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**Arthroscopically assisted resection of overlooked fracture of
posterior talar process**

Артроскопски асистирана ресекција превиђеног прелома
задњег наставка талуса

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Arthroscopically assisted resection of overlooked fracture of posterior talar process

Артроскопски асистирана ресекција превиђеног прелома задњег наставка талуса

SUMMARY

Introduction The fractures of the posterior process of talus are relatively rare injuries of the ankle. They most frequently occur via the mechanism of the forced hyper plantar flexion and inversion. Sometimes they are not initially diagnosed, since over 40% of cases of the fractures of the posterior process of talus are not seen in the initial radiography. The objective of this work is the review of the case study of the arthroscopically treated unhealed fracture of the posterior process of talus.

Case outline In our case report we have presented the 30-year-old male, professional soccer player, with a three-month-long history of chronic pain in the region of the left ankle and heel and the fracture of the posterior process of talus.

Conclusion The work shows all the advantages of minimally invasive surgery - arthroscopic excision of the fragment, quick recovery and returning to physical activities.

Keywords: the fracture of the posterior process of talus; radiography of ankle; arthroscopic excision

САЖЕТАК

Увод Преломи задњег наставка талуса су релативно ретке повреде скочног зглоба. Настају најчешће механизмом форсиране плантарне флексије и инверзије. Понекад се иницијално не дијагностикују, јер преко 40 % случајева прелома задњег наставка талуса се не види на иницијалним радиографијама. Циљ овог рада је приказ случаја артроскопски леченог несраслог прелома задњег наставка талуса.

Приказ болесника У нашем приказу болесника приказали смо прелом задњег наставка талуса код тридесетогодишњег мушкараца, професионалог фудбалера са хроничним болом који траје три месеца у пределу левог скочног зглоба и пете.

Закључак Рад показује предности минимално инвазивне хирургије – артроскопске ексцизије фрагмента, бржи опоравак и враћање физичким активностима.

Кључне речи: прелом задњег наставка талуса; радиографија скочног зглоба; артроскопска ексцизија

INTRODUCTION

Talus has a complex anatomy since it is involved in the formation of the following joints: tibiofibular, talocalcaneal and talonavicular joint. About 60 per cent of the talus surface is covered with joint cartilage. Talus consists of a body, neck and head. Talus tissue is poorly vascularized which often brings to avascular posttraumatic necrosis of the talus. The posterior process of the talus is composed of lateral tubercle, medial tubercle and a groove for the tendon flexor hallucis longus. Lateral tubercle, also known as Stieda process is more posterior than the medial tubercle. There are attachments for the posterior talocalcaneal and posterior talofibular ligaments on the lateral tubercle. Medial tubercle is usually smaller but varies more in size. It includes attachments for the posterior third of the deltoid ligament superior and the medial bundle of talocalcaneal ligament inferior. A joint surface which articulates with calcaneus is placed under both tubercles [1, 2].

Mechanism of injury

There are two most frequent mechanisms of injuries of the posterior process of talus. The first one is the forced hyper plantar flexion and inversion which causes the direct pressure of the lateral tubercle between the posterior edge of the tibia and the posterior facet of the calcaneus [2, 3]. The second mechanism of injury is forced dorsiflexion and inversion which brings to the avulsion fracture of the lateral tubercle (lig. talofibulare posterior) [3]. Cedell [4] described the avulsion fracture of the posteromedial tubercle during forced pronation and dorsiflexion of the foot. The rarer mechanism is the direct trauma of the posteromedial facet by the impingement of the sustentaculum during supination and forced dorsiflexion with injuries caused by high intensity forces [5].

Diagnosis and clinical features

The diagnosis is made via clinical features and imaging procedures. A swelling and pain in the posterior side of the ankle are usually present, and a positive talar impingement test, with the pain increasing during the active movements of the toe thumb flexion and extension. In a clinical examination, palpation is extremely significant in the posterior talar process as well as apprehension test with great toe flexion (FHL) in order to differentiate it from an ankle sprain [3].

