

A Clinical Comparison of Treatment of Deltoid Ligament Injuries in Ankle Fracture: Repairing the Deep Deltoid or Superficial or Not

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Background/Purpose: Decades ago, it was common for surgeons to repair the injured deltoid ligaments at the time of fibular osteosynthesis. In the last 30 years, many reports showed no significant difference in outcomes when patients received conservative or surgical treatment if the medial clear space reduced in Weber type B and C fractures. However, there has been varied opinion on when to do open repair of the deltoid ligament. This study compared the clinical outcomes in patients with repairing the injured superficial deltoid ligaments and deep deltoid ligaments, and patients without direct surgical intervention after anatomic restoration of the fibular fracture and the medial clear space.

Methods: Since April 2013, a prospective study of ankle fractures associated with deltoid ligament rupture and lateral or lateral-posterior dislocation of the talus was conducted on 3 groups of subjects: 22 patients were treated by superficial deltoid ligament repair, 25 patients received deep components augmentation at the time of fibular osteosynthesis, and 21 patients accepted no direct surgical intervention. For the deep components group, a suture anchor was placed in the talus at the talar insertion of the deep deltoid ligaments and the four suture limbs were passed through the bony canal of medial malleolus to augment them. For the superficial one, the suture anchor was placed in the tip of medial malleolus, and sutured the injured ligaments directly. All the patients were evaluated with stress views preoperatively and intraoperatively. The outcomes were evaluated with Philips and Schwartz clinical scoring system of ankle and AOFAS (American Orthopaedic Foot & Ankle Society) Ankle-Hindfoot Scale.

Results: 68 patients were followed for an average of 15 months. In the superficial components group, the mean degree of plantar flexion was 48.5°, with 2.3° (range, 0-10°) less than the normal side, the mean degree of dorsiflexion was 14.1°, with 6.8° (range, 0-15°) less than the normal side. In the deep components group, the plantar flexion was 49.1°, the dorsiflexion was 14.0°, with 2.6° (range, 0-10°) and 6.9° (range, 0-14°) less than the normal side. In the nonrepaired group, the plantar flexion was 49.4°, the dorsiflexion was 14.4°, with 2.2° (range, 0-10°) and 6.4° (range, 0-20°) less than the normal side. The mean Philips and Schwartz score was 92.8 (range, 80-100) in superficial group, 93.7 (range, 70-100) in deep group, and 93.8 (range, 85-100) in the nonrepaired group, while the AOFAS score was 94.3, 94.6, and 93.7, respectively. According to the intraoperative stress views, we found that the repair group, especially the deep components repair group, can reduce the talus tilt and rotation under valgus and lateral rotational stress. However, no statistically significant intergroup differences were evident in terms of clinical outcomes.

Conclusion: This study did not support regularly exposing and repairing the injured deltoid ligaments whether superficial or deep components, since both repairing and nonrepairing achieved similar results. Repairing injured deltoid ligaments may be helpful to early talus

stability postoperatively. For some cases in the deep components group, the augmentation of suture anchor replaced the syndesmosis screw and posterior malleolus fixation and improved the short-term outcome.

	Superficial group	Deep group	Non-repairing group
Mean degree of plantar flexion(FP)	48.5°	49.1°	49.4°
Difference from normal of PF	2.3° (0-10°)	2.6° (0-10°)	2.2° (0-10°)
Mean degree of dorsiflexion(DF)	14.1°	13.8°	14.4°
Difference from normal of DF	6.8° (0-15°)	7.2° (0-14°)	6.4° (0-20°)
Philips and Schwartz score	92.8 (80-100)	93.2 (88-100)	93.8 (85-100)
AOFAS Ankle-Hindfoot Scale	94.3 (82-100)	94.1 (85-100)	93.7(85-100)