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Case Report

Chronic instability in a malformed tibiofibular syndesmosis associated with osteochondral lesion of the talus: a case report

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Abstract

Surgical treatment of tibiofibular syndesmosis (TFS) with chronic instability aims to obtain a solid and stable joint to avoid ankle arthritis. Osteochondral lesions of the talus (OLT) may be associated in up to 24% of cases and must be treated concomitantly. We present a 27-year-old male patient with chronic ankle pain and a history of recurrent sprains since childhood. Imaging exams showed malformation of TFS associated with an OLT. He was submitted to surgical treatment with open repair, TFS fixation with suture-button, and osteochondroplasty of the OLT with collagen membrane through arthroscopy. At 13 months follow-up, he was asymptomatic and fully active.

Level of Evidence V; Case Report; Expert Opinion.

Keywords: Tibiofibular ankle syndesmosis; Joint instability; Osteochondral lesion.

Introduction

Tibiofibular syndesmosis (TFS) is often caused by a combination of external rotation and foot pronation. If left untreated, TFS can evolve into joint instability, causing pain and functional limitation[1]. The diagnosis of TFS instability is not always clear, and it is not uncommon to have a patient with chronic (> three months) injury in the first appointment[2].

Tibiofibular syndesmosis with chronic instability is better addressed with surgical treatment to avoid ankle arthritis. Surgical techniques include procedures that preserve the joint, in which the ligaments are repaired or reconstructed with tendon grafts, and fusion[2]. Arthrodesis is usually indicated in secondary osteoarthritis of the TFS[3].

Osteochondral lesions of the talus (OLT) are common in chronic TFS lesions and must be treated concomitantly[4]. The procedure is decided according to the lesion size and can be performed open or arthroscopically. Lesions smaller than 1.5 cm^2 in diameter are treated with debridement and drilling. When larger than 1.5 cm^2, the options are the osteochondral autograft transfer system (OATS) or collagen membrane with cancellous bone graft[5].

The aim of this study is to report the clinical and radiological results of a patient submitted to surgical treatment for chronic instability in a malformed TFS associated with OLT.

Case description

This study was approved by the Institutional Review Board, and the patient signed the informed consent form.

A 27-year-old male patient with a body mass index of 25 had chronic pain in the right ankle for the last two years, limiting

Study performed at the Department of Orthopaedic Surgery, Hospital Alemão Oswaldo Cruz, São Paulo, SP, Brazil.

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his sports practice (soccer and gym). He reported recurrent sprains since childhood. On physical examination, there was pain on palpation and stress maneuvers in the TFS (external rotation and posterior drawer) and pain in the anteromedial region of the ankle. He had a slightly asymmetrical foot shape, the right foot in mild planus valgus and the left a subtle cavus. Plain radiographs, magnetic resonance imaging (MRI), and computed tomography (CT) scans were requested. In the radiographs, we evaluated the anatomy of the feet and fibula with angular and length measurements. The right foot had a Meary angle of -8 degrees, and the left had an angle of 12 degrees. The right lateral malleolus presented altered anatomy with a different width and shape, but its length was practically equivalent to the contralateral side (Figure 1). On MRI, scar tissue in the TFS and an osteochondral lesion in the medial talar dome measuring 16 x 7 x 6 mm were evidenced (Figure 2). A bilateral comparative CT scan of the ankle was taken to evaluate TFS malformation, focusing on the morphology of the syndesmotic notch and fibular shape (Figure 3). The initial treatment consisted of physiotherapy, avoiding the impact on physical activities. No pain relief after six months was observed, and surgical treatment was indicated.

To perform the surgery, the patient received spinal anesthesia and was in a supine position with a cushion under the ipsilateral hip. A pneumatic thigh tourniquet was inflated to 300mmhg pressure. Initially, we confirmed the TFS instability by stress maneuvers under fluoroscopy visualization (Figure 4). Varus stress test was also performed to rule out lateral ligament instability. Then, the arthroscopic portals were performed. The OLT was identified and debrided until the cancellous bone was exposed, with well-defined cartilage borders (Figures 5A and 5B). We measured the lesion size with a template to mold the collagen membrane (Figure 5C).

