

Reconstruction of Chopart's Amputation Stump with the Osteomusculocutaneous Latissimus Dorsi-Rib Flap

Vo Thai Trung, MD
Truong Minh Nha, MD
Hoang Van Bay, Dr

Summary: We present an original technique for reconstruction of the right forefoot after Chopart's amputation. The case report was of a 20-year-old man who was a nonsmoker without comorbidities. He was referred to our department because of equinus deformity, pain, and prominence of the cuboid under the skin, leading to chronic ulceration at the stump. We performed flow through free latissimus dorsi flap including the eighth and tenth ribs to reconstruct the stump. Results were assessed at 18 months after operation, showing good stability and normal functional outcome of the foot. The patient is satisfied with the results achieved. (*Plast Reconstr Surg Glob Open* 2022;10:e4422; doi: [10.1097/GOX.0000000000004422](https://doi.org/10.1097/GOX.0000000000004422); Published online 15 July 2022.)

Chopart's amputation selection is less common compared with other foot amputation procedures due to the high risk of postoperative equinus/varus deformity. Moreover, the procedure is often associated with postoperative damage, defects, or poor vascularization of the surrounding tissue, making it difficult to cover the amputation stump with soft tissue in some cases.¹

In such cases, alternative approaches should be explored, such as reconstruction by flaps to the amputation stump² or secondary wound closure by negative pressure wound therapy.³ In severe cases in which stump coverage with soft tissue has failed, the decision to give up preservation of the heel and a higher level leg amputation may be considered.^{4,5}

We report a case of equinus deformity and prominence of the cuboid under the skin at the stump after Chopart's amputation of an injured foot. It was successfully treated by secondary stump reconstruction with the combination of an osteomusculocutaneous latissimus dorsi-rib flap and a special suturing tendon technique.

CLINICAL CASE

A 20-year-old man sustained a work accident caused by a press machine, resulting in a crush injury of the right

forefoot. He underwent Chopart's amputation followed by stump coverage with sural flap and skin graft. Twelve months after surgery, he was referred to our department for reconstruction because of equinus deformity, pain, and prominence of the cuboid under the skin. He was unable to walk even with a forefoot prosthesis (Fig. 1). The patient was a nonsmoker without comorbidities.

The stump was covered with a free latissimus dorsi flap, including the eighth and tenth ribs. Revascularization was achieved by an end-to-side anastomosis on the posterior tibial artery and an end-to-end anastomosis on the medial saphenous vein. The rib segments were fixed to the talus to obtain at least a 2-cm-long surface contact with screws, and these were distally held together with screws. We inserted the navicular and the cuboid into the space between the rib segments and fixed them to the rib segments with screws. We drilled two holes into the rib segments, passed the anterior tibial tendon through the medial drill hole, passed the extensor digitorum longus tendons through the lateral drill hole (this tendon was connected with a graft taken from the ipsilateral fibularis longus tendon), and sutured to itself with nonabsorbable suture while the ankle was kept in slight dorsiflexion (Fig. 2). This procedure was combined with lengthening of the Achilles tendon. The latissimus dorsi muscle was wrapped around the ribs, and the island skin was placed at the phantar aspect of the stump for future protection. The remaining uncovered muscle was skin grafted. A short-leg splint was removed at 6 weeks, but weight-bearing was not allowed for another 6 weeks. Walking with crutches or a walker, with touch down weight bearing 12 weeks postoperatively, was allowed as tolerated. Total weight-bearing was allowed at 6 months.

From the Department of Orthopaedic and Reconstruction, Binh Duong General Hospital, Binh Duong, Vietnam.

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Fig. 1. Equinus deformity and prominence of the cuboid under the skin at the stump.