The standard radiography of the ankle is a routine procedure (AP, mortis and lateral view) [6]. Sometimes Ebraheim X-ray is necessary when standard radiography is insufficient. They are angled beams with external rotation of 45 degrees and 70 degrees [7]. In more than 40 per cent of cases, the fracture of the posterior process of talus is not registered in initial radiography. In such cases, when difficulties are persistent, it is necessary to do a CT (computed tomography) and MRI (Magnetic resonance imaging). CT and MRI are not needed both, but on CT we could see position of fractured fragments and the relationship between them, and on MRI we could see if there is damage of soft tissue especially FHL tendon [8].

Fractures of the posterior process of talus

Fractures of posterolateral process (Shepherd fracture)

The fractures of posterolateral process can be mistaken for an ostrigonum, which develops as a consequence of secondary ossification when the fusion with the talus body fails. The differentiation between the fracture of the posterolateral process of talus and ostrigonum can be performed via CT and NMR diagnostics. The clinical picture of the Shepherd fracture can be very similar to an ankle sprain. It differs in the pain during movements in the subtalar joint and the passive movement of the tendon flexor hallucis longus.

Fractures of the posteromedial process of talus (Cedell fracture)

Cedell [4] first described the fracture of the medial part of the posterior process of talus. It can also be mistaken for an ankle sprain if the posteromedial pain is ignored.

Fractures of the posterior process of talus

The fractures of the entire posterior process of talus are very rare. There are only several described cases [9, 10].

The aim of this work is the case study of the unhealed fracture of the posterior process of talus with a professional footballer. The applied method of treatment – arthroscopic excision of the bone fragment of the posterior process of talus – was chosen as a recommended surgical treatment in the modern orthopedic surgery.

CASE REPORT

A 30-year-old male, professional footballer with a three-month-long chronic pain in the region of the left ankle and heel was examined in our hospital for the first time in August 2018 when he was sent to additional CT and MRI diagnostics (Figure 1). The examination revealed the presence of posteromedial pain on palpation and the positive flexor hallucis test. Prior to this, he had been treated with physical procedures in another hospital, after the injury by distortions mechanism in April the same year. CT and MRI diagnostics revealed a nonunion fracture of the posterior process of talus and an indication for surgical treatment was set.

The surgery was performed in the conditions of block anesthesia and Tourniquet control (280 mmHG) with the patient in prone position. After the surgical field cleaning and preparation, posteromedial and posterolateral portals were created in the level of the lateral malleolus top, medially and laterally in regard to the Achilles tendon. The arthroscope, size 4mm, was inserted through the posterolateral portal, and shaver was inserted through the posteromedial portal. After debridment had been performed, a free body by fibrous tissue, i.e., the broken fragment of the posterior process of talus fixed, was discovered (Figure 2). The free body was then removed through the posteromedial portal (Figure 3). After irrigation, both portals were closed. Antibiotic and tromboprofilaxis therapy were conducted with the patient according to the protocol (Primacef 1g in bolus administered intravenously and fraxiparin 0,4 ml subcutally 1x1 until the 21st postoperative day).

The patient was suggested physical therapy after the release from hospital, which he conducted completely.

Two weeks after the surgery, at the control examination, the patient was free of any difficulties and with the full range of motion in the left ankle, flexor hallucis longus negative, without any pain posteromedially.

Written consent for publication of this article has been obtained by the patient's family member.

