Foot and Ankle Surgery 20 (2014) 174–179

Contents lists available at ScienceDirect

Foot and Ankle Surgery

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

Hindfoot endoscopy for the treatment of posterior ankle impingement syndrome: A safe and reproducible technique

Jesús Vilá MD[a,*], Jordi Vega MD[b], María Mellado MD[a], Rodrigo Ramazzini MD[c], Pau Golanó MD[d,e]

[a] Department of Orthopaedic and Trauma Surgery, Hospital Universitario 12 de Octubre, Madrid, Spain
[b] Unit of Foot and Ankle Surgery, Etzelclinic, Pfäffikon, Schwyz, Switzerland
[c] Department of Orthopaedic and Trauma Surgery, Hospital Asepeyo Sant Cugat, Sant Cugat del Vallés, Barcelona, Spain
[d] Laboratory of Arthroscopic and Surgical Anatomy, Department of Pathology and Experimental Therapeutics (Human Anatomy Unit), University of Barcelona, Barcelona, Spain
[e] Department of Orthopaedic Surgery, University of Pittsburgh, Pittsburgh, PA, USA

ARTICLE INFO

Article history:
Received 8 December 2013
Received in revised form 3 February 2014
Accepted 13 March 2014

Keywords:
Posterior ankle impingement
Hindfoot endoscopy
Os trigonum
Stieda's process
Ankle arthroscopy

ABSTRACT

Introduction: Posterior ankle impingement is a clinical syndrome characterized by posterior ankle pain that is mainly presented on plantar flexion. The aim of this study is to compare and evaluate the results of posterior ankle impingement treated by endoscopic hindfoot posterior portals.
Materials and methods: Between 2004 and 2009, a total of 38 endoscopic hindfoot procedures were performed to treat posterior ankle impingement. The indication for procedure was posterior ankle impingement syndrome in all cases. There were 38 patients, 17 females and 21 males. Mean age was 27.6 years (16–59 years). Mean follow-up was 27.6 months (12.5–52 months). The results were evaluated following the AOFAS score. Data statistical analysis was performed using the Student's *t*-test.
Results: The main preoperative AOFAS score increased from 67.42 (range 41–91) to 97.13 (range 84–100) at follow-up. No complications were reported in any case.
Conclusion: Hindfoot endoscopy is a reproducible and safe procedure which offers excellent outcomes in posterior ankle impingement syndrome.

1. Introduction

Posterior ankle impingement (PAI) is a pain syndrome. A PAI syndrome through overuse is mainly found in ballet dancers and runners [1–4]. Running that involves forced plantar flexion such as downhill running can put repetitive stress on the posterior aspect of the ankle joint [5]. In ballet dancers, the forceful plantar flexion during the en-pointe position or the demi-pointe position causes compression at the posterior aspect of the ankle joint. In the presence of a prominent posterior talar process or an os trigonum, forceful plantar flexion can lead to compression of these structures.

The forced hyper-plantar flexion test is most important for the diagnosis. With this test, the examiner performs a quick, passive, forced hyperplantar flexion movement. The test is positive when the patient has recognizable pain at the moment of impaction.

After failure of conservative treatment, the impediment (os trigonum, hypertrophic posterior talar process, or scar tissue) can be removed by means of an open approach or by an endoscopic procedure [6].

Treatment of PAI through an endoscopic approach has been published with good or excellent results. However, complications related to neurological structures [7–13] have been described. We hypothesize that experience on part of surgeon and a thorough knowledge of foot and ankle anatomy are important to decrease risk of complications.

The aim of this paper is to evaluate the results of the PAI using the endoscopic hindfoot posterior portals, and focalizing on the possible anatomical complications. For this purpose, results of two experienced surgeons in foot and ankle endoscopy have been evaluated.

2. Materials and methods

In the period of 2004–2009, 38 patients (21 men and 17 women, mean age 28 years [range 16–59 years]) with PAI syndrome were

* Corresponding author. Tel.: +34 619056447.
E-mail address: vilayrico@gmail.com (J. Vilá).

http://dx.doi.org/10.1016/j.fas.2014.03.002
1268-7731/

treated with an endoscopic hindfoot approach. The right ankle was affected in 23 cases. Mean follow-up was 27.6 months (range 12.5–52 months).

The indication for procedure was PAI syndrome in all cases, combined or not with FHL tendinitis. Diagnosis was performed by clinical exploration, presence of a postero-lateral talar process alteration in radiological study and, impingement in posterior area of the ankle in magnetic resonance (MR) image. The presence of posterior ankle effusion and bone marrow edema in the posterior area of the talus are the MR findings most consistent with symptomatic PAI.

Patients with concomitant anterior ankle impingement syndrome, osteochondral injury of the ankle, osteoarthritis of the tibio-talar or subtalar joint, ankle instability, calcaneal tendinopathy and, posterior tibial tendon or peroneal tendons pathology were excluded.

All patients were treated by two experienced surgeons in foot and ankle arthroscopic techniques.

Twenty patients had an occupation with high ankle strain, such as amateur soccer player in 13 patients, and professional classic dancer in 11 patients.

At follow-up, the patients were evaluated during a clinical exploration. The results were evaluated following the AOFAS hindfoot score.

Statistical analysis of results was performed using the Student's *t*-test. Statistically significant differences were identified as a *p*-value less than 0.05.

