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Reconstruction of hand skin defects by microdissected mini anterolataral thigh perforator flaps

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Summary Three cases of traumatic skin defect and two cases of secondary skin defect after releasing scar contractures on the dorsum or palm of the hand, except for the fingers and thumb, were successfully reconstructed with the use of microdissected thin anterolateral thigh perforator flaps. This particular type of reconstruction needs thin, small flap coverage with a reliable blood supply from a long vascular pedicle. Microdissection of the perforator enables the distribution of vessels towards the thin layer of adipose tissue to be identified and the vessel in the deep adipose layer to be used as an additional pedicle vessel. Therefore, a small and thin flap can be elevated accurately with a longer vascular pedicle than is possible with the conventional method of flap elevation.

In skin defects of the hand caused by a crushing trauma or release of scar contracture, deep anatomical structures such as the bone, joint, tendon, and muscle are inevitably exposed. At the same time, these defects tend to be partial and small in size. Therefore, it is necessary to prepare a small and well-vascularised thin flap transfer for restoration of the injured hand. Microdissected thin anterolateral thigh perforator flaps[1,2] have become one of the most appropriate options for this purpose.

Operative procedure

Preoperative examination of the perforators with a Doppler probe on the lateral and anterior thigh area is advisable. To find the perforator of the anterolateral thigh flap, a selective area referenced to surface anatomical landmarks is useful: approximately 10 cm around the mid-point on the line between the anterior superior iliac spine and the lateral side of the patella.

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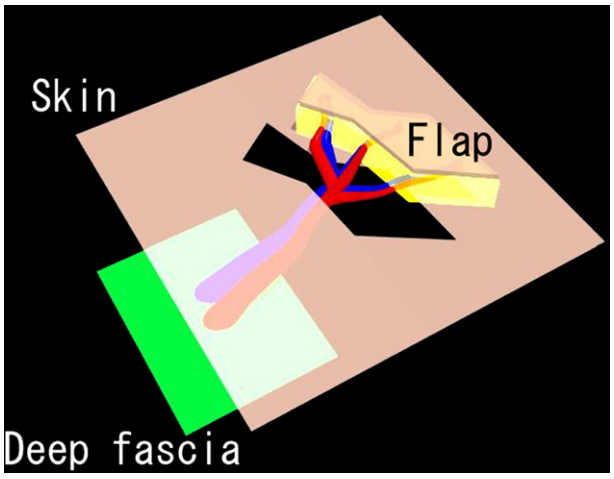

Figure 1 Diagram of the flap elevation after microdissection.

At first, an incision is made longitudinally, approximately 10 cm medial to the point of detection of the perforator, and then a suprafascial dissection is carried out until the perforator is identified. This is followed by microdissection, which represents intra-adipose dissection and exposure of the vessels, towards the thin adipose layer with a thickness of approximately 3 to 4 mm to expose the branches of the perforator in the deep adipose tissue. Subsequently, the insertion points of these branches to the thin layer are marked correctly from the skin side, and an outline of the necessary flap is designed on the skin based on consideration of these marks (Figure 1).

These particular processes take approximately 1 h; however, they enable a very small and thin flap to be produced on the basis of a certain blood flow. After additional proximal dissection of the pedicle from the initial incision, the designed thin flap is elevated at a stretch leaving deep adipose tissue behind the flap.

Generally, the donor site of the flap can be closed primarily as well as the initial incision for the dissection.

Patients and results

Five cases of skin defects of the hand, whose aetiologies were traumas, were the subjects of treatment. A solitary defect of the finger and the thumb was excluded. Three cases were defects on the palmer side and the others were dorsal skin defects of the hand (Table 1). Among these, three cases were primary skin defects and two cases were secondary skin defects occurring after the release of scar contractures. Five microdissected thin anterolateral thigh (MDALT) flaps measuring from 3×8 cm to 9×13 cm were transferred to the defect. An averaged pedicle length of the prepared flap was 11.4 cm, ranging from 8 to 14 cm. All the recipient vessels were the radial artery and radial cutaneous veins, and two cases of anastomosis were performed at the anatomical snuff box in end-to-end fashion, and others were performed at the flexor side of the wrist joint in end-to-side fashion. The postoperative course of all flap transfers was uneventful, and acceptable results were obtained without secondary operative procedures.

Case report

Two typical cases of a traumatic skin defect and a secondary skin defect after releasing a scar contracture are presented.

Case 2

A 45-year-old man had a traumatic skin loss of the dorsum of the right hand with exposure of the crushed metacarpophalangeal joint of the ring finger. To restore his total hand function, an MDALT flap measuring 5×8 cm with a distally extended descending branch of the lateral circumflex

Table 1 Patients summary

Patient	Age/Sex	Aetiology	Defect	Length of the pedicle	Size of the flap	Recipient vessel/ anastomosis (anastomosis site)	Follow up
Case 1	34/M	Traumatic skin defect	Multiple laceration of the skin and tendons on the flexorside of the wrist joint	8 cm	8×4	Radial artery/end to side. Cutaneous vein/end to end (Wrist joint)	1 year
Case 2	26/M	Traumatic skin defect	Skin defect on the 2nd and 3rd metacarpal head with exposure of the extensor tendon	13 cm	9×13	Radial artery/end to end. Cutaneous vein/end to end. (Anatomical snuff box)	2 years
Case 3	45/M	Traumatic skin defect	Skin defect on the dorsum of the 3rd and 4th metacarpus with 4th MP joint defect	10 cm	5×8	Radial artery/end to end. Cutaneous vein/end to end. (Anatomical snuff box)	1.5 years
Case 4	33/M	Scar contracture	Scar contracture on the 1st and 2nd metacarpal area of the palm	12 cm	4×8	Radial artery/end to side. Cutaneous vein/end to end (Wrist joint)	1.5 years
Case 5	25/M	Scar contracture	Sever flexor contracture of the middle finger	14 cm	3×8	Radial artery/end to side. Cutaneous vein/end to end (Wrist joint)	1 year