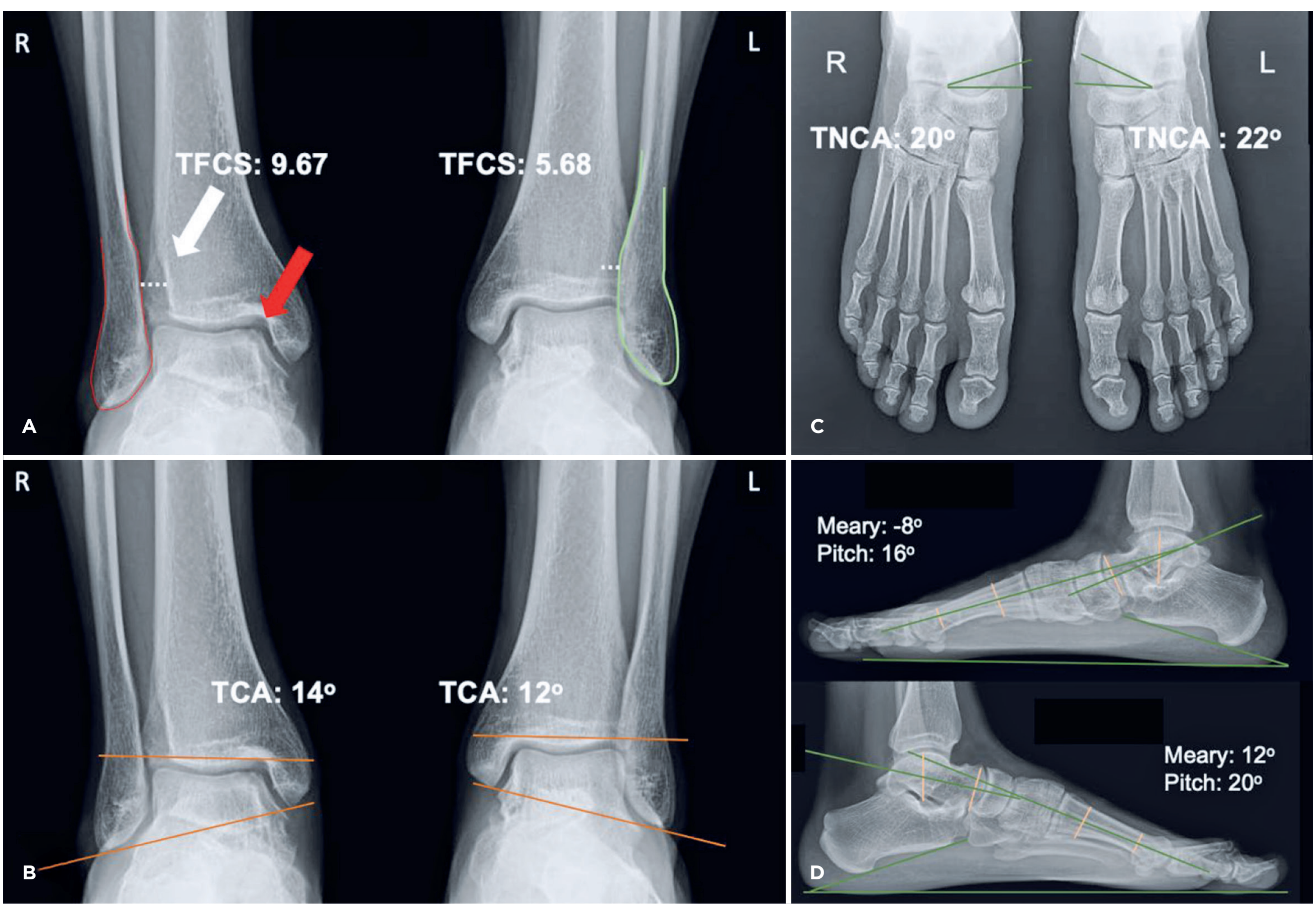

Figure 1. Ankle radiographic images to evaluate the tibiotalar and TFS joints. The anteroposterior views show (A) the right fibula with a different width and shape (*red line outline*), TFS malformation (*white arrow*) with wider TFCS (dotted white line), and the medial OLT (*red arrow*); (B) bilateral fibula length comparison. Radiographic images of the feet were taken to analyze alignment based on (C) anteroposterior and (D) lateral views.

