RECONSTRUCTION FOR LATERAL LIGAMENT INJURIES OF THE ANKLE

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Seventy-six patients (83 ankles) with chronic lateral instability of the ankle were treated by a simple reconstructive operation, namely, a subperiosteal release on the distal part of the lateral malleolus. The released flap, including the insertion of both the anterior talofibular and the calcaneofibular ligaments, was re-attached to the malleolus more proximally.

Seventy-five patients (82 ankles) were examined at a mean of 24 months (range 12 to 70) after operation. In 78 ankles (95%) the result was excellent or good. Forty-four of the 51 patients (86%), whose sporting activities were restricted before operation had no restriction at follow-up. Recurrence of instability occurred in one ankle, following a further injury two years after operation.

Chronic lateral instability of the ankle is a common condition restricting activities in athletes and active people. In the long term uneven stress distribution and overloading with recurrent sprains may lead to osteoarthritis (Harrington 1979). Several techniques for restoring the efficiency of the lateral ligaments have been described. Examples are a tenodesis using the peroneus brevis tendon (Watson-Jones 1952; Evans 1953; Chrisman and Snook 1969) or a fascia lata graft as a ligament substitute (Elmslie 1934). In 1966, Broström reported that end-to-end repair of the ruptured anterior talofibular ligament was still possible several years after the primary injury, but in our experience the ligaments have usually healed although with lengthening and consequent insufficiency. We report the results of a new reconstructive procedure for chronic lateral instability of the ankle.

PATIENTS AND METHODS

Surgical technique. In brief, a slightly curved longitudinal skin incision is made along the lateral malleolus and extended distally to the lateral side of the talus. The peristeme is then incised transversely just distal to the tibiofibular ligament, and the incision is extended distally along the posterior margin of the malleolus just anterior to the peroneal tendons (Fig. 1). The talofibular joint is opened and the cartilage of the talus and the distal fibula is inspected; in patients with chronic synovitis a partial synovectomy is performed. The periosteum with the attached anterior talofibular and calcaneofibular ligaments, as well as the inferior retinaculum, is carefully separated from the tip of the malleolus using a sharp elevator. The uncovered bone of the distal fibula is decorticated with an osteotome, after which four channels for sutures are made in the bone using a pricker and a hook (Fig. 2). The flap, consisting of periosteum, ligament and retinaculum is placed with its base upon the decorticated fibula under optimal tension with the foot in eversion. The free edge of the flap is sutured to the periosteum, usually overlapping the proximal edge of the decorticated border by 3 to 5 mm (Fig. 3). The skin is closed and the ankle immobilised in a below knee plaster for six weeks; full weight-bearing is allowed after the first two weeks.

Patients. Between 1979 and 1986, 83 ankles in 76 consecutive patients (50 male and 26 female), with a mean age at surgery of 28 ± 9 years (range 16 to 55), were operated upon. Each patient described a definite and in most cases severe injury after which the previously stable ankle had become unstable. The average time from the primary injury to operation was 5.2 ± 4.1 years (range one to 21). The indication for surgery was restriction of
physical activities with manifest instability on clinical examination including a positive anterior drawer sign and a positive inversion sign. In 51 patients (56 ankles) the main problems were related to athletic activities, while the remaining 25 patients (27 ankles) had problems mainly related to their normal occupation. Before operation each patient had had four to six months of conservative management given by a physiotherapist, including exercises for increasing muscle strength and training of balance and co-ordination; this treatment had failed to relieve the symptoms or the signs of instability. No ankle had previously been subjected to any surgical procedure. Before operation unstressed anteroposterior and lateral radiographs were taken.

At a mean of 24 ± 12 months (range 12 to 70) after operation, 75 patients (82 ankles) were examined. Whichever of the authors had done the operation, the other conducted the examination before operation and at follow-up. The clinical examinations before surgery and at follow-up included measurement of mobility in extension, flexion, inversion and eversion as well as determination of the sagittal stability and inversion stability. A questionnaire was used to assess the functional stability before operation and at follow-up.

RESULTS

There were no peroperative complications, nor any complications during the six weeks of postoperative immobilisation in plaster.

