

Anterior Inferior Tibiofibular Ligament (AITFL) Stabilization In Ankle Fractures

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Statement of Purpose

The purpose of this research was to highlight the importance of ankle ligament stabilization during ankle fracture surgery. A retrospective study was performed of patients undergoing ankle fracture repair with concomitant stabilization of the anterior inferior tibiofibular ligament (AITFL).

Introduction

Ligament stabilization in ankle fracture surgery is not a novel topic however, significant variability remains to which ligaments are addressed during osseous stabilization and how the syndesmosis is stabilized. Commonly taught, the posterior inferior tibiofibular ligament (PITFL) is the main stabilizer of the syndesmosis comprising 42% of the overall strength¹. This benchmark research furthered our understanding of the strength of individual syndesmotomic ligaments however, testing was performed with lateral translation stress only. This work was extrapolated on by Clanton et al², where each ligament was tested with dorsiflexion and external rotation stress (Fig.1). The authors found that when the AITFL is sectioned, there is a 24% reduction in resistance of external rotation forces. This research identified the potential need for stabilization of important ligaments such as the AITFL during standard ORIF. Many surgeons have shifted toward stabilizing the syndesmosis with flexible fixation rather than rigid fixation due to high mal-reduction rates³ and the potential need for hardware removal. Although flexible fixation continues to gain in popularity, these devices may not be sufficient in isolation to properly balance the syndesmosis⁴.

Methodology

The senior author's medial records were reviewed (SJM) from 2017 to 2019 for patients who underwent AITFL augmentation during ankle fracture repair. All patients who had AITFL augmentation with uni-malleolar distal fibular fractures, bi-malleolar, tri-malleolar and syndesmotomic injuries were included.

Results

A total of 14 patients patients were included. The mean age was 48.1 years old (16 to 87). There were 5 males and 9 females. **(Table 1)** All Patents at final follow up showed maintenance of their surgical correction.

Age / Sex	Laterality	Fracture Type	Fixation	Syndesmotomic Repair	Syndesmotomic Fixation	AITFL Repair
16 / M	L	Weber B	Neutralization	Yes	Flexible	Yes
31 / F	L	Weber B	Posterolateral	Yes	Flexible	Yes
27 / F	R	Weber B	Neutralization	No	No	Yes
73 / F	L	Weber B	Posterolateral	Yes	Static	Yes
72 / F	L	Weber B	Posterolateral	No	No	Yes
26 / M	L	Weber B	Neutralization	No	No	Yes
28 / F	R	Weber B	Neutralization	No	No	Yes
20 / M	L	Weber B	Posterolateral	Yes	Flexible	Yes
47 / F	L	Weber B	Neutralization	Yes	Flexible	Yes
62 / F	R	Weber B	Neutralization	No	No	Yes
62 / M	R	Weber B	Neutralization	No	No	Yes
63 / F	R	Weber C	Lateral	Yes	Static	Yes
87 / F	R	Weber B	Posterolateral	Yes	Static	Yes
59 / M	L	Weber B	Neutralization	No	No	Yes



Figure 1. Dorsiflexion external rotation stress exam revealing anterior gapping of the syndesmosis indicative of attenuation of the AITFL

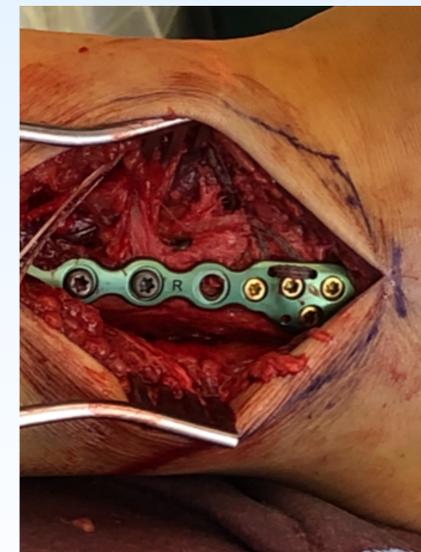


Figure 2. AITFL augmented following ORIF

Intra-operative Stress Testing with External Rotation

Videos 1-2 grossly and radiographically depict instability following ORIF. Note the instability of the syndesmosis with no syndesmotomic stabilization. Videos 3-4 reveal both radiographic and gross stabilization of syndesmosis following augmentation of the AITFL alone.



Figure 3. Dorsiflexion external rotation stress exam revealing increased medial clear space. On the right shows negative dorsiflexion external rotation stress test after AITFL augmentation **Figure 4.** Please take a picture of the QR code for a live video showing sequential AITFL repair



Discussion

Advancement in implants and technique has challenged rigid screw fixation during ankle fracture repair of the syndesmosis. A trend has occurred with foot and ankle surgeons to address concomitant syndesmotomic injuries with dynamic flexible fixation in certain patient populations as well as promote early ROM and weight-bearing. Many surgeons still address only part of the syndesmosis, the interosseous ligament with commercially available devices, while neglecting an important stabilizer of the ankle joint, the AITFL. Further research in the field of multi-ligament stabilization during ankle fracture repair will continue to advance how ligaments are sequentially addressed during ORIF and advance patients to earlier return to function.

References

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