

# The Reverse Cross Finger Flap

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The reverse cross finger flap is usually performed on patients with deep dorsal digital skin, nailbed, and extensor tendon injuries that cannot be repaired and grafted. These patients will require additional dorsal digital flaps from the adjacent fingers. (*J Hand Surg Am.* 2016;41(1):122–128. Copyright © 2016 by the American Society for Surgery of the Hand. All rights reserved.)

**Key words** Cross finger, flap, reconstruction, reverse, subcutaneous.

**T**HE PRINCIPLE OF THE REVERSE subcutaneous tissue transfer was introduced in 1973<sup>1</sup> to cover a heel defect. In 1978<sup>2</sup> this principle was used to cover an exposed distal interphalangeal (IP) joint. Since 1979 this procedure has been used successfully by the current author's practice in many cases of digital injuries with avulsion of full-thickness dorsal skin and extensor tendon injuries, to support skin graft and cover exposed bone, joints, and the nailbed.

The reverse cross finger flap is technically more difficult than the regular cross finger flap.

## INDICATIONS AND CONTRAINDICATIONS

The reverse cross finger flap is indicated in these situations:

1. Reconstruction of an eponychial skinfold and coverage of an exposed extensor tendon near the IP joint
2. Reconstruction of large, full-thickness, sterile matrix nailbed defects with exposed distal phalanx

3. Coverage of a contused, repaired, or grafted extensor tendon denuded of paratenon
4. Boutonniere deformity with poor-quality skin over the proximal interphalangeal (PIP) joint after burn or avulsion injury
5. Full-thickness coverage of complete avulsion of the nailbed, germinal matrix, and surrounding skin of digits. In such an injury of the index finger, the alternative procedure is a cross thumb to index flap.<sup>3</sup>
6. As an elective case to correct a deformity of the digit and apply a reverse cross finger flap

There are no contraindications except extensive dorsal skin loss and injuries to the adjacent digits.

## SURGICAL ANATOMY

Preferred donor areas are the dorsal aspect of the middle and proximal phalanges of the adjacent fingers. Because of the thinness and lack of adequate subcutaneous tissue at the dorsum of the distal IP and PIP joint areas, these regions are not satisfactory, and if possible they should be avoided.

## SURGICAL TECHNIQUE

Axillary block or regional anesthesia and arm tourniquet are preferred, depending on the patient's condition. After routine preparation and draping of the upper extremity, a properly located, sized, and designed flap is marked. This is usually obliquely located at the dorsum of the middle phalanx about 1 cm longer and about 4 to 5 mm wider than the defect. Under loupe magnification, a thin full-thickness skin flap with intact subdermal vascular plexus is elevated based on the

