Reconstruction of degloved thumb with prefabricated flap

ZHANG Gong-lin, GE Bao-feng, HU Yu-xiang, WU Hui-guo and YIN Ying

The wrap around the toe flap from the great toe is considered to be a good reconstructive procedure for degloved injuries of the thumb.\(^1\) In this study, we used prefabricated flaps of the medial plantar skin to cover a degloved injury of the thumb of a patient unsuitable for application of this method and obtained satisfactory clinical results.

CASE REPORT

General data of patient

A 46-year-old man sustained a degloved injury of the left thumb in a machine accident in May 2007. The skin of the left thumb was avulsed from the middle of proximal phalange and the underlying tendons and neurovascular structures were exposed (Fig.1). The wound contamination was slight. The phalanges and tendons were not obviously injured. The wrap around the toe flap could not be applied as the feet were infected by ringworm. We decided to use prefabricated flaps of the medial plantar skin to reconstruct a degloved injury of the thumb.

Operative procedure

Debridement of the wound of the thumb was performed, then the wound was temporarily covered with wet dressing. The full thickness skin of the medial plantar skin (about 4.5 cm×3 cm) was harvested from the right foot (Fig.2). The wound of the donor site was covered by free skin grafts. The harvested full thickness skin of the medial plantar skin was grafted temporarily onto the surface of the right fascia lata of the anterolateral thigh region (Fig.3). The proximal and distal ends of incision were covered by two slices (3 cm×3 cm and 2 cm×2 cm) of free split-thickness skin graft, respectively. The grafted skin was fixed by a tie-over suture fixation. The dressing of the anterolateral thigh was removed 2 weeks later and the prefabricated flap of the medial plantar skin survived. Then the prefabricated flap was harvested, including the artery and vein of the descending branch of the lateral circumflex femoral vasculature and the lateral cutaneous nerve of the thigh (Fig.4). The donor site of the thigh was closed directly. The degloved injury of the left thumb was reconstructed with this prefabricated flap (Fig.5). The artery and vein of the descending branch of the lateral circumflex femoral vasculature and the lateral cutaneous nerve of the thigh of the flaps were anastomosed end-to-end to the artery and vein of the radial and the medial antebrachial nerve, respectively.

Aftertreatment

Aspirin (300 mg/day) and dextran (500 ml/day) were given to the patient for 7 days continuously. Heparin was not used. The flap color, turgor, and capillary refill were monitored. Active motion of the thumb began after 3 weeks. The postoperative course was uneventful. The prefabricated flap of the medial plantar skin survived completely. Seventeen months postoperatively, the thumb was well in contour and function. Sensation restored and two-point discrimination was 6-8 mm (Fig. 6-8). The patient was very satisfied. And there was no remarkable donor site morbidity.

DISCUSSION

The wrap around the toe flap from the great toe is the optimal selection for degloved injuries of the thumb.\(^1\) The patency of the dorsalis pedis and the posterior tibial arteries is essential for the operative method. When both feet were infected, the patient is unsuitable for application of this method. Under these circumstances, pedicled and free radial forearm flaps and the infraclavicular pedicle flap of the contralateral chest wall are alternatives.\(^2\-^4\)
However, quality and appearance of the reconstructive thumb with these procedures are not satisfactory, and recovery of durability to the skin and thumb sensory are also poor. The ideal operative method can not only be used to cover the defect of soft tissues but also to obtain a good quality and appearance of the thumb. The skin of the thumb requires durable skin with protective sensation.

Fig.1. Preoperative view of a degloved injury of the left thumb. Fig.2. The medial plantar skin is harvested from the right foot.

Fig.3. The medial plantar skin is grafted temporarily onto the surface of the right fascia lata of the anterolateral thigh region. Fig.4. The prefabricated flap is harvested 2 weeks later.

Fig.5. Postoperative appearance after 2 weeks. Fig.6. Postoperative appearance after 8 months.

Fig.7. Postoperative view of the palmar surface. Fig.8. Postoperative view of the dorsal surface.
When a patient is unsuitable for application of the method with the wrap around the toe flap, we used pre-fabricated flap of the medial plantar skin to reconstruct a degloved injury of the thumb and obtained satisfactory clinical results. The advantages of the flap are as follows: (1) The medial plantar skin is durable from the non-weight-bearing area of the sole between the heel and the metatarsal heads. After the skin is harvested from the medial planta, there is no remarkable donor site morbidity.\(^5\) (2) The prefabricated flap is thinner, so there is no need to be thinned by second operation. The reconstructed thumb is well both in contour and function. (3) The flap is nourished by the desending branch of the lateral circumflex femoral artery. The flaps seem to have ample blood supply, a constant anatomy and a long vascular pedicle, so that dissection of the flaps could be accomplished easily.\(^6\)\(^8\) (4) Sensation of the flap may be established and protective sensation is reinnervated by the lateral cutaneous femoral nerve, which emerges from the deep fascia below the anterosuperior iliac spine and divides into two or three branches that lie along the deep fascia.\(^7\) (5) There is no need to sacrifice major arteries of the donor limb. After the flap is harvested, the thigh donor site is closed directly and well-hidden, and thus only a linear scar of the donor area is left. The donor site does not have obvious functional deficits. And (6) the donor and recipient sites allow two teams to operate at the same time, which is good for the rational use of operative time and personnel.

The anterolateral thigh region is an ideal donor site for the prefabricated flap.\(^9\)\(^10\) However, a two-stage procedure is required, and nail bed of the thumb is not reconstructed. These are the main disadvantages of this operative procedure.

REFERENCES


(Received October 23, 2008)
Edited by LIU Yang-e