TFS: tibiofibular syndesmosis; OLT: osteochondral lesion of the talus; TFCS: tibiofibular clear space; TCA: talocalcaneal angle.

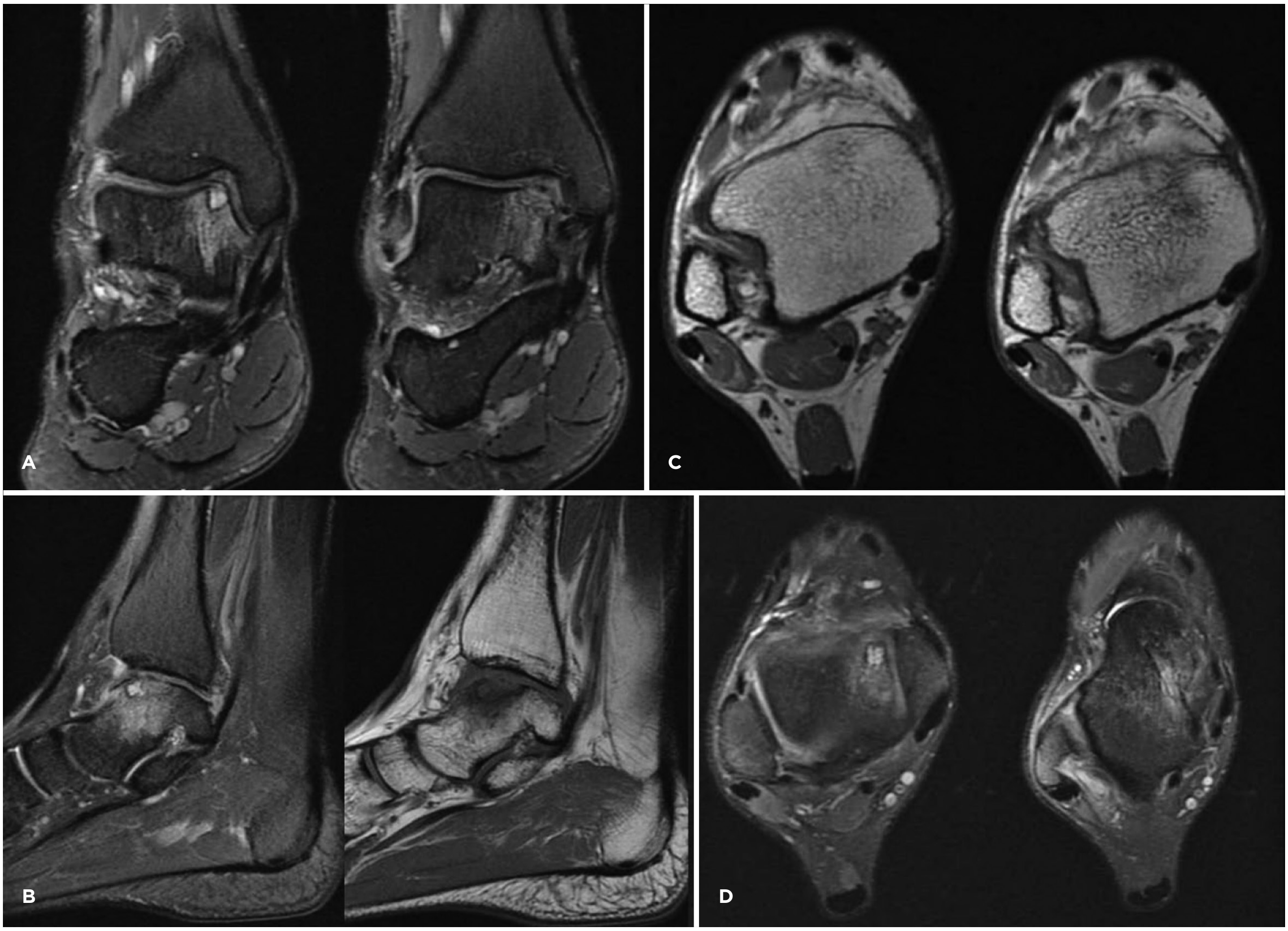

Figure 2. Magnetic resonance images of the OLT (A, B, D) measuring 16 x 7 x 6 mm and the malformed TFS with widening of the joint (C). OLT: osteochondral lesion of the talus; TFS: tibiofibular syndesmosis.

