

THE FOOTBALLER'S ANKLE

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INTRODUCTION

Chronic ankle pain in football players is most frequently caused by formation of talar and/or tibial osteophytes at the anterior part of the ankle joint. Morris and later McMurray, named the condition 'athlete's' ankle or 'footballer's' ankle and described the treatment^{1,2}. McMurray² stated that this injury is peculiar to the professional soccer player, especially those over the age of 25 years who have played for many years. In subsequent studies this entity has been described in other athletes such as runners, ballet dancers, high-jumpers and volleyball players. Since then, the term footballer's ankle has been replaced by 'anterior ankle impingement syndrome' and differentiation has been made between soft tissue impingement and bony impingement lesions^{3,4}.

AETIOLOGY OF OSTEOPHYTES

Little is known about the exact cellular development and patterns of osteophytic formation. In osteoarthritis it is thought to be due to stimulation of cells at the chondrosynovial junction by

polysaccharides derived from degradation of articular cartilage⁵. Osteophytic formation may, however, also occur without weight-bearing articular cartilage damage, as seen in the bony impingement lesions^{6,7}.

Mechanical factors are thought to play an essential role in osteophytic formation. Several authors have tried to describe mechanical factors, which could be influential.

McMurray² attributed the development of the talotibial osteophytes to repeated capsule-ligamentar traction of the anterior ankle joint, by repetitive kicking with the foot in full plantar flexion (ea. traction spurs)². Since then, traction to the anterior ankle capsule during plantar flexion movements was supposed to be an important aetiological factor of the formation of anterior tibiotalar osteophytes in the anterior ankle impingement syndrome (ea. traction spurs). This hypothesis is supported by the fact that these spurs are frequently found in athletes who repetitively force their ankle in hyperplantarflexion actions, resulting in repetitive traction to the anterior joint capsule. It assumes that

the capsular attachment is located at the anterior cartilage rim, where the spurs originate.

However, in a cadaver study it was demonstrated that the anterior joint capsule attaches onto the tibia on average 6 mm proximal to the anterior cartilage rim. On the talar site, the capsule attaches approximately 3 mm from the distal cartilage border. The distance of capsule attachment to the site where bony spurs originate is thus relatively large. Based on these anatomic observations, the hypothesis of formation of talotibial spurs due to recurrent traction to the joint capsule (traction spurs) is not very plausible. This is supported by observations during arthroscopic surgery^{8,9}. In patients with bony impingement, the location of tibial spurs is reported to be at the joint level and within the confines of the joint capsule. On the talar side, the typical osteophytes are found proximal to the talar neck notch. Both tibial and talar osteophytes can easily be detected during an arthroscopic procedure with the ankle in forced dorsiflexion. The capsule does not have to be detached to locate these osteophytes.



O'Donoghue¹⁰ considered osteophytes to be related to direct mechanical trauma associated with the impingement of the anterior articular border of the tibia in the talar neck during forced dorsiflexion of the ankle joint¹⁰. Here, bone formation is considered to be a response of the skeletal system to intermittent stress and

injury, as evidenced by Wolff's law of bone remodelling. Even though this aetiological factor is widely cited, experimental support for either is scarce.

Along the distal tibia, the width of the non-weight-bearing cartilage rim extends up to 3 mm proximal to the joint line. It is this non-weight-bearing anterior cartilage rim that undergoes the osteophytic transformation⁹. Damage to this anterior cartilage rim is known to occur in the majority of supination traumas. It has been postulated that, depending on the degree of damage, chondral and bone cell stimuli will initiate a repair reaction with cartilage proliferation, scar tissue formation and calcification. Additional damage by ankle sprains due to recurrent instability or forced dorsiflexion movements will further enhance this process³. Studies have shown that chronic ankle instability is indeed significantly correlated with osteophytic formation in the medial ankle compartment.

Another factor in the development of spurs is recurrent micro trauma. In soccer players it was demonstrated that spur formation is related to recurrent ball impact, which can be regarded as repetitive micro trauma to the anteromedial aspect of the ankle^{2,11}. Repetitive trauma to the anteromedial cartilage can probably be precluded by prevention of recurrent ankle sprains.

In anterior ankle impingement syndrome, the cause of pain is hypothesised to be not the osteophyte itself but the inflamed soft tissue impingement that occurs between the osteophytes. The tibial and talar spurs typically do not overlap each other. Histopathologic analysis of arthroscopic resected soft tissue reveals synovial changes of chronic inflammation. In cadaver specimens, a triangular soft tissue synovial fold, subsynovial fat and collagen tissue was found along the entire anterior tibiotalar joint line. During forced dorsiflexion movements, this soft tissue component gets squeezed between the anterior distal tibia and the talus. Recurrent trauma to this soft tissue component may lead to hypertrophy of the synovial layer, subsynovial fibrotic tissue formation and infiltration of inflammatory cells. In theory, arthroscopic excision of the soft tissue could relieve pain. Talar and tibial osteophytes, however, decline the anterior space and compression of this soft tissue component is more likely to occur. In case of a bony anterior impingement lesion we feel it is therefore important to remove these osteophytes, to restore the anterior space and reduce the chance of symptoms recurring.

