



Open talar dislocations without associated fractures



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ABSTRACT

Aim: Total dislocation of the talus first reported in 1680. It is a rare injury and without associated fractures is even rarer. Is generally considered to be one of the most disabling ankle injuries and occurs after high energy trauma. The primary goal of our study is the retrospective evaluation of complete talar extrusion without associated fractures and immediate reimplantation.

Materials and methods: In the past nine years, nine patients with mean age 31.7 years were admitted to our center with a complete open talar extrusion. The dislocated talus was reduced and held in place with two Steinmann pins placed from the inferior aspect of the calcaneus, through the talus and into the inferior aspect of the tibia. An external fixator was used to stabilize the limb. The mean follow up time was 21.1 months. At the last follow up visit, six patients were evaluated both radiographically and functionally with the AOFAS score.

Results: Six patients were free of complications and the mean AOFAS Ankle-Hindfoot Scale score at the time of the last follow up visit was 82.5. Two patients had an infection, one had avascular necrosis of the talus and one had signs of subtalar joint arthritis. Two patients had to undergo arthrodesis.

Conclusions: It is important to attempt reimplantation of the talus since a good final outcome is to be expected. Even in the case of a catastrophic complication this technique will ensure adequate bone stock for additional surgical procedures.

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1. Introduction

Dislocation of the talus without concomitant fracture (i.e. dislocation of the tibiotalar, subtalar and talonavicular joints) is a rare injury accounting for 0.06% of all dislocations and 2% of all talar injuries [1–3]. It was first reported by Fabricius of Hilden in 1680 [3]. Nevertheless, a complete dislocation from its articulation with the tibia, calcaneus and navicular is a rare injury with only 73 cases documented up to 1989 [4–6]. The talus is the only bone in the lower limb with no muscular attachment and 60% of its surface is articular [7]. The rarity of this injury is probably due to the position of the talus deep in the foot, the strong ligamentous support and the amount of force required for dislocation [3,7,8]. The complete dislocation of the talus is generally considered to be one of the most disabling ankle injuries, because the talus alone provides the link between the ankle and the foot and is responsible transferring the body's force during weight-bearing activity [6,8].

Open talar dislocations without associated fractures are even rarer (Table 2). Rarely the open ankle dislocations are anterolateral

[9]. It occurs after high energy trauma [3,7]. Very few sporadic cases are reported in the English literature [10–12]. Treatment option has been limited to talectomy, arthrodesis and reimplantation after surgical debridement [7]. Today, the most common treatment for a missing talus is considered to be the reimplantation of the talus after repeated surgical debridement [7,13].

The primary aim of our study is the retrospective evaluation of the complications, clinical and functional results of immediate talar reimplantation in cases of complete talar extrusion without associated fractures. Also as secondary goal is to correlate the rate of complications using a technique combination of talus stabilization with Steinman pins and external fixation of the foot.

2. Materials and methods

In the past nine years (from 2003 to 2011), nine patients (7 males and 2 females), with a complete open talar extrusion, ranging in age from twenty seven to forty-two years (mean 31.7 years), were admitted to our level four trauma center (accepting referred cases from all over the country, level three general hospitals and level two and one medical centers and rural medical offices). We performed a retrospective series study of pure talar extrusion without concomitant fractures and intent to report a short- to midterm outcome. There were five right and four left tali.

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Table 1

Gender male (M), female (F). Scenario a: talus reimplanted at time of surgery, b: patient referred after placement of previously extruded talus. Complications: INF (infection), AVN (avascular necrosis), STA (subtalar joint arthritis).

Patient	1	2	3	4	5	6	7	8	9
Age (years)	29	27	42	32	31	28	37	29	30
Oestern-Tscherne type	III	IV	IV	III	III	IV	III	III	III
Cartilage damage	++	–	++	–	+	–	++	++	+
Follow up (months)	23	19	25	21	19	22	20	21	20
Gender	M	F	M	M	M	F	M	M	M
Scenario	a	b	a	b	a	b	a	a	a
AOFAS score	90	–	–	70	82	55	86	80	87
Complications	–	INF	AVN	STA	–	–	–	–	–
Time from injury to final treatment (h)	2	17	3	9	5	4	8	3	7

The mechanism of injury was either a motor vehicle accident (six patients) or a fall from a height (three patients). All nine cases involved an anterolateral dislocation of the talus without any concomitant fracture but with varying degrees of soft tissue connections. Three cases were classified as Oestern–Tscherne type IV injuries and six cases type III (Table 1).

All patients were evaluated at the emergency department; the wound was irrigated with normal saline, a tetanus toxoid booster was administered and then the patient was transferred to the operating theater as soon as the concomitant injuries allowed (Figs. 1 and 2). The talus and the wound were irrigated again with bacitracin solution and normal saline. The dislocated talus was reduced in its anatomic position and held in place with two Steinmann pins placed from the inferior aspect of the calcaneus, through the talus and into the inferior aspect of the tibia under fluoroscopic guidance. An external fixator was used to stabilize the limb and neutralize all the compressive and shearing forces to the talus (Figs. 3 and 4). The distraction of the ankle was in favor of the articular damage repair. The torn ligaments of the ankle were repaired as possible attempt. The wound was then closed by primary intention with a suction drain in place. Intravenous antibiotics were routinely administered for seven to ten days and after that only if it was dictated by the clinical picture. Two different scenarios were encountered. In 6 patients the talus was reimplanted at the time of surgery and 3 patients were referred to our institution after replacement of a previously extruded talus. The same surgical technique was followed in all patients. Out of six cases redacted in our emergency department, only in 4 was recognized cartilage damage at the dome of the talus. In all cases, weight bearing was forbidden for the first three months. The Steinman pins were removed at six weeks (33–52 days). The external fixator was removed after mean time of nine weeks

(8–12 weeks) and partial weight bearing in a removable cast was allowed together with range of motion exercises of the tibiocalcaneal and subtalar joints (Fig. 5).

All patients were treated on an outpatient basis after hospital discharge. The demographic details of our patients were documented together with the time elapsed between injury and definitive surgical treatment and the complications encountered. At their last follow up visit the six patients who had no complications were evaluated both radiographically and functionally with the AOFAS Ankle-Hindfoot Scale score. The AOFAS contain all these information needed about the range of motion of the ankle, the disability of the foot and pain scale during walk. The patient that had a post-operative infection did not undergo the same treatment protocol as the other six patients and were excluded. The two patients (22%) that underwent secondary procedures and arthrodesis due to complications were not assessed with AOFAS score.

3. Results

The mean time elapsed between injury and final operative treatment was 6.4 h (range from 2 to 17). The mean follow up period was 21.1 months (range from 19 to 25). Two patients (22%) underwent secondary arthrodesis due to complications. A patient (11%) developed an infection. Treatment with intravenous antibiotics and debridement did not respond and thus had to undergo talectomy and later on arthrodesis. Pin track infection was observed and treated in 3 cases (33%). In one patient (11%) the talus demonstrated signs of AVN at 7 months after trauma and an arthrodesis was performed two months later. In one patient (11%), radiographic signs of subtalar arthritis were evident at 21 months after injury. In the six patients (66%, who had no complications, the



Fig. 1. Anteroposterior and lateral view X-rays of a talar extrusion without associated fracture.

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