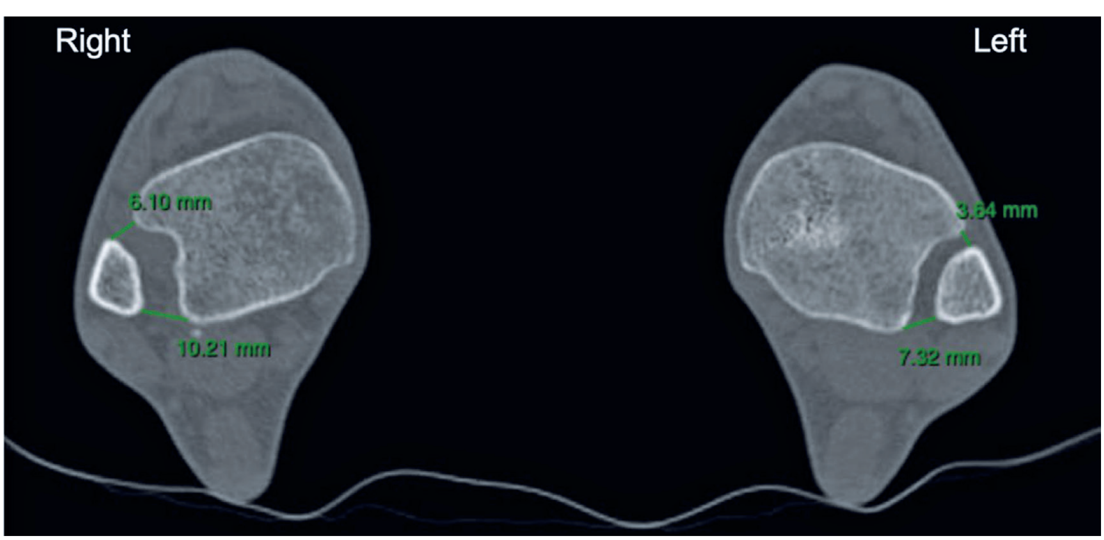

Figure 3. Bilateral CT scan images in the axial plane of the ankle showing asymmetry of the TFS anatomy and joint space. CT: computed tomography; TFS: tibiofibular syndesmosis.

Through a longitudinal approach of 1 cm on the lateral side of the calcaneus body, a cancellous bone graft was harvested with a Jamshidi biopsy needle. The infusion of fluid was turned off, and the bone graft was placed in the OLT bed with the needle itself and impacted with a curette (Figures 6A, 6B, and 6C). Then, the membrane was accommodated, with its rough side facing down, and fixed with fibrin glue (Figure 6D and 6E). The smooth surface was dotted with a Codman pen to identify the membrane sides when it was intra-articular (Figure 6D). The glue limit was at the level of the intact joint

