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Technical note

Arthroscopic anatomical reconstruction of the lateral ankle ligaments: A technical simplification

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ABSTRACT

Anatomical reconstruction of the lateral ankle ligaments has become a pivotal component of the treatment strategy for chronic ankle instability. The recently described arthroscopic version of this procedure is indispensable to ensure that concomitant lesions are appropriately managed, yet remains technically demanding. Here, we describe a simplified variant involving percutaneous creation of the calcaneal tunnel for the distal attachment of the calcaneo-fibular ligament. The rationale for this technical stratagem was provided by a preliminary cadaver study that demonstrated a correlation between the lateral malleolus and the distal footprint of the calcaneo-fibular ligament. The main objectives are simplification of the operative technique and decreased injury to tissues whose function is crucial to the recovery of proprioception.

1. Introduction

Surgery on the lateral ankle ligaments has been proven effective in the treatment of chronic ankle instability. Anatomical ligament reconstruction [1,2] is steadily gaining ground as a means of avoiding the long-term risk of osteoarthritis seen with non-anatomical reconstruction [3,4]. Furthermore, failures have been reported after direct repair with or without tissue augmentation, which has a number of contra-indications [4]. An arthroscopic variant of anatomical lateral ankle ligament reconstruction was described recently [5,6]. It remains technically challenging, however, particularly regarding the accurate placement of the calcaneal tunnel [7].

Here, we describe a technical stratagem for positioning the distal insertion of the calcaneo-fibular ligament (CFL). This stratagem was developed based on a cadaver study [8]. It simplifies the technique of arthroscopic anatomical reconstruction of the lateral ankle ligaments.

2. Operative technique

The patient is supine with the feet hanging over the edge of the table. A pad is placed under the ipsilateral buttock to rotate the foot medially, thus facilitating access to the lateral malleolus (Fig. 1a).

To harvest the gracilis, the knee must be flexed at 90°. During this manoeuvre, a counter-support is placed laterally, in contact with the tourniquet at the root of the thigh (Fig. 1b).

Standard arthroscopy equipment is used.

2.1. Transplant harvesting and preparation

The gracilis tendon is harvested according to the safe mode described by Lanternier et al. [9], using a tendon stripped introduced through a short, oblique, anteromedial incision centred on the pes anserinus. A transplant length of 10 cm is sufficient.

The transplant is then simply prepared by threading #2/0 Fiberloop on a straight needle (Arthrex, Naples, FL, USA) through each of its ends.

A Bio-Tenodesis Screw™ system (4.75 mm × 15 mm, Arthrex, Naples, FL, USA) is placed at one end of the transplant for fixation to the talus (Fig. 2).

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Fig. 1. (a) The patient is supine with the foot rotated medially. (b) The knee is flexed at 90° for harvesting of the gracilis tendon.

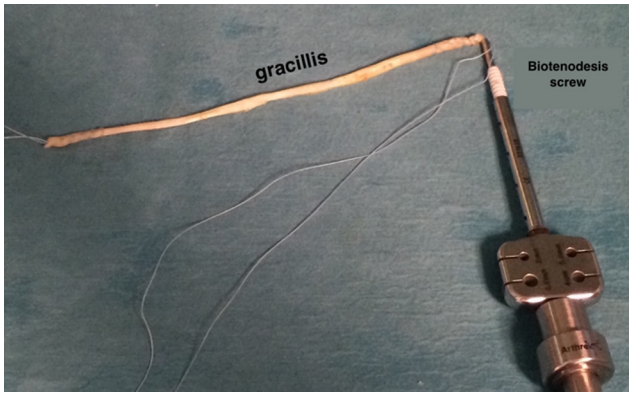

Fig. 2. Preparation of the transplant. Bio-Tenodesis Screw.

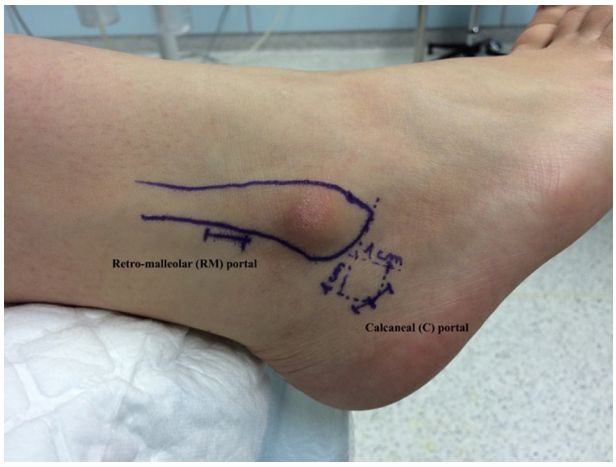

Fig. 3. Skin markings for the calcaneal (C) portal and retro-malleolar (RM) portal. Retro-malleolar (RM) portal. Calcaneal (C) portal.

Fig. 4. Creation of the calcaneal tunnel while spreading the portal open.

2.2. Creating the calcaneal portal (C), calcaneal tunnel, and retro-malleolar portal (RM)

The technical stratagem consists in creating the calcaneal tunnel percutaneously using a method based on a preliminary cadaver study [8] that demonstrated an anatomical correlation between the lateral malleolus and the distal insertion of CFL.

A dermographic pen is used to draw a vertical line along the posterior cortex of the fibular shaft and another line perpendicular to the first and running through the tip of the lateral malleolus. The point located 1 cm inferior and posterior to the intersection of these two lines indicates the C portal (Fig. 3).

A 1 cm-long incision cutting only through the skin is made and the underlying tissues are spread painstakingly down to the bone. An eyelet wire 2.4 mm in diameter is introduced using a power tool towards the posterior, inferior, and medial edge of the calcaneus (Fig. 4). A calcaneal tunnel open at both ends is then over-drilled using a cannulated 6-mm bit. The lead suture n° 1 is positioned (Fig. 5).

A 1 cm-long retro-malleolar (RM) portal (Fig. 5) is created 3 cm above the tip of the lateral malleolus, just behind the posterior fibular cortex. This portal allows protection of the fibular tendons during drilling of the fibular tunnel and ensures proper positioning of the cortical endobutton.

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