The sporting ankle

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Abstract

Sporting injuries to the ankle are common; most will settle with non-surgical treatments and proprioceptive work is an important component of the rehabilitation regime. Acute ligament reconstruction may be considered, primarily in elite athletes.

For most patients, surgery should be reserved for those who fail to progress and are left with ongoing pain and/or instability. Surgery for symptomatic instability should take the form of an anatomic repair wherever possible, for example using the Broström technique. The other groups of patients who may require surgery are those who have pain which can be associated with a number of other conditions.

The surgeon should keep in mind the diagnoses of the different ankle impingement syndromes and be aware of the potential structures which may have been injured. Patients may have an osteochondral lesion of the talus as a result of their ankle injury. The natural history of these lesions has not been well documented and a conservative approach is most prudent initially. If surgery is indicated then micro-fracture represents a safe, reliable and cost-effective option. If micro-fracture fails initially it may be repeated, as techniques aiming to restore hyaline cartilage are riskier, technically demanding, costly and as yet have not been proven to be superior to micro-fracture. The cystic lesion remains a difficult problem and evidence does not currently exist to guide practice. Fortunately these are a rare complication of a common injury, and most patients with ankle sprains will experience a good recovery.

Keywords ankle; impingement; lateral ligament; osteochondral lesion; sports

Introduction

Sporting injuries to the ankle are common, with an incidence of over 300 000 per year and representing 25% of all musculoskeletal injuries.[1] They follow certain recognizable patterns and include fractures, tendon ruptures and ligament injuries. Many of these injuries improve with simple supportive therapy but the patients who fail to improve require further evaluation and investigations. This review focuses on the most common aspects of sporting ankle injuries and those which are amenable to arthroscopic treatment. We have elected to discuss primarily

- lateral ligament injury
- impingement syndromes
- osteochondral lesions of the talus.

Isolated medial ligament injuries are uncommon, as the medial ligament is most frequently ruptured as part of an ankle fracture pattern. As such they are beyond the scope of this review. Subtalar joint dislocation and subsequent instability is uncommon, but an important differential to consider when dealing with instability of the ankle. Again, a full description is beyond the scope of this article. Similarly sporting traumatic ruptures of Achilles tendon, tibialis posterior or peroneal tendon conditions are not going to be considered.

Lateral ligament injuries of the ankle

The term ankle "sprain" represents a spectrum of injury severity. It generally applies to the lateral ligaments and is the commonest of all ankle injuries, representing 85% of the total number.[1] The anatomy of the lateral ligament complex has been well described. The anterior talofibular ligament (ATFL) is the primary restraint to anterior displacement of the talus underneath the tibial plafond. The calcaneofibular ligament (CFL) is the primary restraint to varus tilting of the talus within the mortise. The posterior talofibular ligament (PTFL) prevents posterior subluxation of the talus (Figure 1).

The incidence of injury is highest for ATFL, followed by CFL (which is involved in around 50–70% of cases).[1,2] The PTFL is rarely injured (less than 10%). It has been suggested that this reflects the relative strengths of each ligament.[2] However, the incidence of injury is more likely related to the position of vulnerability for each ligament, rather than its absolute strength. The ATFL is at maximal stretch in internal rotation and the CFL in inversion. This composite position occurs very frequently during tripping injuries. The PTFL is vulnerable in maximal dorsiflexion, which is far less common. Furthermore, we know from biomechanical studies that the ultimate strength of the ATFL is in the order of 150N, equivalent to 15 kg.[3,4] This is clearly a small fraction of body weight and it is therefore unlikely that these ligaments have a purely mechanical role as static stabilisers of the ankle. They are subjected to loads that are in excess of their breaking strength during impact activities. They most likely act via an intermediary mechanism in order to be able to provide stability. It is therefore logical to view them as playing an important proprioceptive role, and may give feedback to enable the much stronger tendons to act as a dynamic restraint.[5] This proprioceptive feedback function can be disrupted by injury. It therefore follows that surgical repairs should aim to restore proprioception where possible.

The severity of ankle sprains has been classified based on the structures which have been injured.[6]

Grade I – partial tear of ATFL

Grade II – complete tear of ATFL plus partial tear of CFL

Grade III – complete tear of ATFL and CFL ± PTFL

Irrespective of the severity of the injury, majority of lateral ligament injuries will settle with non-operative, symptomatic treatment.[7] It has been demonstrated that immobilization leads to poorer outcomes than functional rehabilitation.[8,9] Proprioceptive work should be the focus of any physiotherapy regime.

