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Synovial impingement in the ankle

A NEW PHYSICAL SIGN

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Inversion injuries of the ankle are common and most are managed adequately by functional treatment. A significant number will, however, remain symptomatic.

Synovial impingement is one cause of continuing pain. This condition is often difficult to diagnose because the physical signs and investigations are non-specific. If the diagnosis is made, treatment by arthroscopic debridement has been shown to be highly effective. Our aim was to describe a new physical sign to help in the diagnosis of anterolateral synovial impingement in the ankle.

A cadaver dissection demonstrated the anatomical basis for the physical sign and a prospective clinical study involving 73 patients showed that the lateral synovial impingement test had a sensitivity of 94.8% and a specificity of 88%.

We describe the test and conclude that this physical sign will be of use to practitioners treating patients with chronic pain in the ankle after injury.

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Sprains of the ankle from inversion are very common and account for up to 10% of all attendances at accident and emergency departments.[1] Most are simple soft-tissue injuries which resolve after functional treatment. Gerber et al,[2] however, reported that 40% of patients had residual symptoms six months after their injury.

There are many causes of chronic pain after inversion injuries to the ankle. The differential diagnosis includes synovial hypertrophy and impingement.[3,4] Wolin et al[5] were the first to describe synovial hypertrophy in the anterolateral aspect of the ankle. They called this, perhaps misleadingly, a 'meniscoid lesion' and demonstrated by histological examination that it was hyalinised connective tissue. Since then, ankle arthroscopists have recognised that there is a spectrum of sites where impingement can occur, as well as a range of histological findings. The meniscoid appearance is unusual and is a pathological rather than an anatomical variant.

The presenting complaint may be vague, but pain and a feeling of instability are often described. There may be discomfort in the anterolateral aspect of the ankle or limited dorsiflexion, but no ligamentous instability.[5,6] This so-called functional instability is caused by soft-tissue impingement and not by true ligamentous instability.[7]

Radiological investigations, including MRI, are, unfortunately, not specific for the diagnosis of soft-tissue impingement in the ankle.[6,8] Ogilvie-Harris, Gilbart and Chorney[9] therefore recommended ankle arthroscopy for patients who had pain persisting for six months after their sprain. Arthroscopic debridement of soft-tissue impingement lesions is very effective in most patients.[6,7,10]

The problem therefore is in the selection of patients likely to benefit from this treatment. We report a new clinical sign, which can help in the diagnosis of anterolateral soft-tissue impingement. This will aid clinicians and other practitioners who are treating patients with the 'sprained ankle which will not heal'.

Patients and Methods

The clinical sign. After routine assessment of the foot, ankle and more proximal examination if indicated, ankle impingement is determined in conjunction with other special tests. The sign is useful as part of a thorough clinical evaluation, but like all clinical tests should not be used in isolation.

The examiner, standing at the end of the examination couch, elicits the sign by a two-handed manoeuvre. To examine the left ankle, his right hand grasps the calcaneus. The fingers are placed around the calcaneal tuberosity and the thumb over the anterolateral part of the ankle (lateral gutter). The left hand then grasps the forefoot to control flexion at the ankle. The foot is initially held in a plantarflexed position and anterolateral pressure applied with the

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Fig. 1a

Fig. 1b

Fig. 1c

Photographs showing a) plantar flexion of the left ankle with thumb pressure over the anterolateral aspect, b) dorsiflexion of the ankle with no thumb pressure over the anterolateral aspect and c) the combined manoeuvre which makes up the impingement sign.

