Salvage of an Extensive Degloving Injury of the Forearm-Hand with Orthotopic Free Tissue Transplantation

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LETTER TO THE EDITOR:

Traumatic degloving injuries of the forearm and hand with extensive loss of substance, usually involve exposure of underlying structures (nerves, vessels, tendon, bone), requiring proper coverage for protection and facilitation of future reconstructions. Different techniques have been described. Dermal substitutes (Integra®) are gaining popularity; regional flaps such as groin flap, radial or ulnar forearm flaps, ulnodorsal septocutaneous (Becker), or the posterior interosseous flap are reasonable options for small to medium-sized defects. Different free flaps have also been proposed, including the lateral arm flap, paraescapular flap, dorsalis pedis flap, temporal fascia free flap, medial sural artery perforator flap and anterolateral thigh (ALT) flap [1, 2].

However, in the presence of an extensive degloving injury of the forearm and hand, with associated tendinous or bone lesions, the ideal reconstructive procedure should use forearm/hand like tissue to optimize the aesthetic and functional results.

A 41 year-old female, was victim of a car accident which resulted in a massive degloving injury with severe loss of substance of the forearm and dorsum of the left hand (Fig. 1a and b), associated fractures of the 4th and 5th proximal phalanges, carpal bone loss, as well as loss of the extensor

tendons of the fourth and fifth fingers. She was initially submitted to K-wire fixation of proximal phalangeal fractures, extensor indicis proprius transfer for the 4th and 5th fingers and soft tissue repair. After 2 weeks, she underwent reconstruction with a free contralateral radial forearm flap designed to exactly match the recipient defect, incorporating the palmaris longus muscle (for additional tendon reconstruction); microsurgical anastomosis were performed to the radial artery and cephalic vein (Fig. 1c).

The postoperative period was uneventful, with total flap viability, satisfactory healing of the donor area and good adaptation to the defect. The patient was discharged on the 68th postoperative day after completing a daily rehabilitation program. After 5 years, a good aesthetic and functional result was observed; she still retains some extension limitation of the ring finger in relation to the injury severity (Fig. 1d). Her DASH score-Disabilities of the Arm, Shoulder, and Hand Questionnaire is 59 (It ranges from 0- no disability, to 100- most severe disability). She is very satisfied with the functional results as she previously thought that her forearm would be amputated, and doesn't complain about the receptor/donor site appearance and scarring.

Microsurgical free tissue transfer has changed the reconstructive paradigm from simply "filling the defect" to reconstructive refinement to provide the best results [3, 4]. An orthotopic free tissue transplantation is a simple and versatile option for the reconstruction of an extensive loss of substance of the hand and forearm, due to the existing anatomical and functional similarity, comprising a thin flap with reduced adiposity and elastic/sliding properties. In addition to the consistent vascular anatomy and the possibility of including tendon/bone, the large anatomic boundaries of this flap can involve practically the entire volar surface and ulnodorsal forearm. It

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Fig. 1 **a** Severe degloving injury of the forearm and hand (lateral view). **b** Dorsoulnar view: extensive tendon and bone exposure. **c** Harvesting of an extended contralateral flap. **d** Good aesthetic and functional result after 5 years

also enables two surgical teams to work simultaneously, which are basic prerequisites for the reconstruction of extensive degloving injuries.

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

Ethical Approval All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Informed Consent Informed consent was obtained from all individual participants included in the study.

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