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Case Report

Crossover replantation of a foot after bilateral traumatic lower-leg amputation

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ABSTRACT

A successful case of crossover replantation of the left foot to the stump of the right leg was described. The lower extremities were amputated at different levels. On the left side, there was a complete amputation in the distal part of the lower leg with comminuted fracture of the distal tibia. On the right side, there was a complete amputation in the hindfoot with comminuted fracture of both the talus and calcaneus. Since anatomical replantation was impossible, we performed crossover replantation of the left foot to the right lower leg. At the latest follow-up examination, forty-six months after the accident, the patient walked independently with a prosthesis on the stump of the left leg. Crossover replantation should be considered in bilateral amputations for the salvage of at least one extremity.

Introduction

Bilateral amputations of the lower extremities are relatively rare conditions, often caused by traffic accidents. Anatomical replantation may be impossible if both of the extremities are severely damaged. For these patients, crossover replantation could be an appropriate choice, helping patients save one extremity.

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Figure 1. Both of the lower extremities were amputated at different levels.

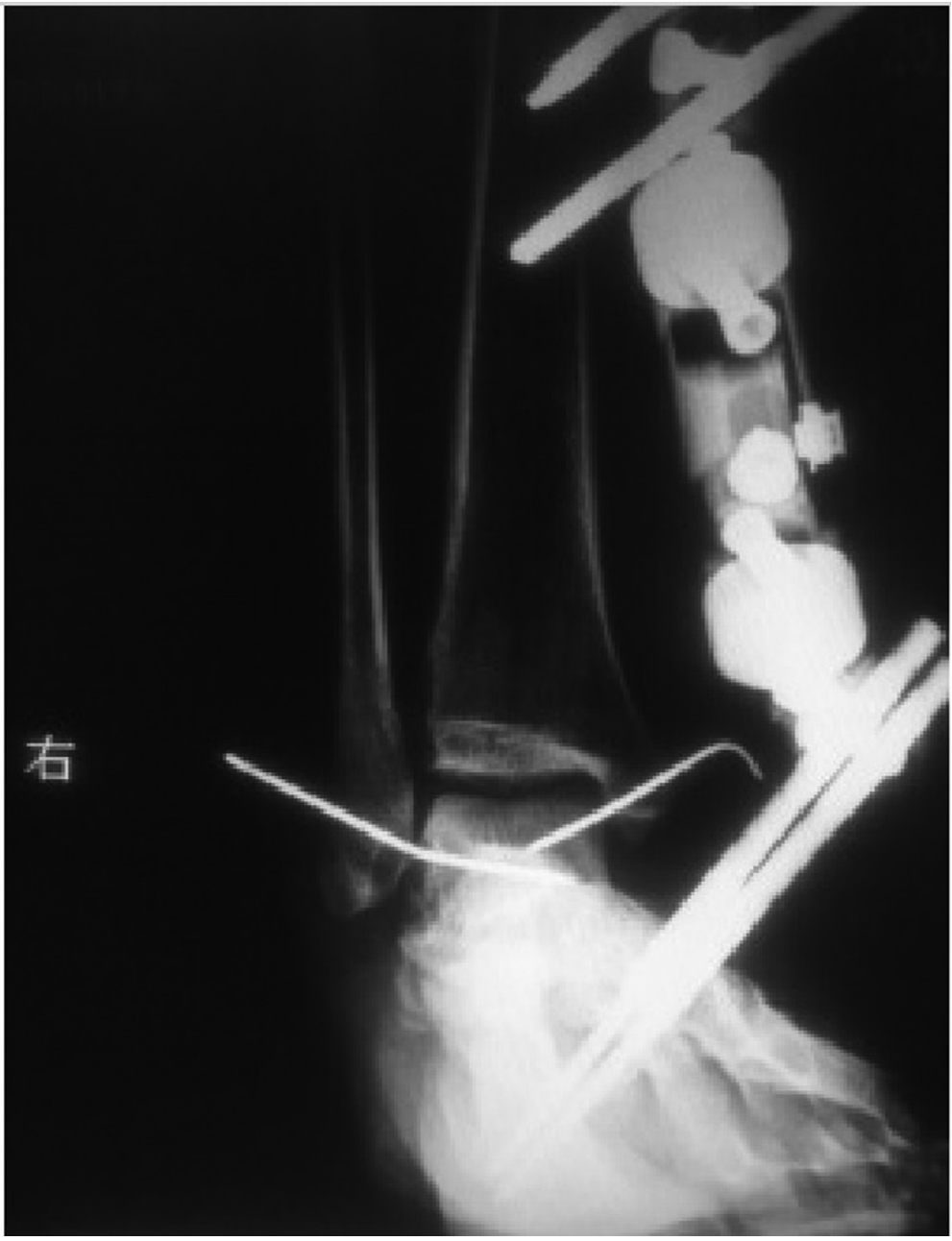

Figure 2. Anterior-posterior X-ray image of the ankle joint fixed with two K-wires and an external fixator.

