The distal fascicle of the anterior inferior tibiofibular ligament as a cause of anterolateral ankle impingement

Results of arthroscopic resection

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We arthroscopically resected the impinged distal fascicle of the anterior inferior tibiofibular ligament (AITFL) in 21 patients (mean age 31 (11–68) years, 14 women) with chronic ankle pain after an ankle sprain. Clinical tests revealed moderate laxity in 2 and severe laxity in another 2, the remaining 17 ankles showing only mild laxity. During arthroscopy, an impinging distal fascicle of the AITFL was found in all cases. Following anterolateral synovectomy, the fascicle was excised. At the follow-up after mean 3 (2–4) years, good-to-excellent results were obtained in 17 patients. 19 patients were satisfied with the procedure and 17 patients returned to their previous level of activity. 2 patients who had mild laxity were graded as poor because of neuromas of the terminal branches of the superficial peroneal nerve. These patients became asymptomatic after an injection of steroids.

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Anterolateral soft tissue impingement of the ankle is a well-known disorder and a common cause of chronic pain after an ankle sprain (Ferkel 1994). Arthroscopy is helpful for diagnosis (Ferkel et al. 1991). 3 types of intraarticular soft tissue lesions that lead to chronic anterolateral ankle pain, following an inversion injury, have been described: the meniscoid lesion, synovitis, and the distal fascicle of the anteriorinferior tibiofibular ligament (AITFL) (Bassett et al. 1990, Ferkel et al. 1991, Thein and Eichenblat 1992, Meislin et al. 1993, Ferkel 1994, Liu et al. 1994, Horner and Liu 1996, DeBerardino et al. 1997) (Figure 1). Although synovitis and the meniscoid lesion have been referred to relatively frequently, less is known about the separate fascicle of the anterior inferior tibiofibular ligament as a cause of anterolateral ankle impingement. This was first described by Bassett et al. (1990). They identified the fascicle in 10 of 11 cadavers, and in 7 patients suffering from chronic pain at the anterolateral aspect of the ankle after an inversion sprain. The fibers of the fascicle ran obliquely from the lateral, anterior and distal corner of the tibia to the anteromedial aspect of the lateral malleolus, close to the fibular insertion of the anterior talofibular ligament (ATFL). They postulated that the fascicle was common in normal persons, but it might become pathologic when mechanics of the ankle changed. They

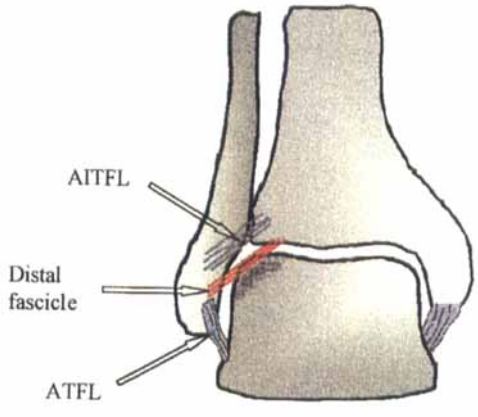


Figure 1. A schematic diagram of the distal fascicle of the anterior tibiofibular ligament (AITFL) and the anterior talofibular ligament (ATFL).

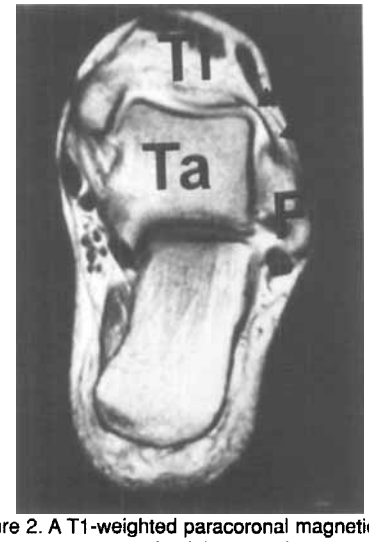


Figure 2. A T1-weighted paracoronal magnetic resonance arthrography image of a right ankle demonstrating the distal fascicle of the AITFL (arrowheads).
Ta Talus, Ti Tibia, F Fibula.

thought that the anterolateral aspect of the talar dome might extrude anteriorly with dorsiflexion and come into contact with the distal fascicle, due to a tear of the ATFL. Meislin et al. (1993) found a similar pathology in 3 of their patients with chronic anterolateral pain. More recently, Horner and Liu (1996) isolated the accessory fascicle in 9 patients, without previous inversion sprain.

We report the results of arthroscopic treatment of impinging distal fascicle of the AITFL.

Patients and methods

21 patients (mean age 31 (11–68) years, 14 women) with previous inversion sprain and a clinical diagnosis of anterolateral ankle impingement comprised the study group. 11 of the injuries resulted from sports injuries. 14 ankles were painful, 4 complained of instability and 2 were stiff. The average duration of symptoms at presentation was 2 (0.3–5) years. 9 patients reported more than 3 previous sprains.

