

# Endoscopic reconstruction of CFL and the ATFL with a gracilis graft: a cadaveric study

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## Abstract

**Purpose** The purpose of this study was to evaluate a step-by-step approach to endoscopic reconstruction of the anterior talofibular ligament (ATFL) and the calcaneofibular ligament (CFL).

**Methods** Fourteen lower extremity cadaveric specimens were used. Four standard portals were defined and used. A step-by-step approach using several anatomical landmarks was used to reconstruct the ATFL and CFL. The feasibility of visualising the anatomical landmarks and both ligaments and their footprints was assessed. Both ligaments were reconstructed using a gracilis graft fixed in bone tunnels. The lateral side of the ankle was completely exposed and dissected. The specimen was assessed for clinical stability of the reconstruction and damage to the surrounding anatomical structures. The distance between the centre of the tunnel and the anatomical insertions of the ligaments was measured. The distance between the portals and the nerves was measured.

**Results** The step-by-step approach allowed a good visualisation of the entire course of the ATFL and CFL. An endoscopic reconstruction of both ligaments was performed, and good stability was obtained. The measurements revealed a good positioning of the reconstructed ligament insertions

with a maximal error of 2 mm in most specimens. Anatomical dissection revealed no damage to the surrounding anatomical structures that were at risk. The average distance to the superficial peroneal nerve was  $11.9 \pm 5.3$  mm (standard deviation), and the average distance to the sural nerve was  $12.4 \pm 3.2$  mm (standard deviation). A safe zone was defined with regard to the surrounding nerves.

**Conclusion** The described technique, which involves an anatomical endoscopic reconstruction of the ATFL and CFL, using a gracilis graft, is a viable option to treat lateral ankle instability. This technique is reproducible and safe with regard to the surrounding anatomical structures.

**Keywords** Ankle instability · Anterior talofibular ligament · Calcaneofibular ligament · Endoscopic reconstruction · Tendoscopy · Gracilis tendon · Autograft · Allograft

## Introduction

In the surgical treatment of symptomatic ankle instability, we can distinguish several techniques: anatomical repairs, non-anatomical procedures and anatomical reconstructions.

Anatomical repairs are still the gold standard for treatment of symptomatic chronic instability [1, 8, 9, 17, 32]. The Broström procedure is a true repair of the lateral ligaments and is often associated with the Gould procedure, which is an augmentation with a proximal advancement of the extensor retinaculum [5, 15]. Recently, there has been a move towards endoscopically assisted or full endoscopic repair of the lateral ligaments [1, 9, 13, 23, 26, 30, 32]. However, the study by Drakos revealed some risk of entrapment of the surrounding anatomical structures using these procedures [11].

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