Foot and Ankle Surgery 23 (2017) 1–8

Contents lists available at ScienceDirect

Foot and Ankle Surgery

journal homepage: www.elsevier.com/locate/fas

Review

Current concepts review: Arthroscopic treatment of anterior ankle impingement

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ARTICLE INFO

Article history:
Received 11 January 2015
Received in revised form 30 September 2015
Accepted 27 January 2016

Keywords:
Ankle
Arthroscopy
Impingement
Anterior ankle impingement syndrome

ABSTRACT

Anterior ankle impingement is a common cause of chronic ankle pain, particularly in athletic populations. Morris and McMurray provided the earliest descriptions of anterior impingement, coining the condition as "athlete's ankle" or "footballer's ankle". The pathology has since been a topic of considerable investigation and has been re-termed "anterior ankle impingement syndrome". Treatment with open surgery has provided good results historically, but at the price of significant complications. Advancements in ankle arthroscopy have decreased the risk of complication drastically and evidence in the literature indicates that anterior arthroscopy is an effective approach to treating osseous and soft tissue impingement. Effective clinical diagnosis and diagnostic imaging are critical for pre-surgical planning. Preoperative detection of anterior osteophytes has been correlated with outcomes. Factors such as joint space narrowing and large osteophytes may also influence outcomes. Therefore, a comprehensive understanding of diagnosis and surgical technique can influence patient outcomes, and patient expectations can be managed around prognostic indicators such as the presence of osteoarthritis. The purpose of this review is to discuss the etiology, clinical presentation, diagnosis, surgical technique, and postoperative rehabilitation of anteromedial and anterolateral anterior ankle impingement syndrome and to evaluate the evidence-based outcomes of arthroscopic management.

Contents

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http://dx.doi.org/10.1016/j.fas.2016.01.005
1268-7731/

1. Introduction

Anterior ankle impingement is most often described as anterior ankle pain with restricted dorsiflexion as a result of either tibiotalar osteophytes and/or soft tissue impingement [1–3]. It is a common cause of chronic ankle pain and is particularly common in athletes that sustain repetitive dorsiflexion movements [4]. Morris and McMurray provided early descriptions of anterior impingement, coining the condition as "athlete's ankle" and "footballer's ankle", respectively [4,5]. Since then, substantial investigation into the pathology has occurred and the terminology was replaced with "anterior ankle impingement syndrome".

Non-operative treatment options include rest, bracing, shoe modification, physical therapy, and intra-articular injection. Conservative treatment is unlikely to be successful and in such cases, surgical intervention is often indicated [1,6]. A number of authors have reported good results with traditional open arthrotomy [7–10], but the procedure is associated with complications, including cutaneous nerve entrapment, iatrogenic damage to the long extensor tendons, wound dehiscence, and formation of hypertrophic scar tissue [10,11]. The growing popularity and efficacy of ankle arthroscopy has furthered the understanding of ankle impingement and chronic ankle pain; it is now accepted as a safe and effective procedure [1,6,12].

Bony impingement and soft tissue impingement have been distinguished and the prognostic factors, including presence of anteromedial versus anterolateral osteophytes, that influence outcomes of ankle arthroscopy have also been reported [1,2,13]. There are a wide range of indications, relative contraindications, and absolute contraindications for arthroscopic intervention (Table 1) [6]. Initially, arthroscopic surgery of the ankle was considered technically demanding and had complication rates as high as 26.4% [14]. However, as arthroscopic techniques and equipment have become more sophisticated, published complication rates after arthroscopic surgery in the ankle are reported as low as 3.5% [15]. Of these, the most commonly reported complication is neurological injury [15]. Other reported complications include vascular injury, false aneurism [16,17], infection, and synovial fistula [15,18]. Complications such as stress fracture, pin track infection, and ligament injury have occurred with use of invasive distraction [19]

The purpose of this article is to describe current knowledge of etiology, clinical presentation, diagnosis, surgical technique, and postoperative rehabilitation of anterior ankle impingement, as well as to provide an evidence-based review of arthroscopic treatment outcomes. The current review distinctly describes both anterolateral and anteromedial impingement in this manner.

Table 1
Indications, relative contraindications, and absolute contraindications for performing ankle arthroscopy [17].

Indications	Relative contraindications	Absolute contraindications
Unexplained pain	Reduced joint space	Severe degenerative joint disease
Instability	Severe edema	Localized Infection
Stiffness	Questionable vascular status	
Swelling	Moderate degenerative joint disease with limited range of motion	
Hemarthrosis		
Locking and popping		
Osteochondral defects		
Osseous impingement		
Arthrofibrosis		
Fracture		

2. Anterolateral ankle impingement

2.1. Etiology

Anterior ankle impingement is thought to be the result of mechanical factors, traction, trauma, recurrent microtrauma, and chronic ankle instability [1,20]. In the case of anterolateral ankle impingement (ALI), symptoms are believed to result from the entrapment of hypertrophic soft tissues or torn and inflamed ligaments in the lateral gutter and anterolateral ankle joint [21]. Several types of soft tissue impingement have been reported, including a "meniscoid" lesion, impinging fascicle of the anterior inferior tibiofibular ligament (AITFL), and hypertrophied synovium [21].

Wolin et al. first described the "meniscoid mass" in the lateral gutter of patients that underwent open arthrotomy several weeks or months after inversion injury [22]. Patients had a hyalinised mass of connective tissue extending from the anterior talofibular ligament (ATFL) and invading the joint; excision of the scar tissue relieved symptoms in all cases [22,23]. Involvement of synovial tissue and scarred capsule, as well as entrapment of torn ATFL were later described [24]. The lateral anterior tibiotalar ligament has also been indicated as a factor contributing to impingement in more recent studies [25].

Ferkel et al. postulated that this process begins after an ankle inversion injury tears the ATFL and AITFL with or without an associated tear of the calcaneofibular ligament (CFL) [23]. The ligament injury itself is not severe enough to cause chronic instability, but repetitive motion after incomplete injury healing may lead to inflammation in proximity to the healing ligaments, as well as subsequent synovitis and scar tissue formation [23]. As the mass of impinging soft tissue and synovium increases in size, irritation and inflammation are exacerbated, leading to ankle pain [23]. Even mild sprains with minimal capsular tearing may result in an intra-articular hematoma that is slowly reabsorbed by the synovium [26]. Reabsorption of the blood by the synovium in the lateral gutter may then lead to reactive synovitis [23,26]. Hypertrophied, inflamed synovium is often seen at the time of surgery and may appear hemorrhagic with a firmer, more elastic quality than is typically observed with synovitis. The impinging tissue is most commonly synovial and often seen in conjunction with associated bands of adhesive scar tissue [21,23].

2.2. Clinical presentation

Patients are typically young, athletic, and present with chronic ankle pain, limited dorsiflexion and swelling, thereby reducing activity [10,11]. The patient may have a history of recurrent ankle inversion injuries [27]. Anterolateral impingement can be differentiated from AMI by the location of tenderness, which is elicited