

Free thenar flap reconstruction of a high-pressure paint injection injury: a case report

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Purpose

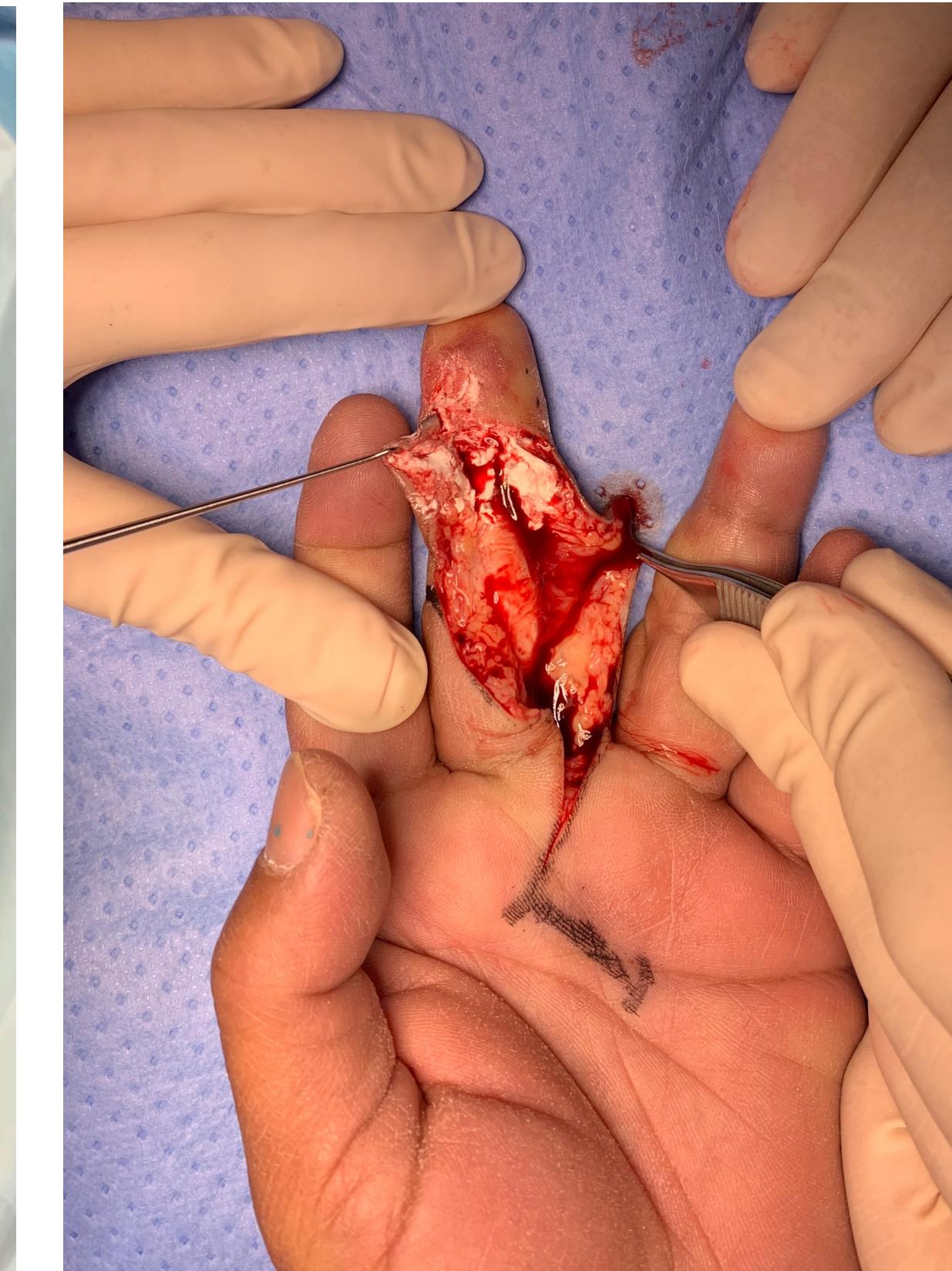
To review the free thenar flap as a functional option in the reconstruction of a defect resulting from debridement of a high-pressure injection (HPI) injury.

Case Report

A 53-year-old right-hand dominant male handyman presented to our emergency department with worsening pain and swelling 48-hours after sustaining a HPI injury to his left middle finger with a water-based paint (see image 1). He was taken to theatre for exploration and debridement that day, and again 24-hours later, with extensive involvement of the pulp and volar skin, with exposed flexor sheath and neurovascular bundles.

Two debridements resulted in a significant soft tissue defect extending from the proximal interphalangeal joint to the fingertip (see images 2 and 3). On the fifth day following the initial injury definitive reconstruction was performed using an ipsilateral free thenar flap anastomosed to the ulnar digital artery and dorsal vein – providing coverage to the entire defect. The donor site was closed with a full-thickness skin graft taken from the ipsilateral volar forearm.

The post-operative course was uneventful and our patient was discharged on day five. On clinical review at three months the patient had returned to work with full range of motion in flexion and preserved fingertip sensation (see image 5 and 6). No revision procedures were required and the patient was satisfied with both the functional and cosmetic outcome of his reconstruction.



Figures 1–4 (clockwise from top left)
Figure 1: Wound to pulp of left middle finger on presentation to hospital at 48 hours post-injury.
Figure 2: Residual white paint visible within flexor sheath and soft tissues at second debridement.
Figure 3: Volar soft tissue defect to middle finger and ipsilateral free thenar flap templated and raised prior to division of vessels.
Figure 4: Flap following anastomosis to recipient vessels.



Discussion

HPI injuries are rare and potential devastating. Treatment invariably requires comprehensive exploration and multiple debridements – resultant soft tissue defects are often significant (1).

First described by Kamei in 1993 for the treatment of two volar defects of the index finger, the free thenar flap is a fasciocutaneous flap based on a consistent superficial palmar branch of the radial artery (2). Since this time, the flap has been highlighted as a useful option for the reconstruction of a variety of hand and digital defects (3). Descriptions of the free thenar flap as an option for reconstructing defects resulting from HPI injuries are scarce in the literature. Lee et al.'s comprehensive review of 125 cases of free thenar flap reconstruction includes only one used to reconstruct a HPI injury (4). Our case adds to this.

The free thenar flap exemplifies the concept of "like-with-like" tissue replacement when considering volar soft tissue defects. This thin flap affords excellent tissue match from both a functional and cosmetic standpoint.

Conclusion

The free thenar flap is an excellent source of glabrous skin for the functional reconstruction of volar finger tissue defects following HPI injury.

References:

1. Engel J, Lin E, Tsar H. Neurovascular island flap reconstruction following high pressure injection injuries of the hand. *Injury*. 1981;13(3):181-4.
2. Kamei K, Ide Y, Kimura T. A new free thenar flap. *Plast Reconstr Surg*. 1993;92(7):1380-4.
3. Sassi P, Lin CH, Lin YT. Fourteen cases of free thenar flap: a rare indication in digital reconstruction. *Ann Plast Surg*. 2008;60(3):260-6.
4. Lee SH, Cheon SJ, Kim YJ. Clinical application of a free radial artery superficial palmar branch flap for soft-tissue reconstruction of digital injuries. *J Hand Surg Eur Vol*. 2017;42(2):151-6.

All images taken and presented with patients' consent.



Figures 5 and 6
Figure 5 (above): flap and donor site on review at three months post-operatively.
Figure 6 (below): image sequence demonstrating range of motion at six months post-operatively.