Moderate-to-severe tenderness of the anterolateral joint line was noted in all ankles; the anterolateral corner was also found to be tender in 17 of the patients. Clinical tests revealed moderate laxity in 2 and severe laxity in another 2. The remaining cases had mild laxity. If a slight anterior translation was felt on the anterior drawer test, as compared to the contralateral ankle, the laxity was classified as "mild". If anterior translation considerably exceeded that of the contralateral ankle, but had a firm end-point, the laxity was classified as "moderate". Substantial anterior translation without an end-point was called "severe". Pain with forced dorsiflexion was noted in 14 patients. Subjective evaluations and scoring of the patients were done by the method of Kaikkonen et al. (1994).

Plain radiographs were normal in all except 1 patient who had an ossicle just below the fibular tip. Every patient underwent an MRI examination. T1-weighted axial and paracoronal and T2-weighted sagittal images were taken on all patients using 1 T Unit (Siemens, Magnetom, SP42). Then 10–12 cc. of gadolinium DTPA (diethylene triamine pentaacetic acid) in a concentration of 2 mMol was injected into the same ankle, and the same images were obtained again. With axial images on MRI, the fascicle had a hypointense structure at the anterolateral corner of the ankle in 8 cases, but on paracoronal images no obvious structure was seen. On magnetic resonance arthrography (MRA), an anterolateral hypointense band was observed in all of the ankles on axial images, and in 19 on paracoronal images (Figure 2). The torn anterior talofibular ligament (ATFL) was correctly diagnosed in 10 of the ankles with MRI, but in 17 ankles with MRA. In 1 case, MRA detected elongation of the ATFL that was confirmed at arthroscopy. Hypertrophic synovitis could be diagnosed in only 7 and 8 of the cases, with MRI and MRA, respectively.

Physical therapy, NSAIDs and bracing in patients with instability symptoms, for a period of 3 months, failed in all patients. 7 of the 21 patients were unable to complete the 3-month conservative treatment because of worsening symptoms, and arthroscopy was done 6 weeks–3 months after presentation.

On arthroscopy, patients were placed in the supine position on the table under general, spinal or epidural anesthesia and a tourniquet was applied to the thigh. A 4.5 mm. and 30° angled scope was used without distraction. Intermittent manual distraction was used when needed. The standard anteromedial portal was first established, and then

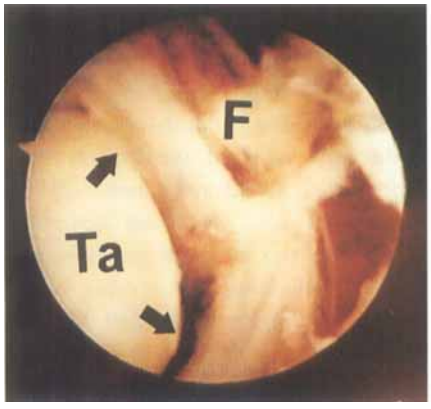
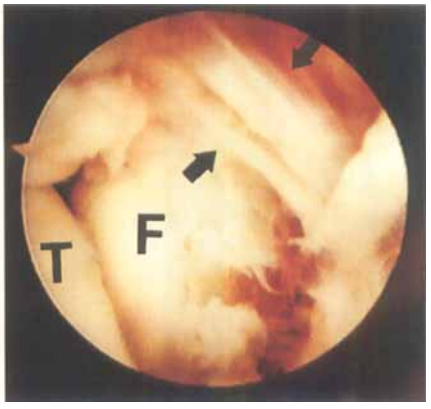


Figure 3. A. Fascicle of the AITFL (superior arrow) impinging against the talus (Ta Talus, F Fibula). Inferior arrow points to the ATFL.



B. Arthroscopic view following excision of the fascicle (T talus, F fibula). Arrow points to the AITFL.

Figure 4. A. Fascicle of the AITFL impinging against the talus during maximum plantar flexion (Ta Talus). Arrows point to the fascicle.

B. Fascicle of the AITFL impinging against the talus during maximum dorsiflexion in the same patient.

under direct vision, an anterolateral portal was placed at the level of the tibiotalar joint, and just lateral to the peroneus tertius tendon. Synovial hypertrophy and granulation tissue were present in the anterolateral part of the joint in 19 patients. Following anterolateral synovectomy with a 3.5 mm full-radius type resector, a ligamentous band extending obliquely from the anterolateral corner of the distal tibia to the anteromedial aspect of the lateral malleolus (just above the origin of the anterior talofibular ligament) was seen in each patient (Figure 3). The band crossed over the anterolateral aspect of the talar dome and contacted the talar dome throughout the whole range of motion of the ankle (Figure 4). The thickness of the band and the amount of contact with the talus varied in each patient. In most cases it was impossible to see the band, before performing the anterolateral synovectomy. The band was excised, using small joint arthroscopic scissors and full radius type resectors. The excised tissue in 10 cases was sent for histopathologic examination.

