Ankle sprains are common: one estimate is that there is one per day per 10,000 of the population.\(^1\) Has there been any progress in the management of this so-called minor injury? The important decisions relate to the rupture of ligaments. It is known that the anterior talofibular ligament is almost always the first or only ligament to rupture. Brostrom\(^2\) found that combined ruptures of the anterior talofibular and calcaneofibular ligaments occurred in 20% of cases and that the calcaneofibular ligament alone very rarely ruptured. Chronic instability of the ankle is likely only if both ligaments have been completely torn.\(^3\)

The place of physical examination in diagnosis has been reviewed in a series of 160 patients,\(^4\) comparing the accuracy within 48 hours of injury with that at four to seven days. All patients had arthrography but the outcome was not disclosed to the patient or investigator until after the second examination. The specificity and sensitivity of delayed physical examination for the presence or absence of a lateral ligament injury were 84% and 96%, respectively. A reasonably precise clinical diagnosis is possible. Routine radiographs, without stress films, serve to eliminate injuries to adjacent areas such as the dome of the talus or the base of the fifth metatarsal.

When an accurate diagnosis has been made, it is generally agreed that grade-I (mild injury, microscopic tears and stretching) and grade-II (partial macroscopic tear) injuries recover fully after non-operative management and early functional rehabilitation. Kannus and Renström\(^5\) analysed 12 prospective randomised studies of grade-III (complete) tears, with both talar tilt and a positive anterior-drawer test. The long-term prognosis was excellent or good in most patients regardless of the treatment (operative repair and cast, cast alone or early controlled mobilisation). Even competitive athletes may be treated functionally at first, since secondary reconstruction or delayed repair for recurrent instability gives good results in the 10% to 20% of patients who may require such operations.

In a very few patients, the subtalar ligament complex may also be injured, and it is difficult to distinguish between the contributions of these two joints. The diagnosis of chronic sub-talar instability is still unclear.\(^6\) Stress tomography using forced dorsiflexion and supination may help,\(^7,8\) and Broden’s view may show an increased gap between the surfaces of the posterior subtalar joint. After an apparently serious ankle injury with negative standard stress tests, patients should have a careful evaluation: they may have a subtalar injury requiring investigation by subtalar arthrography.\(^9\) MR arthrography has a high sensitivity and may have a role in the planning of treatment for chronic injuries\(^10\) as well as in the diagnosis of unsuspected injuries.

Chronic subtalar instability usually results from one serious injury followed by repeated minor trauma. This may occur in triple jumpers and basketball players who repeatedly leap up and land with a considerable impact (Pisani, personal communication). The complaint is usually lack of security on rough ground, with discomfort on the lateral and medial sides of the posterior subtalar joint. Clinical examination often shows no laxity of the ankle ligament, but the appropriate radiological techniques should confirm that the subtalar joint is the site of pathology.

After a severe ankle sprain, persistent symptoms may be particularly troublesome in athletes, producing pain on the medial side of the ankle with tenderness on the anterior aspect of the medial malleolus. An arthroscopic investigation of a series of 30 such patients showed that 20 had fresh injuries of the articular cartilage, in 19 at the tip or anterior distal part of the medial malleolus.\(^11\) Six patients also had a loose piece of articular cartilage. O’Farrell et al\(^12\) reported a series of 54 acutely injured ankles with positive stress radiographs which were investigated using technetium radionuclide scanning: MRI was used to study all with an increased uptake. There was an injury to the deltoid ligament in 60% and an unsuspected osteochondral fracture in 10%. Powerful forced inversion first causes rupture of the anterior talofibular ligament but this may extend across the anterior capsule to involve the anterior fibres of the deltoid ligament.\(^3\)
Chronic instability is not always a severe problem; reconstruction is needed only for patients with specific complaints. For these, tenodesis using the peroneus brevis tendon is still commonly used although Inman considered that this showed lack of understanding of the function of the lateral collateral ligaments of the ankle. Experiments on cadaver ankles by Rosenbaum et al support this thesis (p 162). Ankle instability was simulated by division of the anterior talofibular and calcaneofibular ligaments. Watson-Jones, Evans and Chrisman-Snook tenodeses were carried out. Accurate measurements showed that although these procedures gave stability this was achieved by the loss of normal subtalar movement. There may be a place for the use of the peroneus brevis in the Chrisman-Snook procedure for stabilisation of the subtalar joint, or for very heavy muscular patients. Broström advised direct suture of the torn ends of ankle ligaments, even several years after injury, and modifications of this technique with shortening and reinsertion of the ligaments have been reported to give excellent results. Major advantages of repair as compared with peroneal tenodesis are that the function of the peroneal muscle is preserved and there is less block to inversion which is essential for full function in high-class athletes and ballet dancers. Repair by the use of periosteal flaps can provide an indirect reconstruction. Recent biomechanical studies have shown the importance of intact ligaments for normal kinematic function of the ankle.

The proprioceptive function of the ankle ligaments was first stressed by Freeman, Dean and Hankan over 30 years ago and has been supported by a study of mechanoreceptors in human ankle joints. The most common receptors were Wyke and Freeman type II, thought to provide sensation at the beginning of joint motion, and type III which are activated at the extremes of movement. Takebayashi et al have recently studied the proprioceptor and nociceptor nerve endings in the lateral ligament of the ankle in the cat, finding that 93% were situated near the bony attachments. About 80% of the units identified were mechanoreceptors rather than the small-diameter myelinated fibres of nociceptors. This basic information supports the logic of repairing damaged ligaments with preservation of their attachments to bone.

Recent work has advanced our knowledge and given perspective to past concepts. The importance of ligament tension and feedback in the normal movement of the joint has been established. Appreciation of the proprioceptive function of ligaments has been reinforced. Repair of the ligaments, rather than tenodesis may therefore become the favoured operative technique for chronic instability. Patients with persistent symptoms should have full investigation of joint stability, including the subtalar joint. This may include MRI, arthroscopy, or both when they are indicated.

REFERENCES