syndesmosis, dorsiflexion ROM was $99.7 \pm 0.87\%$ (mean \pm standard error) of baseline ankle ROM. Anterior and posterior displacement of the syndesmosis resulted in dorsiflexion ROM that was $99.1 \pm 1.75\%$ and $98.6 \pm 1.56\%$ of baseline ankle ROM, respectively. One-way ANOVA was performed showing no statistical significance between groups (p -value = 0.88).

Two-way ANOVA comparing the groups with respect to both the reduction condition (intact, anatomic reduction, anterior displacement, posterior displacement) and the displacement order (anterior first, posterior first) did not demonstrate a statistically significant effect (p -value = 0.99).

Conclusion: Maximal dorsiflexion of the ankle is not required prior to syndesmotic fixation. Anterior or posterior syndesmotic malreduction following syndesmotic screw fixation has no effect on ankle dorsiflexion thus poor patient outcomes after syndesmotic malreduction does not appear to be the result of loss of dorsiflexion due to mechanical block.