CLINICAL FEATURES

The typical patient is a relatively young football player with a history of recurrent inversion sprains⁷. Patients present with vague, chronic anterior ankle pain, swelling after activity and limited dorsiflexion. Due to

the cause of pain is hypothesised to be the inflamed soft tissue impingement between the osteophytes

these complaints, the patient has often had to reduce his sporting-activities. McMurray stated that the patient is able to kick the ball as well as ever when using the point of the toe, but when attempting to kick it in the correct manner he feels a sudden stab of pain in front of the joint².

Since anterior impingement is a clinical diagnosis, the diagnosis is based solely on findings at physical examination. Recognisable local pain on palpation is present anteriorly and the osteophytes may be palpable with the ankle joint in slight plantar flexion.

RADIOGRAPHIC FEATURES

The signs on standard lateral and anteroposterior radiographs vary according to the duration of symptoms. In the early stages there is slight periosteal roughening on the anterior aspect of the lower end of the tibia. Later, a bony ridge may be seen

extending forward from the surface of the tibia. Occasionally, a similar bony outgrowth is seen projecting upwards and slightly backwards from the neck of the talus. The radiographic appearances are suggestive of osteoarthritis of the ankle joint with lipping of the articular margin of the tibia, but in fact there is no involvement of the articular surfaces and the outgrowth lies slightly



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above the articular margin which is often unaffected.

Due to the anteromedial notch, anteromedial osteophytes are undetected on standard radiographs in a substantial number of patients with anterior impingement complaints⁷. In a cadaver study it was shown that anteromedial tibial osteophytes up to 7.3 mm in size originating from the anteromedial border remain undetected on a standard lateral X-ray due to superposition or over-projection of the more prominent anterolateral border of the distal tibia⁷. Medially located talar osteophytes remain undetected due to over-projection or superposition of the lateral part of the talar neck and body⁷. In these patients with clinical anterior ankle impingement symptoms, the diagnosis of soft tissue impingement will be made, despite the fact that anteromedial osteophytes, ossicles or post-traumatic calcification may be present.



Detection of the osteophytes is important for preoperative planning. Several authors have stated that surgical distinction between bony and soft tissue normal variants and pathologic conditions is difficult, due to subtle variations in joint anatomy. Especially in patients with accompanying synovial reflections overlying the concealed osteophytes, anteromedial bony spurs are poorly visualised arthroscopically and can be missed. Radiographic classification of spur formation correlates with the outcome of surgery. An oblique radiograph is sensitive to detect medially located tibial and talar osteophytes. In this oblique anteromedial impingement view the beam is tilted into a 45° craniocaudal direction with the leg in 30° external rotation and the foot in plantar flexion, in relation to the standard lateral radiograph position. A lateral radiograph is insufficient to detect all anteriorly located osteophytes and an oblique anteromedial impingement radiograph is a useful adjunct to routine radiographs and recommended to detect anteromedial tibial and talar osteophytes⁷.

TREATMENT AND OUTCOME

Conservative treatment, consisting of injections and/or heel lifts, is recommended in the early stages, but is frequently unsuccessful. McMurray reported the first surgical treated patients². After removal of anterior located osteophytes by open arthrotomy, the patients successfully returned to professional soccer. In subsequent studies numerous authors have reported good results with open arthrotomy. Open arthrotomy can be complicated by cutaneous nerve entrapment, damage of the

long extensor tendons, wound dehiscence and formation of hypertrophic scar tissue⁴.

Before the advent of arthroscopy of the ankle joint it was believed that this technique was unsuitable in view of the narrow joint space and convex talar anatomy. The first approach of arthroscopic inspection of cadaver ankle joints was performed by Burman in 1931.

From the late 1980s several authors have presented (retrospective) studies of arthroscopic treatment for anterior ankle impingement syndrome with good outcome and relative early return to play.

Recurrence of osteophytes after 5 years is reported in 2/3 of the ankle with grade-I lesions (osteophytes without joint space narrowing). Surprisingly, the recurrence of osteophytes is not related to symptoms in the majority of cases. Asymptomatic bony spurs in the ankles are reported in up to 45% patients who played football and in 59% of former dancers. Asymptomatic ankles may become painful when, after major injury, anterior hypertrophic synovial or scar tissue impedes movement^{3,4}. Removal of the soft-tissue usually relieves symptoms. It is therefore suggested that it is not the osteophyte, which is painful, but the compression of the synovial fold or fibrotic (scar) tissue which causes pain. In theory, arthroscopic excision of the soft tissue alone can relieve pain. Talar and tibial osteophytes, however, reduce the anterior joint space. After arthroscopy, a postoperative haematoma may develop and again cause an anterior impingement. It is therefore important to restore the anterior space and reduce the chance of symptoms recurring.

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