

# Microsurgical Soft Tissue and Bone Transfers in Complex Hand Trauma



Roberto Adani, MD<sup>a,\*</sup>, Luigi Tarallo, MD<sup>b</sup>,  
Armando Fonzone Caccese, MD<sup>c</sup>, Luca Delcroix, MD<sup>d</sup>,  
Etienne Cardin-Langlois, MD<sup>a</sup>, Marco Innocenti, MD<sup>d</sup>

## KEYWORDS

- Hand trauma • Microsurgery • Composite tissue loss • Fascioseptocutaneous flap
- Vascularized bone graft • Hand reconstruction

## KEY POINTS

- Debridement of all necrotic tissue is crucial before any attempt at reconstruction.
- If vital structures are exposed, timing of reconstruction is important in planning.
- Preoperative planning should identify an appropriate flap for tissue coverage.
- Cutaneous defect coverage is as follows. Dorsum of the hand (<20 cm<sup>2</sup>): regional pedicle flap (radial forearm flap; posterior interosseous flap; distal ulnar and radial artery perforator flaps). Dorsum of the hand (>20 cm<sup>2</sup>): radial forearm fasciosubcutaneous flap, anterior lateral thigh flap, lateral arm flap, groin flap (pedicle or free), partial muscle flaps (latissimus dorsi or rectus). Palm of the hand: regional pedicle flap for the thenar eminence, and medial plantar flap for the hypothenar eminence and central region.
- For composite defect coverage, tendocutaneous defects are best managed with single-stage reconstruction (tendon grafts in conjunction with pedicle or free flaps, or with composite tendocutaneous flaps). Osteocutaneous defects may be treated with a composite flap (radial osteocutaneous flap or fibular osteoseptocutaneous flap); the choice is made strictly according to the size and location of the defect in the hand.

## INTRODUCTION

The treatment of industrial and vehicular hand trauma remains a challenge for hand surgeons. Complex hand trauma often requires tissue coverage associated with tendon, bone, and joint reconstruction. The introduction of microsurgery has totally modified the surgical approach to this type of injury, allowing for early debridement with immediate, simultaneous reconstruction and soft-tissue coverage. The aim of this article is to

provide guidelines for the surgical approach to complex hand trauma.

## DEBRIDEMENT

Debridement of all necrotic tissue is crucial before any attempt at reconstruction. Many investigators<sup>1–5</sup> recommend early aggressive debridement rather than traditional serial debridement; the concept of waiting for the development of good granulation tissue is confined to the past. As

<sup>a</sup> Department of Hand Surgery and Microsurgery, University Hospital of Verona, Policlinico GB Rossi, Piazzale LA Scuro 10, Verona 37126, Italy; <sup>b</sup> Department of Orthopedic Surgery, University of Modena and Reggio Emilia, Policlinico, Largo del Pozzo 71, Modena 41100, Italy; <sup>c</sup> Department of Hand Surgery, Ospedale dei Pellegrini, Via Portamedina alla Pignasecca 41, Naples 80134, Italy; <sup>d</sup> Department of Plastic and Microsurgery, Careggi University Hospital, Palagi 1, Florence 50139, Italy

\* Corresponding author. Department of Hand Surgery and Microsurgery, University Hospital Verona, Ospedale GB Rossi, Piazzale LA Scuro 10, Verona, Italy.

*E-mail address:* roberto.adani@ospedaleuniverona.it

granulation tissue forms, distinguishing among tissue layers becomes less clear. Moreover, granulation tissue can become infected, increasing the risk of developing joint stiffness and tendon adhesions. These changes delay early mobilization of the hand, which is fundamental to restoring function.<sup>6</sup> Serial debridement can be considered only in particular circumstances, such as electrical burn injuries or severe crush injuries, and in unstable patients and those with massive wound contamination.<sup>7</sup> In these cases, initially estimating the extent of tissue damage can be difficult.

When edema appears, usually 3 to 4 days after initial injury, all tissues tend to indurate. Muscle, tendon, ligament, and joint are involved in this process, concomitant with the risk of later joint stiffness and tendon adhesions.

Radical debridement is performed under tourniquet control. The authors' principle is to start from outside the injured area to recognize and preserve the important structures (nerves, tendons, vessels). Crushed and contaminated skin, avulsed and mangled tendon, and devascularized muscle must all be excised. The same principle has to be applied to free bony fragments without soft-tissue attachment. When all the devitalized tissues are removed, the tourniquet is released and the

wound is irrigated with antibiotic solution. If necessary, the debridement is continued until every part presents satisfactory bleeding.

The following are 2 examples of injuries to dorsum of the hand treated elsewhere by waiting for granulation tissue to develop, which became more difficult to treat later. A 32-year-old man sustained a severe abrasion injury to the dorsum of the right hand and was referred 8 days after injury. The dorsum of the hand was entirely covered by granulation tissue; on radical debridement there was tendon loss in the middle, ring, and small fingers, and avulsion of the interosseous muscles in the third and fourth metacarpal spaces (**Fig. 1**). The second case concerned a 52-year-old man with a long history of infection localized to the dorsum of the left hand. The suggested management is to remove all the dead or contaminated tissue following the approach proposed by Godina<sup>1,6</sup>: "debridement should be done tumor-like, en bloc wound excision," leaving behind a bed that is ready for immediate coverage (**Fig. 2**).

#### TIMING OF RECONSTRUCTION

Early closure of wounds through the use of tissue transfer was initially introduced at the end of the



**Fig. 1.** Debridement of extensive granulation tissue reveals tendon loss in the middle, ring, and index fingers.

Download English Version:

<https://daneshyari.com/en/article/4108060>

Download Persian Version:

<https://daneshyari.com/article/4108060>

[Daneshyari.com](https://daneshyari.com)