

Ankle arthrodesis with a fibular bone autograft and intramedullary nail stabilization in post-traumatic loss of the talus. A case report

Arthrodeza stawu skokowo-goleniowego z użyciem przeszczepu z kostki bocznej i stabilizacją gwoździem śródszpikowym w pourazowym ubytku kości skokowej. Opis przypadku

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CASE REPORT

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Abstract

Post-traumatic talus bone loss is a rare type of high-energy injury, which is associated with a large decontaminated wound and soft tissue contusion. We found 19 articles in PubMed on 21 patients whose talus was not found at the scene of the accident. We present the case of a 37-year-old patient who experienced post-traumatic talus loss and underwent treatment for talocalcaneal and talonavicular joint arthrodesis six months post-injury. The talus was not recovered at the accident scene. Arthrodesis was stabilized with an intramedullary nail, and a graft from the distal part of the fibula was placed to fill the space between the calcaneus and tibia. Additionally, bone graft and navicular were stabilized with K-wire and arthrodesed. At the one-year follow-up, the patient occasionally experiences foot oedema without pain after a full day of work. X-rays present complete ankle and graft-navicular arthrodesis.

Key words: Post-traumatic loss of the talus, missing talus, talus extrusion, ankle arthrodesis, fibular bone graf.

Streszczenie

Pourazowy brak kości skokowej jest bardzo rzadkim, wysokoenergetycznym urazem, który wiąże się z dużą dekontaminacją rany i stłuczeniem tkanek miękkich. W bazie Pubmed znaleziono 19 artykułów prezentujących 21 pacjentów, u których nie znaleziono kości skokowej na miejscu wypadku. Przedstawiono 37-letniego pacjenta z pourazowym ubytkiem kości skokowej leczonego arthrodezą piętowo-piszczelową 6 miesięcy od urazu. Arthrodezę ustabilizowano gwoździem śródszpikowym, a ubytek kości skokowej wypełniono przeszczepem z części dalszej strzałki. Dodatkowo ustabilizowano przeszczep z kością łódkowatą w celu uzyskania arthrodezy. Po roku od ostatecznej operacji na radiogramach widoczny wzrost w miejscu arthrodezy oraz wzrost pomiędzy przeszczepem i kością łódkowatą. Pacjent bez dolegliwości, powrócił do pracy fizycznej.

Słowa kluczowe: pourazowa utrata kości skokowej, arthrodeza stawu skokowo-goleniowego, przeszczep z kości strzałkowej.

Case report

A 37-year-old man presented with traumatic talus bone loss after a scooter accident. The talus bone loss was a result of an extensive open wound on the medial side of the left ankle. The talus bone was not found at the scene of the accident. Following the accident, the patient was admitted to the surgical ward of the local hospital. Due to the extensive trauma sustained, the initial recommendation was to perform a leg amputation; however, the patient declined to give consent. Subsequently, a debridement procedure was performed on the wound to remove necrotic tissue. Then, a few days later, he was transferred to the orthopedic

department of the district hospital, where the ankle was stabilized with an external fixation (Fig. 1). However, due to the wound not healing as expected, the patient was transferred to the chronic wound treatment ward in the same hospital, where VAC therapy administered and a split-thickness skin graft was subsequently applied on the wound. After the wound healed, the patient was discharged without a further treatment plan.

Five months after the injury, following orthopaedic consultation, the patient was admitted to our ward in the district hospital. First, the external fixator was removed, and a plaster cast was applied for four weeks. The foot was swollen and in a stiff equinus position (Fig. 2, 3, 4).

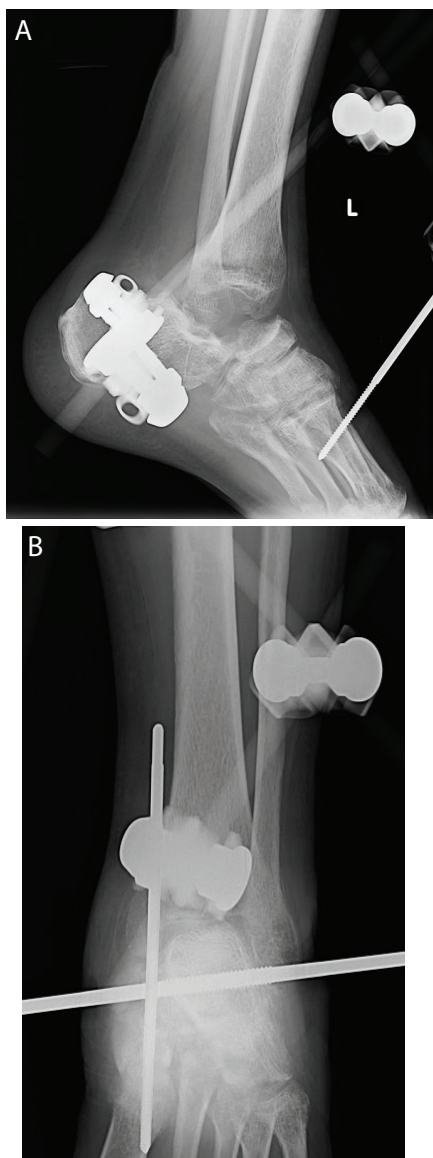


Fig. 1. A, B – Radiographs with an external fixator on the shin and foot show the absence of the talus.