DISCUSSION

The fracture of the posterior process of talus is an infrequent injury which is difficult to notice by radiography and is frequently overlooked. The treatment of the fracture of the posterior process of talus are the following: restoring the talus anatomy which prevents late nonunion of bones or posterior impingement syndrome. Non-displaced fractures of the posterior process of talus are treated by immobilization in a period of 6 to 8 weeks. With displaced fractures of the posterior process of talus surgical treatment is recommended depending on the fragment size (osteosynthesis or excision) [11, 12]. Surgical treatment can be performed by open reduction and internal fixation or the excision of the bone fragment of the posterior process of talus. Posterolateral or posteromedial approaches can be used for this surgery depending on the localization of the bone fragment. In both of these approaches, surgical trauma is significant due to the deep position of the posterior process in the posterior aspect of the ankle. The complications of an open surgery are non-healing wound considering the region, and a greater possibility of infection [13, 14].

Many patients who are treated non-surgically need surgical treatment later because of the fracture nonunion or tarsal tunnel syndrome. Consequently, Swords and associates recommend the acute excision of the posterior process of talus [15]. Due to significant surgical trauma in open surgery, these arthroscopic surgical techniques are applied more and more.

Arthroscopic surgery is a minimally invasive surgery (MIS) with two small portals posterolaterally and posteromedially in regard to the Achilles tendon in the level of the posterior process of talus [16]. In an arthroscopic procedure the complications may be the damage of neurovascular structures in the posteromedial compartment, the branch of the posterior tibialis, lateral and medial plantar nerve and the injury of FHL tendon [17]. In our case an excision of the bone fragment was performed arthroscopically.

American Orthopaedic Foot and Ankle Society (AOFAS) is a clinical score which evaluates the function of the ankle and foot before and after treatment, where the maximal score of 100 corresponds to the normal function of the ankle. In our case, after the arthroscopic removal of the posterior process of talus, AOFAS score was 96.3, and before the surgery it was 60.5.

Arthroscopic method of treatment of this injury is more and more used nowadays because of all of the advantages of minimally invasive surgery [18, 19, 20]. In their study, Zwiers et al. [21] followed 410 patients treated by open or endoscopic treatment methods. They proved that the arthroscopic treatment of the fracture of the posterior process of talus enables significantly faster recovery and returning to sports activities (15.9 weeks with open surgery and 7.2 weeks with arthroscopic surgery). They also proved less frequency of major and minor complications (15.9% with open surgery and 7.2 % with arthroscopic surgery) as well as a higher AOFAS score with patients treated by arthroscopic method in compared to patients treated by open surgery. The fractures of the posterior process of talus are injuries which appear with younger physically active persons. These fractures can sometimes be overlooked due to poor radiography signs. This fracture can be diagnosed late, and can give nonunion, pseudoarthrosis and a consequential posterior impingement syndrome. CT of the ankle must be performed with all suspicious cases. If the fracture is diagnosed late, or the bone fragment is too small, the arthroscopic excision of the bone fragment of the posterior process of talus is recommended. Osteosynthesis can be performed in acute trauma and if the fragment is large enough. In such cases of late diagnosed fractures, we suggest arthroscopic excision of fragment as a preferred method and not osteosynthesis.

Conflict of interest: None declared.

