

Replantation

Current Concepts and Outcomes



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KEYWORDS

• Replantation • Outcomes • Amputation

KEY POINTS

- Good outcomes (function, appearance, and patient satisfaction) in replantation are achievable with well-accepted techniques.
- The best outcomes are seen at high-volume, specialized centers with experience in replantation.
- To increase the likelihood that good outcomes will be achieved, regionalization of replantation care may need to be considered.
- To determine the most cost-effective treatment, more comparative studies of replantation and revision amputation need to be done.
- Although indications and contraindications for replantation are largely agreed on, the decision is shared between surgeon and patient. Anticipated function, costs, hospital stay, length of procedure, and time off from work should all be considered.

INTRODUCTION

Over the last 50 years, advances in microsurgical technique, bone fixation, nerve repair, and tendon repair have allowed salvage of amputated digits, hands, and limbs that would not have been possible in a previous era. Even in the earliest reports of these emerging and useful techniques, reconstructive microsurgeons stressed the importance of critically assessing function when examining outcomes.^{1,2} Simply considering survival of the replanted part is insufficient in determining the outcome and whether the combined efforts of surgeon, patient, and therapist are worth it. Range of motion, sensory recovery, and patient satisfaction all contribute to the overall outcome after replantation and should be evaluated, not just considering the successful reestablishment of blood flow and digit viability. Mechanism of injury (sharp, crush, or avulsion), level of injury

(tip, relation to flexor digitorum superficialis, proximal interphalangeal joint involvement), and skill of the surgeon are all recognized as playing important roles in the overall outcome and function of replanted digits.¹⁻⁴ Financial pressures are having an increasingly large impact on discussions regarding outcomes after replantation because of the costs of the procedures and time off from work for the patient. Evidence-based outcomes and cost accountability may lead to regionalization of hand trauma care, with patients being sent to centers with the highest volume and best outcomes.

This article reviews replantation of digits and addresses:

- Indications
- Accepted techniques and recent refinements (before, during, and after surgery)
- Outcomes after replantation
- New directions

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INDICATIONS AND CONTRAINDICATIONS

In deciding whether to reattach an amputated part, perhaps the most important step in the decision-making process is the discussion between the surgeon and patient about the time invested in treatment and rehabilitation, anticipated functional use, possible secondary procedures, and realistic expectations after a traumatic hand injury. The mechanism of injury, the level of injury, which digit is involved, patient occupation, time off from work, commitment to therapy, and accessibility to

therapy are important in deciding whether to replant or perform a revision amputation.

The most commonly accepted indications for replantation are thumb, digit in child, multiple digits (**Fig. 1**), and distal to the flexor digitorum superficialis tendon insertion (**Table 1**). There is disagreement with regard to the level of amputation, with some surgeons advocating revision amputation if the level is proximal to the flexor digitorum superficialis tendon insertion,² whereas others have shown good functional outcomes with replantation at more proximal levels and



Fig. 1. (A) Amputation of multiple digits. (B) Successful replantation of thumb and multiple digits. (C) Restoration of grasp after replantation.

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