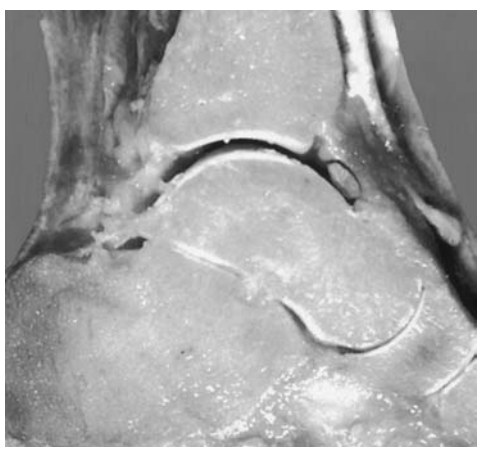

Fig. 2a

Fig. 2b

Photographs of a cadaver specimen showing a) plantar flexion of the left ankle with no pressure over the lateral gutter and b) dorsiflexion of the left ankle with no pressure over the lateral gutter.

examining thumb (Fig. 1a). This alone may produce some pain because of synovial hypertrophy, but is neither sensitive nor specific. The thumb is then removed and the foot dorsiflexed (Fig. 1b). There may be a reduced range of dorsiflexion when compared with the other foot which may be due to a variety of causes. The ankle impingement sign combines both manoeuvres (Fig. 1c). Thumb pressure is applied over the lateral gutter as described above with the foot in plantar flexion and then with continued thumb pressure the foot is moved from a plantar flexed position to a fully dorsiflexed position. If hypertrophic synovium is present it will be forced into the joint by the examiner's thumb and will impinge between the neck of the talus and the distal tibia as the ankle reaches full dorsiflexion. If the combined manoeuvre produces pain or intensifies the pain already felt with pressure alone in the plantar flexed position, this is considered to be a positive sign. If the pain is not increased with the combined manoeuvre the sign is negative.

An anatomical dissection was undertaken to demonstrate the clinical sign. A fresh frozen cadaver below-knee specimen was sectioned in the sagittal plane. Meniscal tissue, to simulate the synovial impingement lesion, was taken from the knee. It was then placed beneath the capsule of the ankle at the level of the tibiotalar joint, and anterior to it. With the left ankle in a plantar flexed position the simulated meniscoid lesion did not enter the articulation between the tibia and the talus (Fig. 2a). With dorsiflexion of the ankle, but no

simulated pressure, the lesion still did not enter the joint (Fig. 2b). When pressure was applied to the anterior aspect of the ankle with combined dorsiflexion, the simulated meniscal tissue became trapped between the tibia and the talus (Fig. 3). This showed that with synovial hypertrophy a combined manoeuvre could cause soft-tissue impingement.

Patients. The patients were each assessed by the senior author (SPB). Mechanical stability of the ankle was assessed clinically and patients shown to be unstable were excluded. Patients with painful 'giving way' but no clinical laxity or with just persistent pain after a sprain were included. The indication for arthroscopy therefore was the presence of pain in the ankle with or without functional instability.

In total, 73 patients were included in this group, 46 men and 27 women with a mean age of 39 years (15 to 68). They were tested for the presence of the impingement sign before operation. A standard arthroscopic assessment was made of each ankle, and the findings documented. The arthroscopy was carried out by the senior author or under his supervision. The impingement lesion was treated by arthroscopic resection and any additional pathology such as chondral lesions were treated accordingly.

The patients were followed up and tested for the presence or absence of the impingement sign by an independent reviewer (SM) at a mean of four months after operation. The reviewer had been instructed in the use of the impingement sign by the senior author and was unaware of the arthroscopic findings when examining the patients.

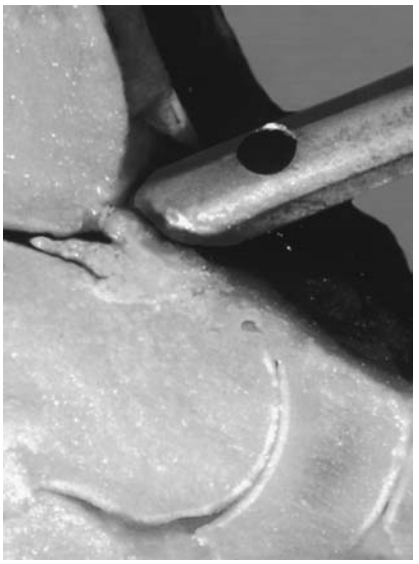

Fig. 3

Dorsiflexion of the left ankle combined with pressure over the lateral gutter. The simulated synovial tissue has been trapped between the tibia and the talus.

