REVERSE DIGITAL ARTERY ISLAND FLAP FOR FINGER-TIP DEFECTS

S Raja Sabapathy, S Suresh Babu and Anil K Agarwal
Hand & Reconstructive Microsurgery Unit, Ganga Hospital, Coimbatore

SUMMARY: Five finger-tip amputations and two fingers with pulp-loss were covered with reverse digital artery island flaps from the same finger. The flap was successful in all cases and provided cosmetically and functionally acceptable results. One patient had venous congestion, but the flap survived. This flap would be particularly useful when the nature of injury precludes the use of local advancement flaps and cross-finger flaps.

INTRODUCTION

Soft-tissue coverage of the finger-tip requires stable and sensate skin. When the nature of the defect demands a flap, straight or oblique advancement flaps of volar skin or cross finger flaps are commonly used. Advancement flaps are mainly applicable when the defect is either transverse or dorsal oblique, while cross finger flaps are preferred for volar oblique defects exposing tendon or bone. The cross finger flap has the disadvantage of improper colour match and of being a two-stage procedure. An island of volar skin raised from the base of the finger with one digital artery can be used as a reverse flow flap to cover such finger tip defects.

SURGICAL TECHNIQUE

The defect is measured and it is marked at the base of the finger centering on the course of the digital artery. The less contact side of the finger is chosen. Since the digital artery is to be divided, integrity of the other digital artery is checked by a digital Allen test. The flap is first raised by making incisions on the sides and proximally. The digital neurovascular bundle is identified and the nerve is separated. Artery is then divided after ligation. To prevent the artery from shearing off the flap, a tagging suture is put to the skin. The flap is then raised, carefully separating it from the digital nerve. The distal skin incision is then made to complete the island. By zig zag incisions made up to the defect distal to the flap, the pedicle is dissected. Since digital arteries are not accompanied by veins, this flap for its venous drainage depends on small venules in the subcutaneous tissue. Hence skeletonization of the artery during pedicle dissection must be avoided. The pedicle is dissected up to the middle of the middle phalanx and the flap is shifted to cover the defect. It is important that the pedicle is dissected well so that there is no tension after the inset. The donor site could be closed or covered with a graft. The rest of the wound is directly closed and if there is tension beyond the pivot point, the pedicle is covered with a graft.

ILLUSTRATIVE CASE REPORTS

7 reverse digital artery flaps have been performed and the details are summarized in Table 1. Two cases are illustrated below:

Case No. 1: A 21 year old male sustained a total crush amputation of the tip of his right middle finger when a heavy object fell on the hand. There was loss of most of the pulp and the distal phalanx tuft (Fig 1A). A reverse digital artery flap was raised from the ulnar side of the base of the same digit (Fig 1B). After insetting the flap the secondary defect could be closed directly (Fig 1C). At 7 months follow-up the flap has healed well and the patient uses the digit in all daily activities (Fig 1D).

Case No. 6: A 17 year old saw-mill worker sustained a crush-amputation of the tip of his left middle finger in a lathe machine resulting in pulp-loss and nail-bed injury (Fig 2A). The protruding distal phalanx was trimmed by 2 mm, and a reverse digital artery flap was raised on the ulnar aspect of the base of the same finger (Fig 2B). The wound was debrided, the nail-bed repaired and the flap given inset. The secondary defect was covered with split-skin graft. The flap took well and after nine months shows good colour match as well as contour (Fig 2C & D).