

Abdominal Pedicle Flaps To The Hand And Forearm



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Chapter Nine: THE OPEN ABDOMINAL FLAP

The open or standard abdominal flap is frequently used to cover large areas on the hand and upper extremity. We try to incorporate axial vessels into the flap and leave the flap thick except where it is applied to the recipient site. The raw surface of the flap is best lined with a split thickness skin graft. The donor site on the abdomen is usually covered with a split thickness skin graft either permanently or temporarily. Frequently the portion of the flap not required on the reconstruction can be replaced back onto the abdomen and the split thickness skin graft removed.

EXAMPLES OF HAND RECONSTRUCTION USING OPEN DIRECT FLAPS Case No. 1:

This case is an example of a flap with storage of additional tissue "banked" at the end or side borders of the flap. The skin is stored in a roll or tube of skin over the MP joints to later replace burn scar contractures on the dorsum of the fingers. After detachment of the flap it is possible to extend this skin down over the digits to cover them. It is very important to retain all or most of the fat in the stored tubed skin when used in this manner otherwise the skin contracts and the surface area is decreased. A 16-year-old boy sustained deep burns of the left upper extremity which were covered with split thickness skin grafts elsewhere. When seen about six months later, there was a heavy burn scar contracture with hyperextension of the MP joints and flexion contractures of the PIP joints of the index, along, ring and little fingers (see photos 9.1A, 9.1B).



Photo 9.1A



Photo 9.1B

Stage I. The burn scar and skin graft of the dorsum of the left-hand and distal forearm were excised with W's at the radial border. Today these W's would be equilateral triangles approximately 2 cm on each side. The excision was down to the plane of the extensor tendons. And internal bayonet shaped Kirschner wire spreader was placed between the thumb and index metacarpals to abduct the thumb. The pattern of the proposed flap was laid out on paper (see photo 9.1C). Today I would use clear plastic sheeting. The W's of the flap are designed to match those on the recipient site exactly. The flap measured 18 cm by 15 cm and the stem included both superficial inferior epigastric vessels.



Photo 9.1C

A split thickness skin graft was used to close the donor site (see photo 9.1D). A heavy Kirschner wire was used to hold the forearm in neutral position and as suspension for the flap. The excess skin stored on the distal border of the flap can be seen as a roll (see photo 9.E). This portion of the flap was left thick and not defatted.



Photo 9.1D



Photo 9.1E

Stage II. Three weeks later the abdominal flap was detached and inserted along the all or border of the hand and forearm with W' s and small drains were inserted. In later cases I would make those W' s more exaggerated and deeper (see photo 9.1F).



Photo 9.1F

Stage III. One month later scar was excised from the dorsum of the fingers and MP joints (see photo 9.1G). Capsulotomy of the MP joints was performed with excision of the ulnar collateral ligaments placing the MP joints and flexion and holding them with Kirschner wires. Kirschner wires were also used across the PIP joints to maintain these joints in extension. Next the tube of skin was opened, defatted and sutured into place.



Photo 9.1G

Several additional stages of surgery followed to fuse the PIP joints, reconstruct the web spaces and remove orthopedic hardware. The postop appearance and function were excellent. Photos are shown 2 years postop



(see photos 9.1H, I, J).

Photo 9.1H



Photo 9.1I



Photo 9.1J

Chapter Nine: THE OPEN ABDOMINAL FLAP

EXAMPLES OF HAND RECONSTRUCTION USING OPEN DIRECT FLAPS Case No. 2:

This is an example of an abdominal flap that is eventually "delayed" to carry more tissue onto the recipient site. This is a 16-year-old boy who suffered fractures and soft tissue injuries to the forearm (see photo 9.2A)



Photo 9.2A

He was treated by the orthopedic surgeon with open reduction and split thickness skin grafts. One year after the accident there were multiple flexor tendons adhering to the graft and limiting range of motion. We elected to use a flap to release the inherent muscle and tendons and to fill the soft tissue defect. (see photos 9.2B, C)



Photo 9.2B



Photo 9.2C

Stage I. A. plastic sheet pattern was designed over the left upper abdomen with w' s at the inferior border and along the elbow side of the flap (see photo 9.2D). The flap was raised based superiorly measuring 19 cm wide by 10 cm long. A split thickness skin graft was used to close the donor site (see photo case 9.2E)



Photo 9.2D

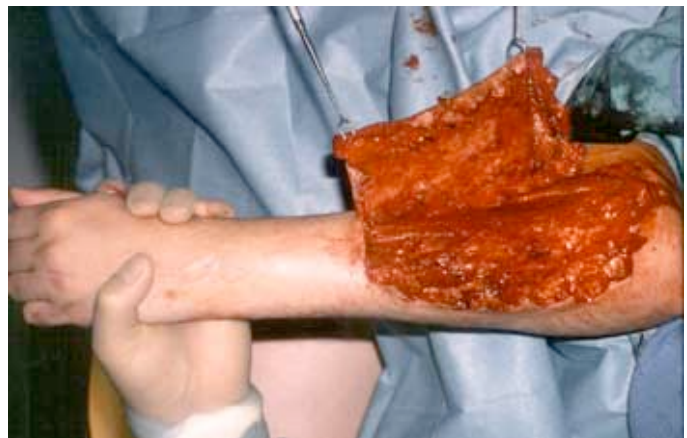


Photo 9.2E

Stage II. Primary delay. Three weeks later. The previously designed plastic sheet pattern of the proposed pedicle was laid over the stem of the flap to determine the amount of flap that would need to be carried. The delay divided two-thirds of the flap, one-third on each side (see drawing No. 9.1 and photo 9.2F)

