Arthroscopic Repair of Ankle Instability

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KEYWORDS

• Arthroscopy • Broström • Lateral ankle • Ankle stabilization

KEY POINTS

- Arthroscopic parameters and indications continue to expand as technological advances and scientific understanding of biomechanical pathology in the foot and ankle continue to improve.
- Additionally, understanding of the proprioceptive contribution to an unstable ankle joint has opened up less-invasive approaches to surgical intervention in the ankle.
- Minimally invasive approaches have a proven benefit of decreased soft-tissue plane dissection, decreased overall soft-tissue embarrassment, and subsequent decreased fibrotic scar tissue deposition tendency postoperatively.
- Lower-profile scars involved in arthroscopic approaches decrease the need for prolonged immobilization, allowing for earlier and safe joint mobilization. Secondary to these perceived and apparent benefits, there is capacity to significantly improve patient outcomes in the active population perioperatively and in the long term.
- A strong understanding of topographic anatomy, natural history and pathobiomechanics, and experienced arthroscopic skills are necessary to mitigate risk profiles in arthroscopic approaches to surgical intervention in chronic lateral ankle instability.

INTRODUCTION

Ankle sprains are a common injury among athletic and non-athletic individuals, at an annual rate of over 3 million injuries per year in the United States.[1] Ankle sprains make up 10% of visits to the emergency department, with 30,000 visits occurring per day.[2] Most sprains are the result of athletic activity in a younger population, with basketball being the cause of 41% of athletically related sprains.[1]

Although most sprains heal uneventfully, about 20% of patients will develop chronic ankle instability after a sprain.[3,4] Ankle instability is characterized by recurrent sprains, difficulty with ambulation on uneven ground, and sometimes pain with activity.[3,5,6]

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The diagnosis of ankle instability is based on history, clinical examination, and radiographs.[7] It is important to avoid undertreatment of chronic ankle instability, as it may lead to early degeneration of the ankle due to unbalanced loading of the medial ankle.[7]

INJURY AND ANATOMY OF THE LIGAMENTS

The mechanism of injury is usually a forced adduction and inversion of the foot while the ankle is plantarflexed.[8] In this position, the anterior talofibular ligament (ATFL) is taut, and the ankle is less stable due the decrease in width of the posterior articular surface of the talus.[3,9] The ATFL is the most commonly injured ligament out of the lateral ankle ligament complex.[9,10] The calcaneofibular ligament (CFL) and the posterior talofibular ligament (PTFL) can also be injured, but these are not as frequent as an ATFL injury.

The surgeon must understand the ligamentous anatomy in order to properly restore ankle function. The ATFL is the main lateral stabilizer of the ankle joint and originates 1 cm proximal to the tip of the fibula.[11] This ligament is 7.2 mm wide, intracapsular, most often consists 2 bands, and inserts just distal to the articular surface of the talus and 18 mm superior to the subtalar joint.[9,12] The origin of the CFL is 8 mm above the tip of the fibula. The CFL the courses posterior to the fibula, under the peroneal tendons, and inserts on the calcaneus 13 mm distal to the subtalar joint.[3] The angle formed by the ATFL and the CFL is 121°.[11]

TREATMENT

Conservative therapy initially entails rest, ice, compression, and elevation.[3] Rehabilitation strategies should include peroneal muscle strengthening, proprioceptive training, and bracing.[3,13,14] External bracing is a viable option to help add extrinsic stability to the ankle joint in addition to aiding the cerebral awareness of the ankle position proprioceptively. For some patients, however, this may not add adequate stability, or they may be unable to tolerate this device as a definitive solution.[15] Surgical repair becomes a necessary and viable option for this group of patients. Those with continued chronic ankle instability, despite appropriate and deliberate conservative intervention, may also become candidates for surgery. Often an MRI (**Fig. 1**) is obtained to evaluate the lateral ankle ligament complex and evaluate for associated injuries including those to the talar dome and peroneal tendons, further enhancing and directing definitive treatment.[13]

HISTORY OF STABILIZATION PROCEDURES

More than 50 procedures have been described for repair of lateral ankle ligaments.[14] Traditionally these procedures fall into 2 reconstructive categories; anatomic and nonanatomic/augmented.[16] Anatomic repair seeks to repair injured ligaments primarily or with local tissue that maintains motion without sacrificing subtalar joint motion. This will allow for physiologic inhibition of anterior translation, axial plane rotation, and inversion of the talus within the mortise without blocking subtalar and ankle motion.[14]

Nonanatomic reconstruction does not restore local anatomy, and is used to create robust restraint to abnormal motion of the ankle joint.[17] Commonly used nonanatomic reconstructive procedures are modifications of those described by Watson-Jones,[18] Chrisman and Snook,[19] and Evans.[20] These repairs have been shown to alter the biomechanics and loading of the hindfoot, midfoot, and forefoot.[21–23]