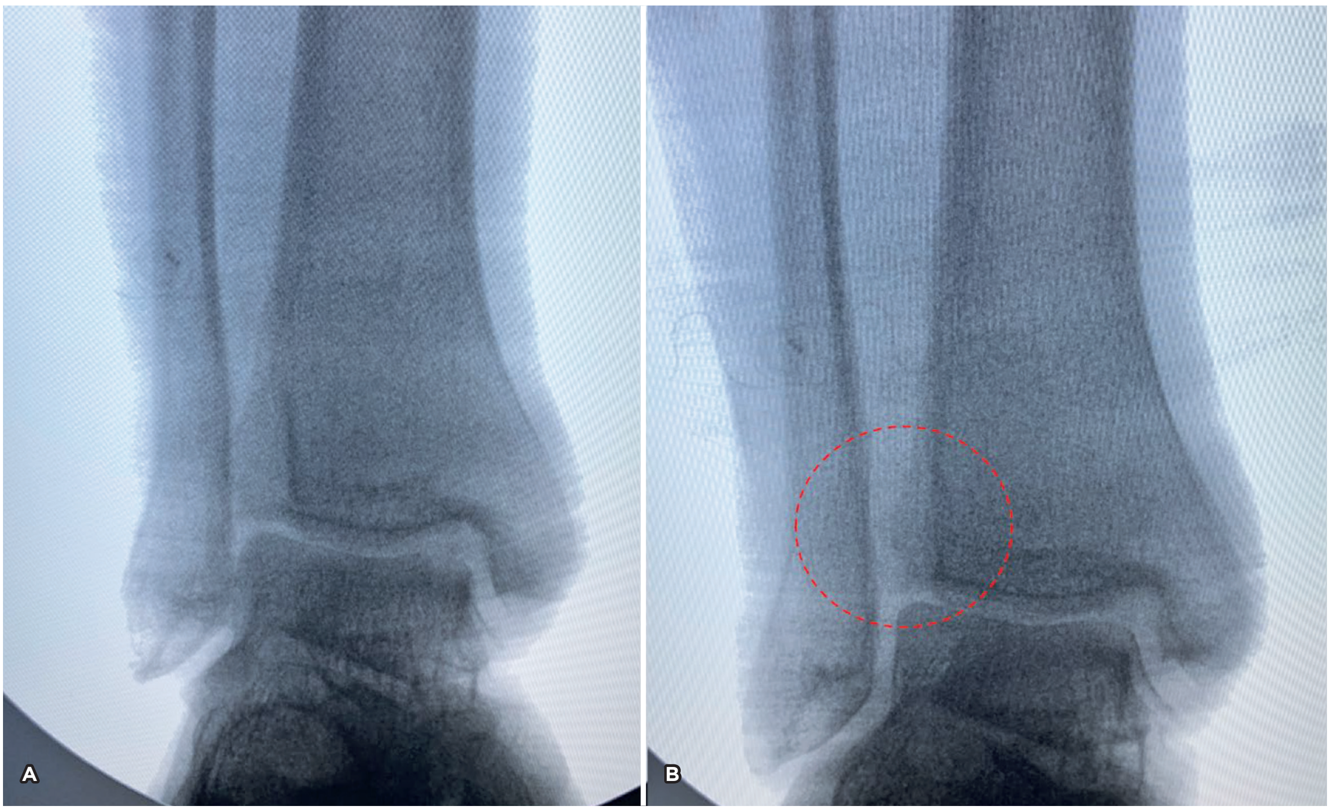

Figure 4. Intraoperative evaluation of TFS instability with stress in external rotation under fluoroscopy view (A) position of the TFS at rest and (B) its openness to stress (*red circle*).
TFS: tibiofibular syndesmosis.

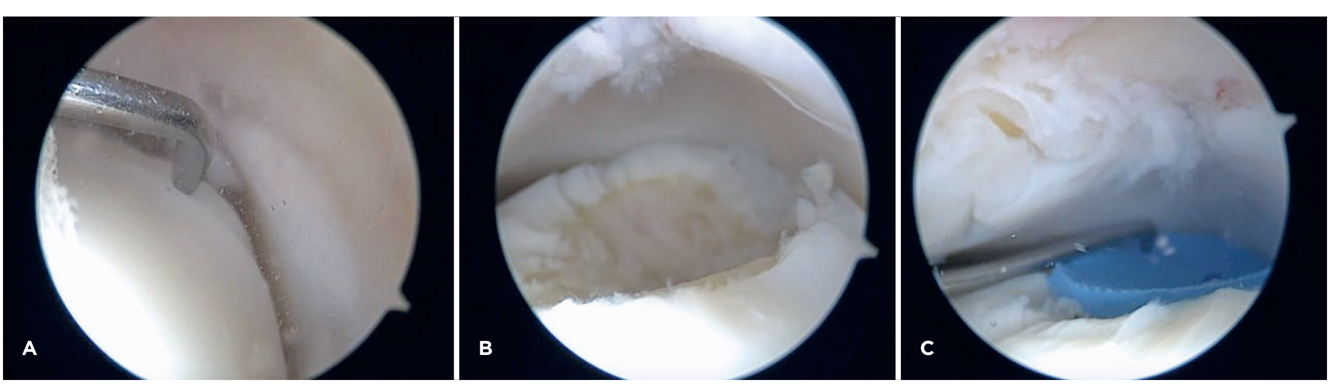

Figure 5. Arthroscopic approach of the OLT (A) identification of the lesion, (B) appearance after its debridement, and (C) measurement of the lesion diameter with a flexible template.
OLT: osteochondral lesion of the talus.

surface to prevent the loosening of the membrane with ankle movements (Figure 6E). Due to the TFS joint malformation, an open approach with a longitudinal incision of approximately 5 cm was performed on the anterolateral edge of the lateral malleolus to evaluate its anatomy better. Debridement of all scar tissue within was performed. We could not bring the fibula closer to the tibia, and they were fitted congruently. Two suture-buttons were placed divergent in the axial plane and parallel in the coronal plane to stabilize it (Figure 7).