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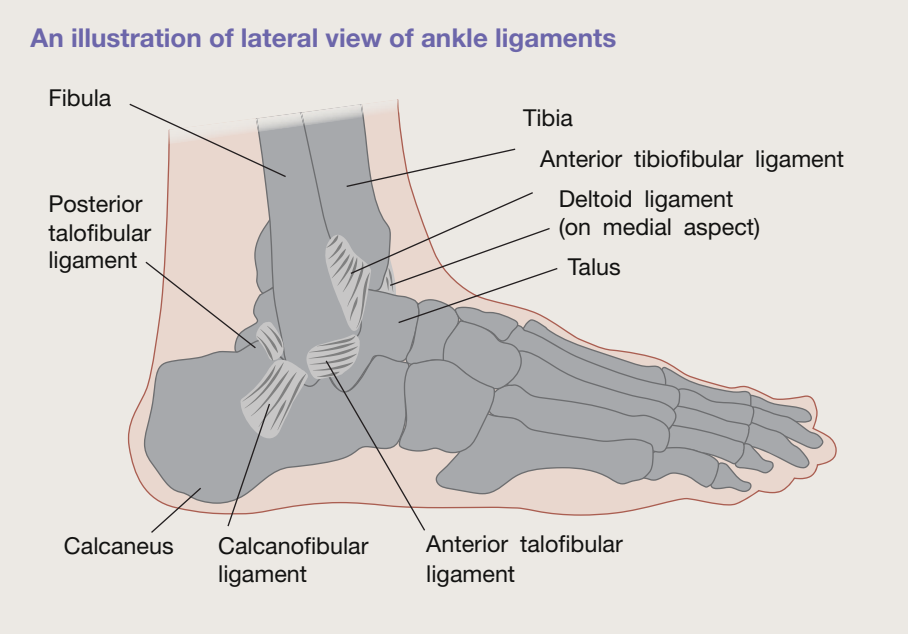

Figure 1 An illustration of lateral view of ankle ligaments.

Acute repair has been the subject of one level II study,[10] which randomised 388 patients to either surgical or functional management. Selection criteria included a positive arthrogram, with leakage of dye indicating rupture of one of the lateral ligaments, or a positive anterior drawer test at one week post-injury. Almost 10% of surgical patients were found to have only a capsular tear and no injury to the lateral ligaments. While the surgical patients fared significantly better at 6 years follow-up in terms of pain (16% vs 25%) and instability (22% vs 34%), the authors still recommend reserving acute repair for higher demand patients. A meta-analysis was inconclusive about the benefits of surgical repair in the acute setting.[11] Outcomes from reported series of delayed repair for chronic instability are similar to those for acute repair.[12] Therefore a trial of non-operative treatment and selecting only those who have failed to progress will help avoid unnecessary procedures and associated complications.

Around 20% of patients will develop recurrent instability subsequent to their initial injury.[4] When dealing with patients with chronic instability, it has been suggested that it is important to distinguish functional from mechanical instability. This requires a demonstration of instability, with stress views if necessary. Maffuli et al.[2] advise that patients with mechanical stability are more suitable for surgery, while those with functional instability stand to gain the most from physiotherapy. There is also a debate about how to investigate patients. Some would advocate MRI or even MR arthrogram in order to visualize the ligaments.

If we accept that proprioception is the main role for the lateral ligament complex, and we have a group of patients who have failed to regain proprioception by non-operative means, then any surgery should be aiming to restore some proprioceptive function. In this situation the distinction between "functional" and "mechanical" may be less important. A patient who has failed non-operative treatment should not be excluded from surgery simply because they have a negative clinical examination or stress X-ray testing instability. There is a very wide spectrum in the normal range of gliding on anterior draw test, and talar tilt on stress views. If a patient has symptomatic instability, then their examination findings and the MRI appearance are secondary. If their ATFL is elongated by 25% that may well be reported as normal on MRI and it may not be discernible on clinical examination. But for that patient who has failed physiotherapy, it may be every bit as debilitating as a complete rupture. Surgery in the form of arthroscopy and anatomic repair (Broström or one of its modifications) (Figure 2) gives the possibility of tightening up the lateral structures and aims to restore the proprioceptive feedback loop. The long-term results of Broström repair (and modified Broström) have been widely reported at around 90% good to excellent results.[12,13]

Where anatomic repair has failed, or where tissues are too attenuated, then an alternative surgical approach may be required. Broadly speaking these can be divided into tenodesis procedures (Chrisman–Snook, Evans and modifications) and anatomic reconstruction, usually with a free tendon graft (such as plantaris, gracilis, or semitendinosus)(Figure 3). More recently, synthetic products have been developed which can be used in place of anatomic reconstruction, either in isolation or as an augmentation to anatomic repair. There is concern that tenodesis reconstructions may alter ankle biomechanics and that this may be detrimental.[14,15] While anatomic reconstructions aim to reconstitute the native ATFL and CFL with harvested biological tissue, it is unlikely that the grafts will become sensing, proprioceptive organs themselves. Associated scar tissue may perform this function. The same arguments can be made about synthetic ligament devices.

While the technique of repair or reconstruction is debated, there is wide consensus that it is appropriate to perform ankle