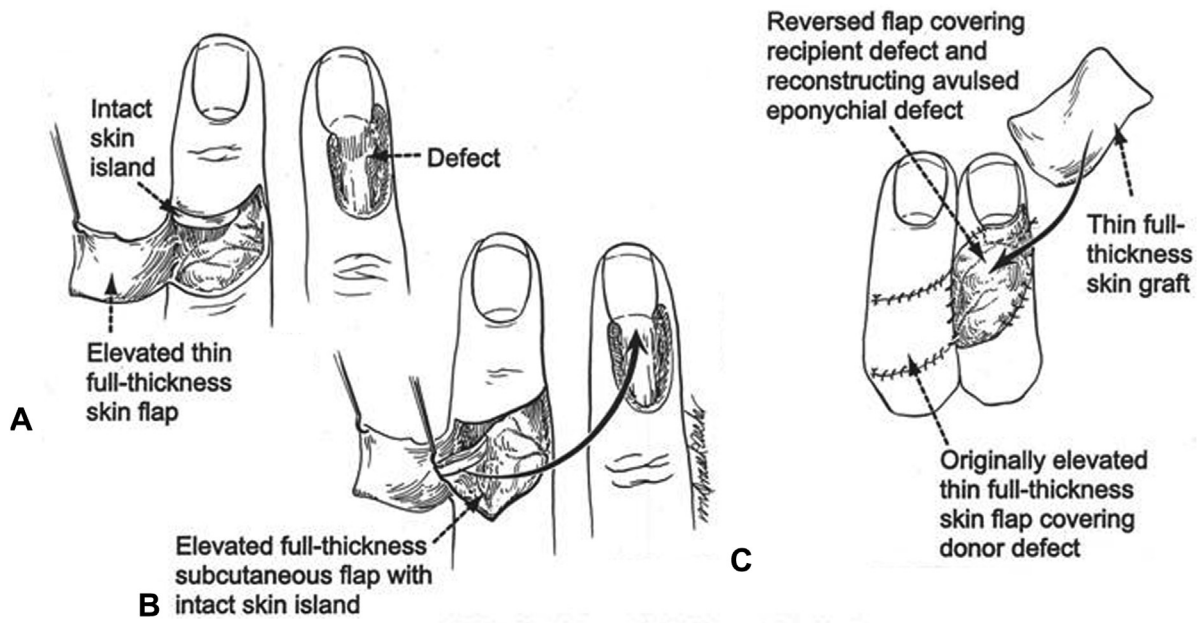
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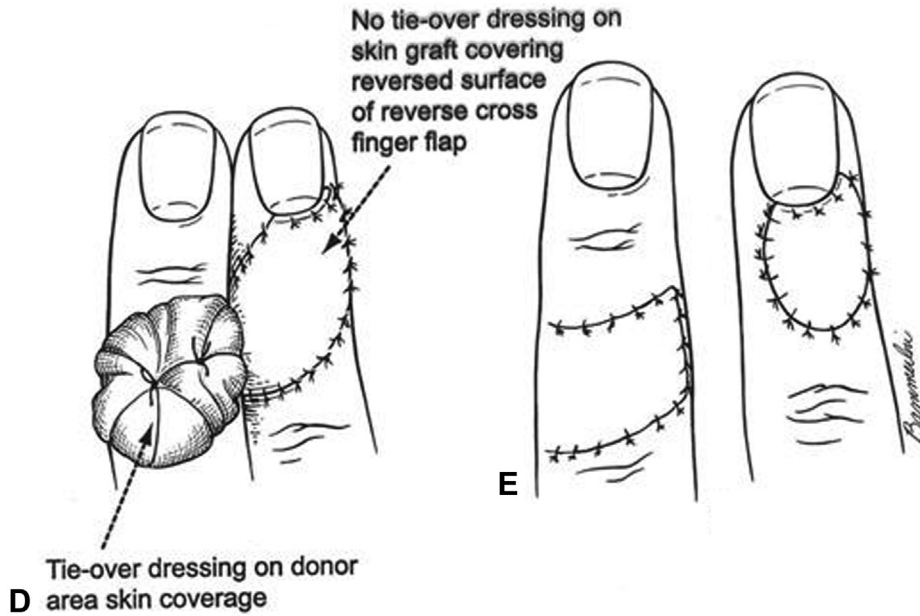
No benefits in any form have been received or will be received related directly or indirectly to the subject of this article.

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**FIGURE 1: A–C** Eponychial skinfold reconstruction and coverage of nail root and exposed extensor tendon with de-epithelialized reverse cross finger flap. After reversing, the preserved small oblique skin island forms the inner surface of the eponychium, as demonstrated in (B). **D** Tie-over dressing on donor skin graft site. There was no tie-over dressing on the skin graft covering the reversed surface of the reverse cross finger flap. **E** Division of flap in 14 days. **F** Reconstruction of eponychial skinfold and coverage of exposed extensor tendon near the distal IP joint. Elevation of thin full-thickness skin flap in the opposite direction. Note the intact small oblique skin island on the dermal flap, which will form the inner surface of the future eponychial skinfold. **G** Reversed subcutaneous flap covering the defect and original full-thickness skin flap on the donor area. **H** Suturing the original skin flap to the donor site and full-thickness skin grafting on the reversed surface of the flap. **I** Tie-over dressing only on the donor area skin graft. There is no tie-over dressing on the recipient site skin graft. **J, K** Normal extension and flexion are demonstrated at 1-year follow-up. Satisfactory coverage is evident. The full nail graft has some deformity owing to germinal matrix injury at the time of the original accident.

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