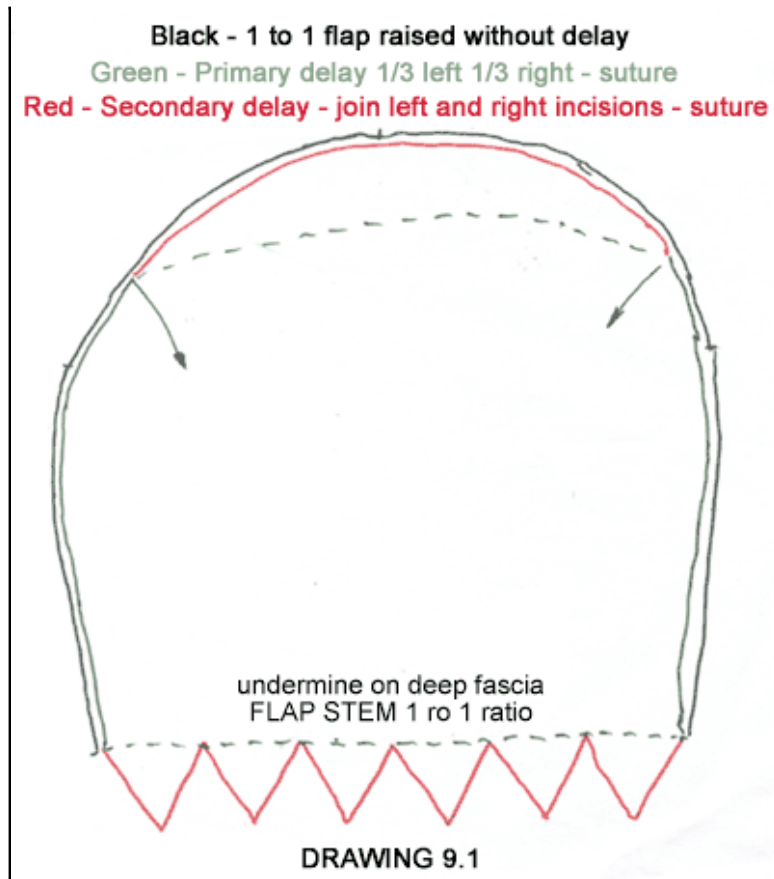


Photo 9.2F

Stage III. Secondary delay. 10 days later. The final one-third is divided. Stage IV. Three weeks following the secondary delay, the remainder of the flap is elevated, defatted and inset using the pattern in the closure. (see photo 9.2G).



Photo 9.2G

The patient went on to develop a full range of motion without restriction and the postop photo of the flap is noted (see photo 9.2H).



Photo 9.2H

Chapter Nine: THE OPEN ABDOMINAL FLAP

EXAMPLES OF HAND RECONSTRUCTION USING OPEN DIRECT FLAPS Case No. 3:

This case is an example of the exaggerated, relatively deep W incisions that were used on my later flaps. Besides allowing more flexibility, these deep W edges provide increased length for additional capillary bridging and therefore better blood supply in the flap. While not the case in this particular flap, I believe that this allows more tissue with better blood supply to be carried if needed for additional areas to be covered in later procedures. This case also illustrates the use of Scarpa's fascia to interpose between repaired tendons and underlying bone.

A 17-year-old boy was seen after an industrial grinder accident that lacerated all of his extensor tendons, deeply abraded the bones, and resulted in significant dorsal skin loss (see photo 9.3A).



Photo 9.3A

Stage I The wound was excised with deep W's and a pattern was created. The tendons were repaired (see photos 9.3B,C, D).



Photo 9.3B



Photo 9.3C



Photo 9.3D

The flap was based on the superficial inferior epigastric vessels and measured 15 cm long by 6 cm in width. The fat tissue deep to Scarpa's fascia was excised. Scarpa's fashion was then elevated on a plane keeping the stem of the fascial flap intact. The skin superficial to Scarpa's fashion was then thinned down to the subdermal plexus. The donor site was closed primarily (see photos 9.3E, F).



Photo 9.3E

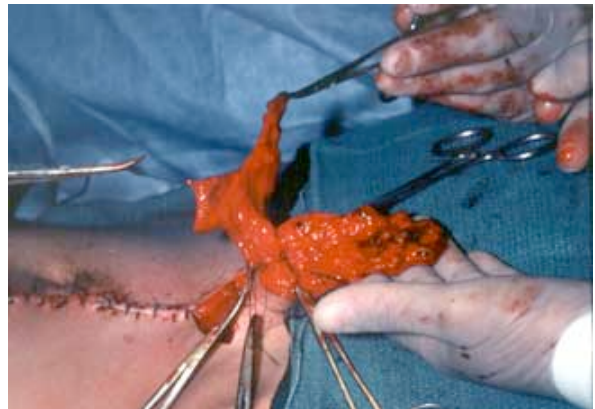


Photo 9.3F

Stage II Three weeks later the flap was divided and inserted into the ulnar side of the hand (see photo 9.3G).



Photo 9.3H

Eight weeks following the injury he has excellent range of motion although I would judge at this time that the flap is just a little fat (see photos 9.3H, I)



Photo 9.3I