Malreduction of Syndesmosis and Outcomes Following Trans-syndesmotic Screw versus Suture Button Fixation under Direct Visualization and Reduction Technique: A Prospective Randomized Controlled Study

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INTRODUCTION: Syndesmotic injury commonly accompanies rotational ankle fractures, with malreduction significantly affecting outcomes. While suture button fixation has demonstrated efficacy in reducing malreduction rates compared to trans-syndesmotic screw fixation, it incurs higher implant costs. However, the introduction of a direct visualization and reduction technique offers the possibility to mitigate the difference. This study aims to compare the syndesmotic malreduction rate and outcomes between trans-syndesmotic screw fixation and suture button fixation, utilizing the direct syndesmotic visualization technique.

METHODS: One hundred patients with unstable rotational ankle fractures and arthroscopically-confirmed syndesmotic injury who underwent open reduction and internal fixation with minimal follow-up time of 2 years were prospectively randomized into two parallel groups, receiving either trans-syndesmotic screw (SS) fixation (n=50) or suture button (SB) fixation (n=50). All syndesmoses were reduced under direct visualization at the anterior tibiofibular line. The primary outcome was the syndesmotic malreduction rate, evaluated by bilateral post-operative CT scan with a 2-mm side-to-side difference threshold. Secondary outcomes included visual analog scale (VAS), Short Form-36 (SF-36), and Foot and Ankle Ability Measure (FAAM) scores, as well as complications.

RESULTS: The malreduction rate was higher in the SS group (14%) compared to the SB group (4%), but it did not reach statistical significance ($p = 0.160$). Both groups showed significant improvement in pain VAS, FAAM scores, and SF-36, without a significant difference between the groups. The complication rate was not significantly different.

DISCUSSION AND CONCLUSION: The syndesmotic malreduction rates and post-operative outcomes were comparable between trans-syndesmotic screws and suture button fixation under direct visualization and reduction technique. Direct visualization and reduction of the syndesmosis with screw fixation can be a useful technique for better adjustment, potentially reducing malreduction to levels closer to those achieved with suture button fixation.