Figure 3. Accomplished crossover replantation of the left foot to the right lower leg.

Figure 4. The medial view of the crossover replanted foot at forty-six months after the first operation.

According to previously published articles, patients felt satisfied with the functional outcomes. We accomplished one crossover replantation, and to provide useful information for clinicians, we share our experience here in this case report.

Case report

A 33-year-old miner presented to our department with bilateral foot amputations, resulting from falling rocks. The lower extremities were amputated at different levels (Figure 1). On the left side, there was a complete amputation in the distal part of the lower leg with comminuted fracture of the distal tibia. On the right side, there was a complete amputation in the hindfoot with comminuted fracture of both the talus and the calcaneus.

The patient was eager to receive a replantation operation. However, anatomical replantation was not possible because some areas on both sides were badly damaged.

After thorough communication with the patient, we decided to perform a crossover replantation of the left foot to the right lower leg to save one lower extremity.

After adequately washing both the stump and the amputated foot, we fixed the ankle joint with two K-wires and an external fixator (Figure 2) and repaired the tendons with 2–0 absorbable sutures. Coaptation of the tendons providing stability to the foot was then accomplished. Primary anastomosis of the anterior tibial artery along with 2 accompanying veins was performed. Defects in the posterior tibial artery were bridged with a reverse 5-cm saphenous graft from the opposite leg, and the ipsilateral great saphenous vein was bridged with another 6-cm saphenous graft from the opposite leg, primarily anastomosed end to end. The tibial and peroneal nerves were not primarily repaired due to nerve defects, and the skin was loosely tagged to provide protection for the anastomosis sites (Figure 3).

The immediate postoperative period went uneventfully, with regular dressing changes. Two weeks later, we performed a below-knee amputation for the left leg, which in the first operation, only received debridement and the removal of tiny pieces of skin necrosis around the right ankle wound. Ten days following the below-knee amputation and during the same hospital stay, skin grafts for the medial and lateral sides of the wound were undertaken.

Two months after the first operation, we removed the external fixation and the two K-wires. The patient managed to install a prosthesis for the left lower leg and was encouraged to stand and walk. At a follow-up visit forty-six months after the injury, the patient could walk independently with his prosthesis on the left side and the left foot now attached to the right lower leg (Figure 4). Although the patient exhibited slight gait abnormalities and a lack of sensitivity, he was satisfied with the crossover replanted foot (Video).

Discussion

In 1988, Girot J et al. described crossover replantation of the lower extremities for the first time, in which the right foot was replanted to the stump of the left leg with a free musculocutaneous graft covering the wound from the latissimus dorsi.[1] Since then, approximately ten cases with similar situations have been reported. All the patients walked well with a crossover replanted extremity and a prosthesis on the other side.[2-10]

In this case, we built a new ankle for our patient, combining the distal part of the right tibia with the left talus, fixed by K-wires and an external fixator. The patient could walk independently as early as only four months after the operation, since there was no need to spare time for bone union. The great toe presented ulceration at a follow-up visit sixteen months after the injury, which was cured after some rest and intravenous antibiotics. Our patient, free to attend social activities, is pleased to save one extremity. He is now working as a door keeper, which requires less manual labour than his previous occupation.

The replantation process, which requires bone fixation as well as nerve and blood vessel repair, is often more complicated than simple amputation. Bone shortening is necessary in certain cases,[1] while a free microvascular latissimus dorsi muscle flap is frequently applied to cover soft tissue defects.[1,7]

In addition, rehabilitation may also take several months. Despite all these difficulties, crosslateral replantation should still be considered, since all the reported patients who have received crosslateral replantation felt satisfied with the functional outcome.

Level of clinical evidence

4

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Ethical approval

Not required.

Patient consent

Patient consent for publication of photographs and videos has been obtained before submission.

Conflict of interest

None declared.

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Supplementary materials

Supplementary material associated with this article can be found, in the online version, at doi:10.1016/j.jpra.2022.01.005.

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