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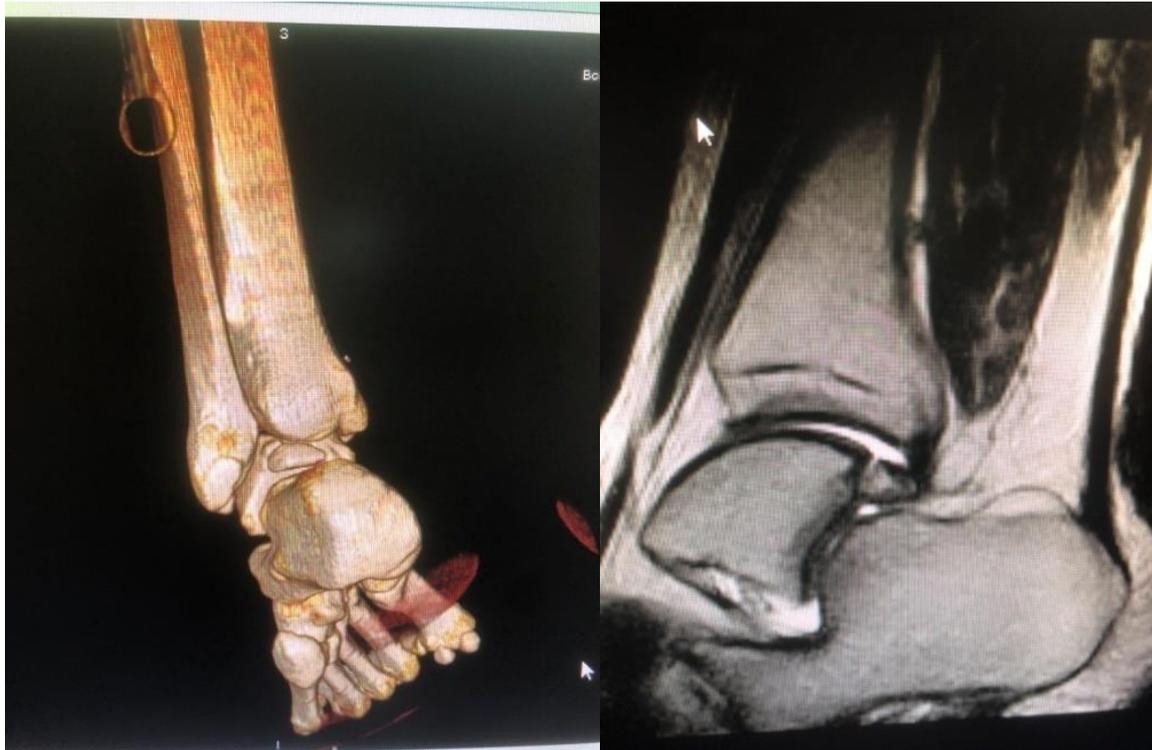


Figure 1. Computed tomography and magnetic resonance imaging showed posterior talar process fracture

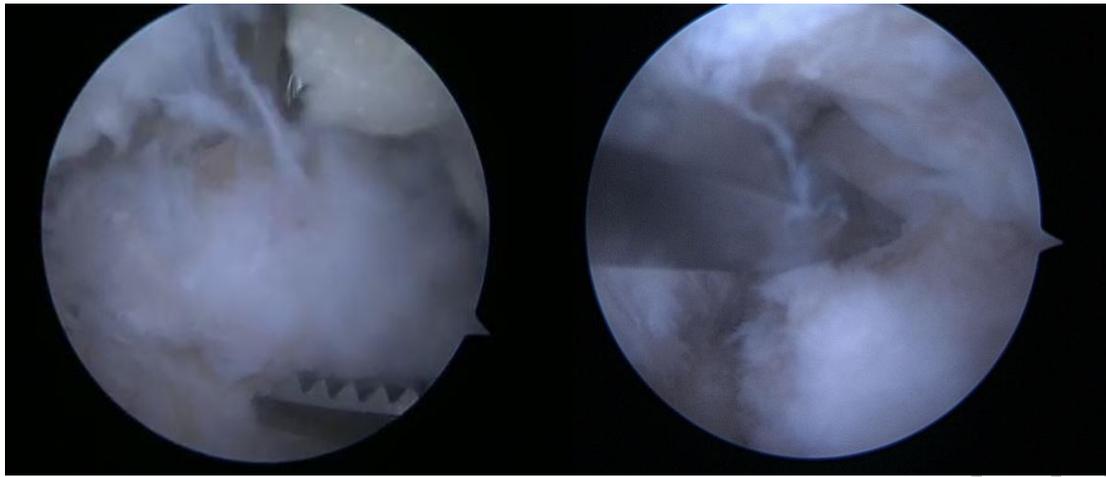


Figure 2. Arthroscopic excision of the posterior process of talus

Paper accepted



Figure 3. The free body was removed through the posteromedial portal

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