The homodigital subcutaneous flap for soft tissue coverage of the dorsum of the finger: a case series

Phoebe Hold · Hamid Tehrani · Lore Feldberg

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Dear Sir,

Numerous methods have been described for the coverage of dorsal digital soft tissue loss, although many carry significant disadvantages. Cross-finger flaps require uninjured adjacent digits; pedicled flaps can resurface multiple digits but carry the same disadvantage of inhibiting mobility and encouraging joint stiffness before undergoing further surgery for secondary division. Ipsilateral pedicled flaps, such as the distally based radial forearm flap, contribute significant donor site morbidity, and free flaps have technical and logistical considerations.

We find the thin pliable tissue provided by fascial flaps invaluable in the reconstruction of complex digital injuries [1]. We present three cases of complex hand trauma and our experience of the homodigital subcutaneous turnover flap in providing dorsal digital soft tissue coverage.

Case 1

A 67-year male, who had previously undergone amputation of the little finger, trapped his right dominant hand in the blades of a lawn mower. He sustained a degloving injury to the dorsum of the ring finger, with complex fractures. The middle finger had minor skin loss, precluding a cross-finger flap. Soft tissue coverage was achieved with a homodigital volar subcutaneous turnover flap with split skin graft overlaid (Fig. 1).

Case 2

A 51-year-old hotelier caught his right dominant hand in the blades of a lawn mower. He sustained index, middle and ring finger complex fractures and dorsal soft tissue loss. Middle and ring finger soft tissue cover was achieved with homodigital volar subcutaneous turnover flaps (Figs. 2 and 3).

Case 3

An 18-year-old right-handed painter was involved in a road traffic accident and sustained complex comminuted fractures and dorsal soft tissue loss involving all four fingers. The distal index and middle finger phalanges were unsalvageable and so were terminalised.

Soft tissue coverage of ring and little finger dorsum was achieved using homodigital volar subcutaneous turnover flaps (Fig. 4).

The use of the homodigital subcutaneous flap for coverage of dorsal digital defects was first described in the English literature by Voche and Merle [2]. Volar subcutaneous or fascial tissue is pedicled on a digital vessel and turned over to cover a dorsal digital defect. In their experience, the potential donor site extended from the proximal volar digital crease to the distal volar digital crease. This provided cover for defects encompassing the distal 2/3 of the proximal phalynx to the proximal 3/4 of the middle phalynx. They described the use of the volar flaps in two patients: the first patient had skin and tendon defects following a burn injury to the index and middle fingers and the second had a circular saw amputation injury to the ring finger distal interphalangeal joint with loss of middle

P. Hold (✉) · H. Tehrani · L. Feldberg
Mersey Regional Plastic Surgery and Burn Centre,
Whiston Hospital,
Liverpool L35 5DR, UK
e-mail: fibhold@gmail.com

Figure 1 Case 1. **a** Soft tissue loss to dorsum of digit, post debridement and bony stabilisation. **b** 2-week postoperative with soft tissue coverage achieved with homodigital subcutaneous turnover flap and split skin graft overlaid.

Figure 2 Case 2. **a** X-ray showing comminuted open fractures of index, middle and ring fingers. **b** Raising of skin flap to expose volar subcutaneous tissue. **c** Raising of volar subcutaneous flap away from skin flap.

Figure 3 Case 2 continued. **a** Arrow demonstrates flap being turned over on its digital pedicle. **b** Flap in place over dorsal defect (with previously exposed bone and tendon repair) before skin graft is overlaid.

Figure 4 Case 3. **a** Complex four digit injury; **b** raising a homodigital subcutaneous turnover flap; **c** 2 weeks postoperative with skin graft healed over the flap.

phalynx dorsal skin. Cosmetic and functional outcomes were deemed satisfactory.

Voche and Merle furthered their work with an anatomical injection study of 44 cadaveric digits [3]; vascularisation of the palmar subcutaneous tissue was found to be via palmar branches arising from the digital arteries. There was an average of seven branches (range 4–12) from each side of the digit, with a consistent accompanying venous network confirming the reliability of the flap.

Jeffery and Pickford [4] have since extended the use of this flap to cover more distal defects of the digit; they successfully used the volar turnover flap to cover defects of the distal interphalangeal joint in three cases.

At 6-month follow-up, all three of our patients have retained robust soft tissue coverage of the fingers, with no functional restrictions resulting from the flaps. There are no reports of cold intolerance. Patient 1 was offered arthrodesis of the injured digit for stiffness 6 months post-injury but declined further surgery. Patient 3 underwent minor cosmetic revisions of the skin grafts and excision of spicules of germinal matrix of all four fingers at 6 months. He has full range of movement.

We hope this case series acts as a reminder that Voche and Merle's homodigital subcutaneous flap is a useful tool in the reconstructive surgeons' armamentarium when aiming to achieve adequate coverage and early mobilisation of dorsal digital defects following complex trauma.

Conflict of interest The authors declare that they have no conflict of interest.

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