2.1. Hindfoot endoscopic technique

All the surgeries have been performed following the same operative technique as indicated the original technique described by van Dijk [6]. The procedure is performed under spinal anesthesia, and a thigh tourniquet is applied. The patient is placed in a prone position, and a small support is placed under the lower leg, making the free movement of the ankle possible. No soft tissue distraction device is used, and no previous distension is performed. A 4 mm 30° scope is routinely used for posterior ankle arthroscopy. Standard excisional and motorized instruments (3.5 mm shaver and burr) are used for soft tissue debridement and, ossicle or posterolateral process removing. A 4 mm chisel, straight or curve, and a periosteal elevator can be useful for Stieda's process removal or ligament release.

With the ankle in a neutral position, the main ankle landmarks are drawn (the lateral malleolus, medial and lateral border of the Achilles tendon, and the foot sole). A straight line is drawn from the tip of the lateral malleolus to the Achilles tendon, and parallel to the foot sole. Both, the posterolateral and posteromedial portals are made just above this line, and close to the Achilles tendon. The posterolateral portal is the first access performed. After a vertical skin incision, the subcutaneous layer is split by a mosquito clamp. The mosquito clamp is directed anteriorly, pointing to the first interdigital webspace. When the tip of the clamp touches the bone, it is exchanged for the scope shaft, with the blunt obturator trocar pointing in the same direction to protect the neurovascular bundle. By palpating the bone in the sagittal plane, the level of the ankle joint and subtalar joint can often be distinguished because the prominent posterior talar process or the os trigonum can be felt as a posterior prominence between the two joints. The trocar is situated extra-articular at the level of the ankle joint. The trocar is exchanged for the 4 mm scope, the direction of view is 30° to the lateral side. Then, the posteromedial portal is performed. The posteromedial portal is made at the same level of the posterolateral portal, but at the medial aspect of the Achilles tendon. After the skin incision, a mosquito clamp is introduced and directed toward the arthroscope shaft in a 90° angle. When the mosquito clamp

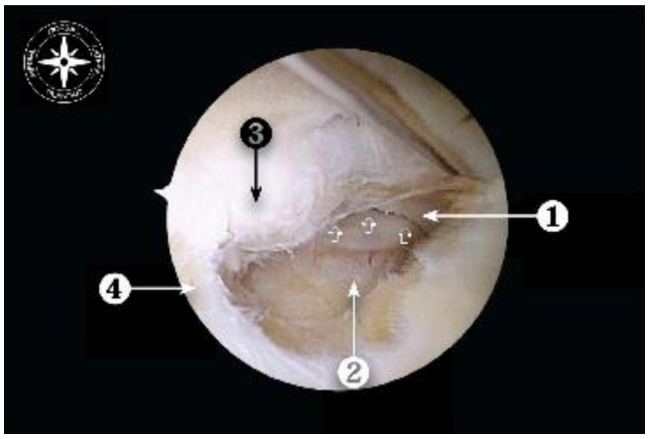

Fig. 1. Endoscopic view of the first reference during posterior endoscopy of the ankle (right ankle). Arrows indicating the lateral area of the posterior subtalar joint (subtalar lateral recess). 1. Talus. 2. Calcaneus. 3. Postero-lateral process. 4. Rouvière and Canela-Lazaro ligament (fibulotalocalcaneal ligament).

touches the shaft of the arthroscope, the shaft is used as a guide to "travel" anteriorly in the direction of the ankle joint, all the way down, touching the arthroscope shaft until it reaches the bone. The tip of the shaver is directed in a lateral and slightly plantar direction toward the lateral aspect of the posterior subtalar joint. A hole of the crural fascia must be opened with the aim of creating a working area in the posterior aspect of the ankle joint. When a tight and thickened crural fascia is present, it can hinder the free movement of instruments. It can be helpful to enlarge the hole in the fascia by means of a punch or shaver.

The subtalar joint capsule and fatty tissue can be removed. After removal of the very thin joint capsule of the subtalar joint, the posterior compartment of the subtalar joint can be inspected (Fig. 1). At the level of the ankle joint, the posterior tibiofibular ligament and the posterior talofibular ligament are recognized. The posterior talar process can be freed of scar tissue and the FHL tendon is identified (Fig. 2). The FHL tendon is an important landmark, and we can work safety lateral to this tendon, while medial we are going to find the neurovascular structures. To reduce the risk of iatrogenic damage of the posterior tibial bundle, use of the motorized instruments must be done cautiously at the medial area.

A motorized shaver, burr or a chisel is used for posterior talar process removing. Instruments are introduced through the posteromedial portal (Fig. 3). A dorsal flexion of the foot and ankle joint is helpful for a better talar process resection. In this position, posterior talar process can be safely and easily removed, and the anterior talar bone is not in risk of iatrogenic injury during resection (Fig. 4). Removal of a symptomatic os trigonum, a

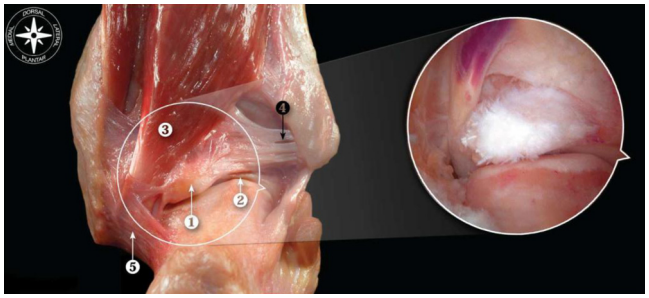

Fig. 2. Endoscopic view of the posterior region of the ankle compared with the anatomical view. 1. Postero-lateral process. 2. Posterior subtalar joint. 3. Flexor hallucis longus muscle. 4. Posterior talofibular ligament and intermalleolar ligament. 5. Flexor hallucis longus retinaculum.