Results

Of the 73 patients who underwent arthroscopy of the ankle, 41 had a positive impingement sign before operation. At arthroscopy 37 of these 41 patients had synovial hypertrophy in the lateral gutter. Of the other four, two had adhesions and two had osteoarthritic changes.

Of the 32 patients who had a negative impingement sign before operation, only two were found to have synovial hypertrophy at the time of operation. One of these two patients had an osteochondral defect in addition to anterolateral synovial hypertrophy and the other had synovial hypertrophy but this was located posteriorly in the joint.

At follow-up, only two of the 41 patients who had had a positive impingement sign before operation had a persistently positive sign. One of these had improved initially but suffered a recurrence of symptoms after nine months. Subsequent arthroscopy confirmed further synovial hypertrophy in the lateral gutter. The other patient had an iatrogenic injury to the superficial peroneal nerve, leading to a false-positive impingement sign after operation. Six of the patients who had coexisting pathology, such as a chondral lesion or anterior osteophyte, had a negative impingement sign after operation, but persistent symptoms.

All 32 patients who had a negative impingement sign before operation had a negative impingement sign after surgery. The ankle impingement sign therefore had a sensitivity of 94.8% and a specificity of 88%.

Discussion

Debridement of anterolateral soft-tissue impingement lesions at arthroscopy has been widely reported as being successful for the relief of symptoms. Because of diagnostic difficulties surrounding this condition, soft-tissue impingement lesions of the ankle are probably underdiagnosed.

The impingement sign is a combination of two existing clinical tests. This combined manoeuvre improves diagnosis and has been recognised in the physical signs of other conditions such as the carpal tunnel syndrome.[11]

Our study showed that patients rarely had a false-positive impingement sign. The four false-positive results occurred in patients with arthritis and with intra-articular adhesions. When the impingement sign was positive an anterolateral impingement lesion was usually found at arthroscopy. It is important to realise, however, that this may not be the sole or primary pathology in all patients with a positive impingement sign. Chondral damage was the most common coexisting lesion seen in 70% of the patients in our series.

False-negative results occurred in two patients. One had a chondral flap with coexisting synovial hypertrophy. The other was found to have a posterior impingement lesion, which would not be expected to cause pain with dorsiflexion and anterior compression in the lateral gutter.

Patients in our series with synovial hypertrophy as their sole arthroscopic finding had excellent results after debridement of the lesion. Six of the patients with coexisting symp-

toms had persisting symptoms suggesting that although a positive impingement sign shows anterolateral synovial pathology in the ankle, it is not a prognostic indicator.

The impingement sign is a provocative test which attempts to pinch hypertrophied synovium between the tibia and the talus. It does not mimic what actually occurs to produce such symptoms. Patients with synovial hypertrophy in the lateral gutter most commonly present with anterolateral discomfort, not intermittent sharp pain which would be more indicative of synovial entrapment. Occasionally, a patient will complain that they experience a sharp pain, usually related to a specific activity such as walking up or down stairs.

Most patients in our study had some tenderness on palpation of the lateral gutter, but this is not a reliable sign for predicting the presence of synovial hypertrophy. Tenderness over the lateral gutter may be elicited in the presence of other conditions such as a chondral defect. If the impingement sign is positive synovial hypertrophy will usually be found at arthroscopy. After arthroscopic debridement the impingement sign may be negative, signifying successful removal of the synovial hypertrophy, but the patient may still have symptoms because of coexisting pathology.

A positive impingement sign is therefore a reliable indicator of the need for arthroscopic assessment, but does not exclude other coexisting pathology.

No benefits in any form have been received or will be received from a commercial party related directly or indirectly to the subject of this article.

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