The patient remained non-weight-bearing with a walking boot for two weeks without joint mobilization. After two weeks, the stitches were removed, and active ankle mobilization was oriented. At six weeks, progressive load on the operated limb was allowed. After eight weeks, the boot was removed, and physiotherapy started. Thirteen months after surgery, the patient was asymptomatic and has returned to his previous sports activities without pain or limitation. Control radiographic and MRI images show TFS and OLT healing (Figure 7).

Discussion

Tibiofibular syndesmosis ligaments take a longer time to heal compared to lateral ligaments. When left untreated, it fails to heal properly, leading to joint incongruency and instability[3]. We presented a patient with pain due to chronic instability in a congruent malformed TFS associated with OLT, which was successfully treated with TFS stabilization and repair of the talus cartilage.

Tibiofibular syndesmosis congruence and instability diagnosis are not always evident and are evaluated by combining different imaging exams[6]. Plain radiographs are unreliable and can miss up to 3mm of joint displacement in 50% of the cases[7]. Images under stress can be taken, but their usefulness is questionable, with a reported accuracy of 72%[8]. Ogilvie-Harris and Reed demonstrated that 7 of 19 of their patients with arthroscopically evidenced TFS instability had a negative stress radiograph[9]. Tibiofibular syndesmosis incongruency is best evaluated by a CT scan, which can detect minor displacements of up to 1mm[7]. In our patient, altered TFS anatomy was easily visible on radiographic views and non-weight-bearing CT images. Besides, intraoperative fluoroscopy demonstrated the widening of the joint with the stress test.

Normally, the fibula has no contact with the weight-bearing area of the talus, but 16% of body weight is transmitted through the strong ligaments of the TFS and the fibula[10]. Therefore, restoring congruency and stability is mandatory to prevent osteoarthritis. However, there is still no consensus on which surgical treatment method is the gold standard. Satisfactory outcomes were achieved in late syndesmosis