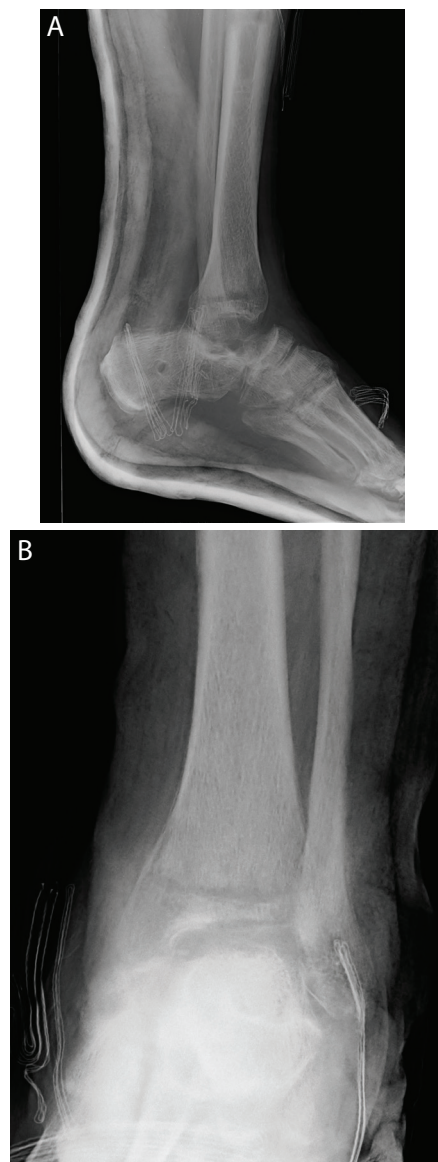


Fig. 2 A – Lateral radiograph presents equinus deformity of the foot and a lack of the talus. B – A-P radiograph of the ankle without external fixator.

The tibio-calcaneal arthrodesis was planned with a full-thickness bone graft from the distal part of the fibula.

Operative technique

The patient was placed in the supine position. The Esmarch tourniquet was fastened around the thigh. The approach was initiated at a point 10 cm above the lateral malleolus and continued to the lateral edge of the foot. The fibula was surgically severed 8 cm from the bone's distal tip and subsequently utilized as an autograft. Following the loss of the talus, there was a considerable amount of scar tissue in the surrounding space, which was removed before correcting the equinus deformity. The cartilage from the articular surfaces of the tibia, calcaneus, and proximal part of the navicular was also removed. The fibular bone graft

was placed in the space between the calcaneus and tibia, parallel to the joint line in the coronal plane. Additionally, the bone graft underwent partial decortication and drilling using a K-wire. The ankle arthrodesis was fixed with the intramedullary nail. One of the screws was used both to stabilize the nail and the bone graft. Also, K-wires were used to secure the bone graft to the navicular bone (Fig. 4). Following the surgery, a splint was applied below the knee to stabilize the foot.

Post-operative follow-up

Three months after the operation, K-wires were removed, and the patient walked with the walking boot for the next nine weeks with partial weight bearing. After another three months, the patient occasionally walked long distances

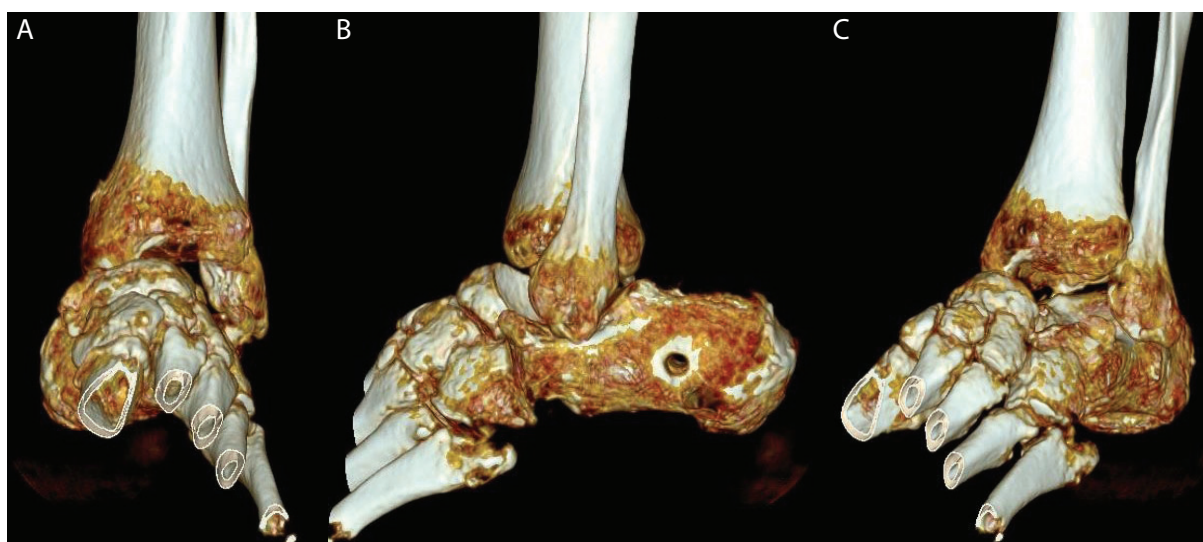


Fig. 3. A, B and C – 3D reconstruction of the foot in computed tomography before operation.