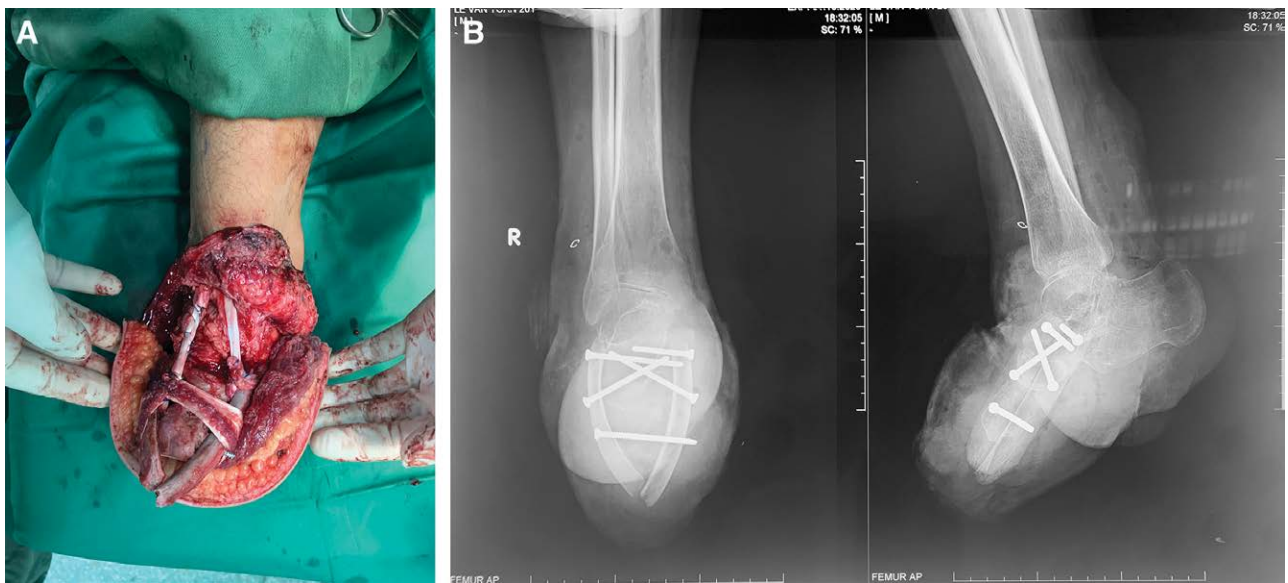


Fig. 2. Surgical technique. A, Elevation of a latissimus dorsi-rib flap, including the eighth and tenth ribs. The rib segments were fixed to the talus with screws. The avicular and the cuboid were put between the rib segments. The tendons were sutured to themselves with nonabsorbable sutures. B, X-ray film obtained after operation.

RESULTS

The latissimus dorsi-rib flap allowed achievement of 9 cm lengthening of the stump. The muscle and skin paddle thickness of the flap provided an additional 2–4 cm. Final range of motion of the ankle joint was compatible with normal ambulating. The patient was very satisfied with the result and did not complain about the donor site. There have been no postoperative complications, and he had no pain. He walked without limping and did not need a forefoot prosthesis.

DISCUSSION

The free osteomusculocutaneous latissimus dorsi-rib flap has been used many times for reconstruction of the lower extremities. It had never been proposed, however, for reconstruction in cases of stump of Chopart's amputation, to our knowledge. Pelissier et al⁶ described a report of five cases of reconstruction of the short lower leg stumps with the osteomusculocutaneous latissimus dorsi-rib flap. At 2 years after reconstruction, they had obtained a good result, in terms of stability. Final range of motion of the knee joint



Fig. 3. Eighteen months after surgery.

was compatible with normal ambulating, and the prosthesis was well tolerated, without any ulceration of the flap.

We identified the following two possible reasons for the good postoperative outcome after reconstruction. The first point is the use of the osteomusculocutaneous latissimus dorsi-rib flap for reconstruction. This procedure, which provides a large amount of skin, muscle, and bone, is very effective for reconstruction of the post-leg amputation stump. The second point is that secondary ankle deformity following Chopart's amputation was prevented by a special suturing technique applied to the anterior tibial tendon and the extensor digitorum longus tendons, which were cut off during Chopart's amputation. These tendons were sutured to the rib segments in the flap to ensure balance of the antagonist muscle, thereby preventing equinus/varus deformity.

Bone configuration was also stable enough to allow early mobilization of the ankle joint, the stiffness of which would have impaired the functional result. Although bone

segments taken from the ribs may seem rather fragile for such a lower leg reconstruction, we never observed either secondary fracture or pseudarthrosis. As far as the indications are concerned, this procedure should be intended for patients with a satisfactory range of motion of the ankle joint.

The patient was evaluated 18 months after the operation. He had no pain. He walked without limping. He could walk without shoes and without prostheses and could squat (Fig. 3). The ankle had a normal range of motion and was stable. In particular, there was no varus instability compared with the contralateral side. Motion analysis of the ankle showed 300 plantar flexion and 50 dorsal flexion.

CONCLUSIONS

Skin ulceration and equinus/varus deformity following Chopart's amputation was successfully addressed with a special suturing tendon technique combined with the osteomusculocutaneous latissimus dorsi-rib flap. This technique provided sufficient resistance to weight-bearing and enabled walking without postoperative complications.

Vo Thai Trung, MD

Department of Orthopaedic and Reconstruction
Binh Duong General Hospital
342, Phu Hoa Ward
Thu Dau Mot City
Binh Duong Province 750000
Vietnam

E-mail: vothaitrung2010@gmail.com

PATIENT CONSENT

The patient provided written consent for the use of his image.

REFERENCES

1. Lange TA, Nasca RJ. Traumatic partial foot amputations. *Clin Orthop Relat Res.* 1984;185:137-141.
2. Isik S, Güler MM, Selmanpakoğlu N. Salvage of foot amputation stumps of Chopart level by free medial plantar flap. *Plast Reconstr Surg.* 1998;101:745-750.
3. Armstrong DG, Lavery LA; Diabetic Foot Study Consortium. Negative pressure wound therapy after partial diabetic foot amputation: a multicentre, randomised controlled trial. *Lancet.* 2005;366:1704-1710.
4. Krause FG, Pfander G, Henning J, et al. Ankle dorsiflexion arthrodesis to salvage Chopart's amputation with anterior skin insufficiency. *Foot Ankle Int.* 2013;34:1560-1568.
5. Krause FG, Aebi H, Lehmann O, et al. The "flap-shaft" prosthesis for insensate feet with Chopart or Lisfranc amputations. *Foot Ankle Int.* 2007;28:255-262.
6. Pelissier P, Pistre V, Casoli V, et al. Reconstruction of short lower leg stumps with the osteomusculocutaneous latissimus dorsi-rib flap. *Plast Reconstr Surg.* 2002;109:1013-1017.