A constant finding at operation was evidence of old injury of the anterior talofibular ligament near its insertion into the lateral malleolus. In most cases the calcaneofibular ligament also revealed obvious signs of old injury although the level of this was less consistent. Both ligaments had invariably healed, although with lengthening where the scar tissue had stretched.
Before operation all the ankles had severe sagittal instability with a positive anterior drawer sign; inversion instability was severe in 67 ankles and moderate in 15 (Table I). Before operation extension, flexion and eversion were normal in all cases while inversion, as compared with the uninjured ankle, was increased by more than 10° in 46 ankles and by 5 to 10° in 36. In patients with bilateral symptoms mobility was compared to the standard range of movement.

At follow-up, clinical examination revealed that full stability had been restored in 66 ankles; in another nine inversion stability was fully restored but slightly increased sagittal mobility remained. In one ankle severe sagittal as well as inversion instability was found; this patient reported that two years after operation he had a further severe injury after which instability had recurred. Mobility was normal in all except one ankle where unrelated frost-bite six months after operation had left inversion reduced by 10° and flexion by 20°; previously the ankle had normal stability and mobility.

The functional stability before surgery and at follow-up as defined by five physical levels is described in Table II. In total, 74 ankles (90%) were subjectively stable at follow-up while in eight ankles, slight to moderate instability was described.

The patients' opinion of the overall result is presented in Table III. Sixty-eight ankles (83%) were regarded as excellent with stability fully restored. Eight ankles rated as good; in them stability was improved but not fully restored. Two of these also had intermittent pain after exercise and another two had moderate swelling and intermittent pain after athletic activities. Apart from the patient who had frost-bite leaving impaired movement, another two ankles were rated as fair because of persistent occupational problems due to their ankles.

In all, 66 ankles were stable both objectively and subjectively; eight patients reported that their ankles were stable but clinical examination showed that stability, though increased, had not been fully restored.

**DISCUSSION**

Of the various methods of reconstructing the lateral ligaments of the ankle, the Watson-Jones (1952) procedure is technically difficult; when transferring the peroneus brevis tendon through the talus, problems may arise if the tendon is not long enough. In the Evans tenodesis (1953) the peroneus transplant functions only along the resultant of the talofibular and calcaneofibular ligaments. Following the Chrisman-Snook procedure (1969), restricted range of inversion (Broström 1966; Riegler 1984; Snook, Chrisman and Wilson 1985), decreased power of eversion (St. Pierre et al. 1984) and damage to the sural nerve have been reported.

We agree with Althoff, Peterson and Renström (1981) that in patients with chronic lateral instability the ligaments are usually healed, but with lengthening and consequently functional insufficiency. Conservative management including training of balance and co-ordination exercises have been reported to reduce the symptoms of instability following recent injury (Freeman, Dean and Hanham 1965), but in the present study of ankles with chronic instability it had no effect.

Stress radiography to demonstrate talar tilt and an anterior drawer sign have been used in previous studies to quantify instability (Rubin and Witten 1960; Castaign and Delplace 1972; Larsen 1976), but problems may arise from false negatives; thus Johannsen (1978) reported 25% of normal stress radiographs in ankles with verified ligament lesions. Kristiansen (1981) also reported that only 29% of functionally and clinically unstable ankles, were demonstrably unstable on pre-operative stress radiographs. The problems of stress radiography include insufficient muscle relaxation, perhaps due to pain, and those of applying the correct magnitude and direction of stress (Johannsen 1978). Stress radiography is also affected by mechanical instability of the subtalar joints (Boasen, Staples and Russell 1955; Laurin, Ouélet and St-Jacques 1968), muscle weakness (Termansens, Hansen and Damholt 1979) and subtalar adhesions (Watson-Jones 1955, Perkins 1961). Mechanical instability is important, but is probably only one of the several aetiological factors. In the present study conventional stress radiography measuring talar tilt and the anterior drawer sign was initially used in order to disclose and to quantify instability, but frequently radiological examination was negative, even in ankles with functionally and clinically severe instability, and despite the radiography being performed under epidural anaesthesia. Stress radiography was therefore abandoned and the indications for surgery were based strictly on the symptoms and on clinical evidence of instability. If radiography is to be used for the diagnosis and assessment of instability a more precise method is needed with which movement, not only in the talocural joint but also in the subtalar joints, can be measured.

In order to standardise the evaluation of stability both before and after surgery, all ankles were handled exclusively by the authors; for each individual patient the surgeon who conducted the clinical examination was not the surgeon who performed the operation. The fact that eight ankles showed subjective although not clinically complete stability, implies that complete mechanical stability is not a pre-requisite of a functionally excellent result. It seems possible that the technique we use not only improves mechanical stability but also improves proprioception and thereby helps to restore functional stability.

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REFERENCES