Postoperatively, a compressive bandage was applied to the extremity and the patients were allowed active exercises and full weight bearing as soon as tolerated. A physiotherapy program including active and passive movements, strengthening, and proprioceptive exercises was continued for 3 months.

All the patients were followed for an average of 34 (24–48) months.

Results

The average preoperative score of 42 (10–75) improved to 84 (10–100) at follow-up. 15 ankles were rated as excellent, 2 as good, 2 as fair and 2 as poor. Overall, 19 patients were satisfied with the procedure and 2 showed no improvement; these unimproved ankles had mild laxity. 17 patients returned to their previous level of physical activity. Of the 11 patients with sport injuries, 10 returned to previous sports activities without any limitations. The one who could not return to sports developed a neuroma at the anterolateral portal and was rated as poor at the latest follow-up.

1 patient with moderate laxity preoperatively and a fair result had a score of 85 at 2 months following surgery. A new sprain 6 months later was treated with ligament reconstruction.

3 of the 4 patients who had moderate-to-severe clinical laxity could return to their previous level of activity. 2 of them were rated as excellent, and 1 as good at the most recent follow-up visit. 1 of the severe laxity cases was a professional ballet dancer, who also had generalized ligamentous laxity. At her most recent follow-up visit, although she continued to have severe laxity, she was completely free from pain and had returned to dancing without limitation. The other patient with severe laxity was also rated as excellent at follow-up. She was a professional volleyball player and returned to sports without complaints.

2 poor results were due to neuromas which were subsequently treated successfully with steroid injections. Arthroscopic resection of the distal fascicle of the AITFL did not cause increased laxity of the ankle.

Histopathologic examination of the band revealed ligamentous tissue with regular collagen fibrils. Synovial tissue surrounding the band with capillary proliferation was seen in all cases.

Discussion

Many reports have been published about the treatment of synovitis and formation of granulation tissue at the anterolateral part of the ankle. Irritation of the joint by bleeding and a torn capsule or torn anterior talofibular ligament (ATFL) are thought to be the underlying factors for developing post-traumatic synovitis in the ankle (Lundeen 1990) which in unstable ankles may lead to the formation of fibrosis and granulation tissue. Wolin et al. (1950) described scar tissue between the fibula and talus which they called a "meniscoid lesion". Some authors thought this lesion was formed from the torn ends of the ATFL (Andrews et al. 1984, Schonholtz 1986). Ferkel et al. (1991), however, found no ligamentous tissue on histopathologic examination of the lesion. Guhl (1993) thought the lesion was of synovial origin.

The distal fascicle of the AITFL is a different structure than the above-mentioned lesions. When Basset et al. first described it in 1990, they believed that the fascicle was common in the normal population but when increased laxity was due to a tear of the ATFL, anterior extrusion of the talus might occur in the standing position (Bassett et al. 1990). This would cause the fascicle and the anterolateral aspect of the talar dome to come into contact and the fascicle would then become pathologic. In contrast to the instability theory of Basset et al. (1990), Horner and Liu (1996) found similar lesions in 9 athletes without previous inversion injury and without ankle laxity. All of our patients had had at least one previous ankle sprain, and our finding of laxity in all patients supports the instability theory of Basset et al. (1990).

An important finding in our study was the observation of contact between the fascicle and talar dome throughout the whole range of motion of the ankle. We called this the "arthroscopic impingement test", and it was positive in all of our cases.

Our results of arthroscopic resection of the fascicle are comparable to those of Bassett et al. (1990) and of Horner and Liu (1996). Our results also compare well with the studies that report the surgical results in patients with synovitis and meniscoid lesion (Martin et al. 1989, Ferkel et al. 1991, Thein and Eichenblat 1992, Liu et al. 1994). In a recent study, DeBerardino et al. (1997) noted good-to-excellent results in 58/60 patients, but the underlying pathology differed completely from that in the present study. Resection of the distal fascicle of the AITFL, in addition to synovial and granulation tissue, makes the surgery more extensive. This may affect the outcome.

It is usually impossible to distinguish the source

of pain in patients with both instability and impingement. So, if the patient complains of giving-way and frequent sprains, the surgeon may choose a reconstructive procedure. But it should be noted that a painful lesion in the joint (synovitis, meniscoid lesion, or an impinging fascicle of the AITFL) may cause reflex sprains. This process may confuse decision-making in this type of combined pathology. In our opinion, not every patient with chronic ankle instability needs a reconstructive procedure. If the history, physical examination and other diagnostic tests suggest impingement in addition to instability, arthroscopic debridement of the soft tissue lesion may be all that is needed.

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