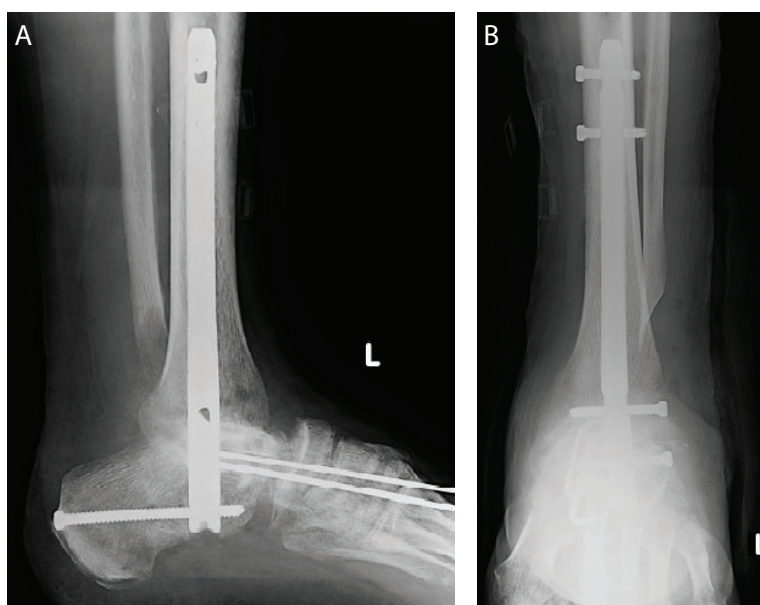


Fig. 4. A and B – Postoperative radiographs show stabilization of the ankle joint with an intramedullary nail and a graft from the fibula located between the calcaneus and tibia. The graft is additionally stabilized with K-wires with the navicular bone.

with crutches or the walking boot. The patient also reported a limited range of motion in the first metatarsal-phalangeal joint. Therefore, a Weil osteotomy of the first metatarsal bone was performed, followed by fixation using 2.5 Herbert screws and capsulotomy of the joint. Finally, the patient achieved an improvement in dorsiflexion of the hallux up to 20 degrees (Fig. 5).

One year after ankle arthrodesis, the patient returned to work as a builder and truck driver. At the 1-year follow-up, the patient occasionally reported foot edema without pain after all-day work. X-rays revealed complete bone healing between calcaneus and tibia, as well as bone graft and navicular (Fig. 6). The patient uses rocker-bottom shoes, which makes walking easier, and was satisfied with the result of the treatment.

Post-traumatic talus bone loss is a rare type of high-energy injury, which is characterized by decontaminated



Fig 5. Full weight bearing A-P radiograph of the foot after Weil osteotomy of the 1st metatarsal bone.



Fig. 6. A and B – Radiographs at follow-up reveal the complete ankle arthrodesis and also arthrodesis between autograft and navicular.

wound and soft tissue contusion. The most popular reconstruction techniques are calcaneo-tibial arthrodesis [1, 2, 4, 6, 10, 11, 13, 14, 17, 18, 19, 21, 23] or use of a custom-made implant of the talus along with ankle arthrodesis [5, 15, 20, 22, 24]. A case is also documented where triple arthrodesis of the foot is employed as a treatment approach. [9]. In the ankle arthrodesis changes type of graft (fibular bone graft [6], tricortical iliac bone graft [1, 2, 13, 14], femoral head graft [9], without information about graft [4, 17, 24], trabecular spacer block [12], lack of the graft [10, 11, 18, 21]) and stabilization methods (intramedullary nail [2, 4, 6, 13, 14, 17, 19, 21, 23], screws [1, 11], plate [18] and without stabilization [10]). Several cases have shown reimplantation of the talus bone [8, 16]. Also, there are techniques involving talectomy and fibular strut stabilization for patients with alternative etiology of missing talus [3, 7].

We demonstrated an example of the treatment of a post-traumatic loss of the talus compared to the articles pre-

senting different methods. All previously described cases presented primary treatment in one hospital immediately after the injury. The difference between our case and those described in the literature [6] is that we added arthrodesis between the bone graft and navicular bone. In our opinion, the time between injury and final treatment may have impacted recovery time (six months).

What we could have done better in our case is to place more bone grafts in the space between the calcaneus and tibia to preserve the distance between them as normal as possible.

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