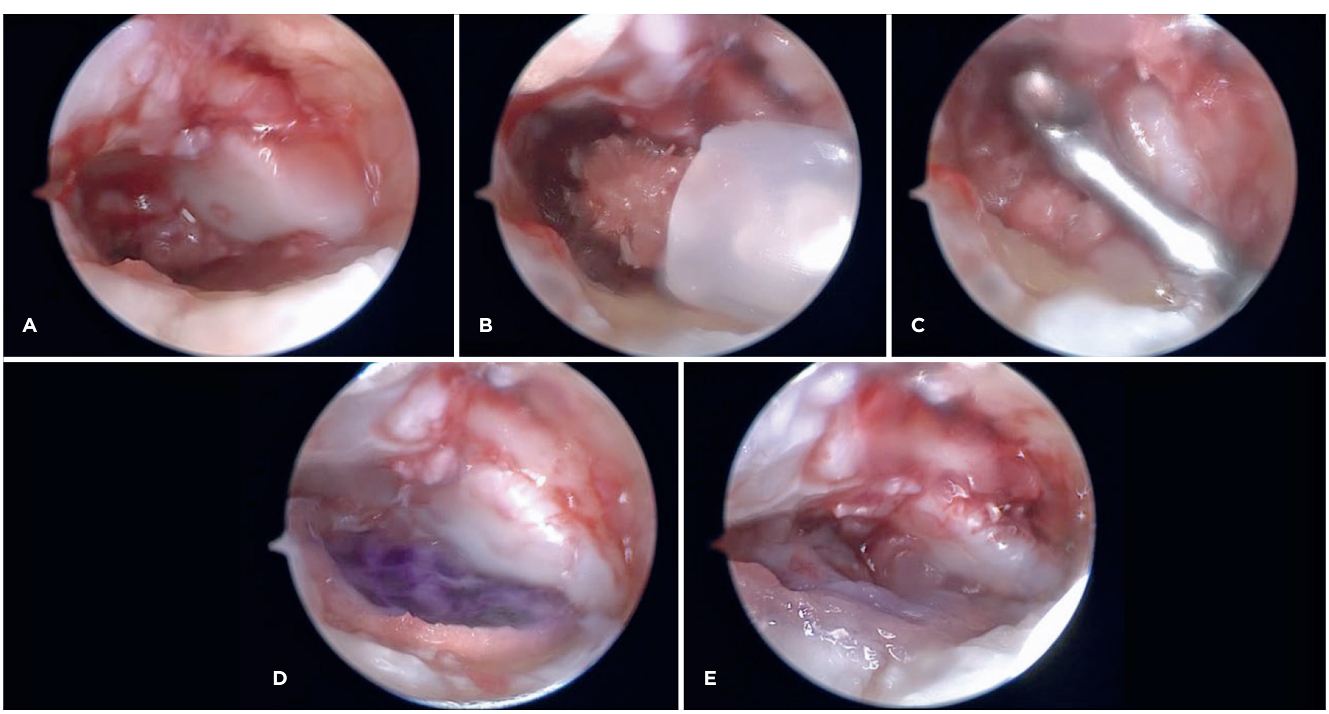

Figure 6. Membrane placement steps, without saline solution infusion (A) appearance of the debrided lesion with a clean bed, (B) placement of a cancellous graft with a small cannula, (C) impaction of the graft with the convex side of the curette, (D) accommodation of the membrane, and (E) its fixation with fibrin glue.

MRI: magnetic resonance imaging; TFS: tibiofibular syndesmosis.

Figure 7. Radiographic and MRI images at 13-month postoperatively (A and B) weight-bearing radiographic views of the ankle with postoperative fixation, (C, D, and E) MRI showing bone graft integration and bone edema resolution, and (F) TFS morphology.

disruptions in ankle fractures treated with joint debridement, anatomical reduction, and stabilization. On the other hand, some authors have recommended arthrodesis in the same fracture setting and described good outcomes[(2)]. In our study, we also had a case with chronic TFS disruption, but differently, it was caused by multiple episodes of ankle sprains and not by a fracture. Intraoperatively, we observed a unity in the malformed TFS, like an acetabular dysplasia, but the joint was significantly unstable. Our impression was that they were fitted together as if they had developed with this anatomy during patient growth. After stabilization, the patient was pain-free in the TFS.

In chronic TFS lesions, OLTs are present in up to 24% of the cases[(4)]. They are traditionally treated surgically with reparative or replacement techniques[(5)]. The main concern is about the longevity of fibrocartilaginous at the OLT site. It can deteriorate with bone marrow stimulation (BMS)[(11)]. In a systematic review, Ramponi et al.[(5)] demonstrated that lesions with size greater than 107.4mm^2 in area and 10.2mm diameter are significantly correlated with poorer clinical outcomes. Although the lesion size (112mm^2) may be an indication to treat with the OATS, we opted for a less aggressive approach, a collagen membrane with cancellous bone graft. Previous studies have demonstrated that it is possible to achieve satisfactory clinical results with this surgical technique[(12)].

The study has limitations, mainly its methodological design and short-term follow-up, such as the risk of overinterpretation and lack of reproducibility of the results.

In this rare case with chronic instability in a malformed TFS associated with OLT, a successful outcome could be achieved with surgical treatment at thirteen months of follow-up.

Authors' contributions: Each author contributed individually and significantly to the development of this article: DRCN *(https://orcid.org/0000-0003-0227-2440), and, PBR *(https://orcid.org/0000-0002-7215-8187) Conceived and planned the activities that led to the study, wrote the paper, participated in the reviewing process, approved the final version; TSM *(https://orcid.org/0000-0003-4168-0981), and, GHS *(https://orcid.org/0000-0002-1211-9258), and FAD *(https://orcid.org/0000-0001-6871-2491), and, MPP *(https://orcid.org/0000-0003-0325-8050) Interpreted the results of the study, participated in the reviewing process; All authors read and approved the final manuscript.*ORCID (Open Researcher and Contributor ID).

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