

# Replantation Surgery

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The current concepts of replantation surgery, a procedure that has been practiced for half a century, can be discussed in terms of patients' demands and expectations, present indications for the procedure, available evidence that influences decision making, and technical refinements practiced to produce better outcomes. (*J Hand Surg* 2011;36A:1104–1110. Copyright © 2011 by the American Society for Surgery of the Hand. All rights reserved.)

**Key words** Replantation, upper limb, current concepts.



## PATIENT DEMANDS AND EXPECTATIONS: CURRENT STATUS

When replantation surgery began, the surgeon guided the patient in decision making. Fifty years later, patients' desire for replantation and the role of the surgeon in guiding the patient in the decision-making process remain unchanged. The skills of the surgical team, the infrastructure available, and the surgeon's experience affect outcomes in replantation. Half a century of collective experience has provided today's hand surgeon with enough evidence to guide the decision-making process. Technical refinements have made it easier to obtain a better outcome with replantation.

## INDICATIONS FOR REPLANTATION

### Distal amputations

The decision to replant is based on the determination that the anticipated function and overall well-being of the patient after replantation will be better than that after a revision amputation.

The indication for digital replantation appears to be expanding. Traditionally, replantation is recom-

mended for amputation of the thumb at all levels, multiple digits, amputations in children, and single finger amputations distal to the flexor digitorum superficialis insertion.<sup>1</sup> Although conventional wisdom is against single finger replantation (especially the index finger), in a study of 28 isolated index finger replants and revascularizations, Buntic et al<sup>2</sup> found that the total active range of motion was 170° for zone I injuries (as per flexor tendon level) and 133° for zone II injuries, with a mean of 153°. The total active range of motion in zone II injuries falls within the good to fair category and is comparable to isolated zone II flexor tendon repairs. These results, coupled with high levels of patient satisfaction, including no patient report of the finger getting in the way or request for secondary amputation, call for a reappraisal of conventional indications.<sup>2</sup>

High success and patient satisfaction rates in fingertip replantation have been reported from many centers in the east. Hahn and Jung<sup>3</sup> reported their experience of 510 replantations of amputated fingertips distal to the nail base in 450 patients done over a 15-year period. The survival rate was as high as 92% when both artery and vein anastomosis was done, with prompt wound healing, good sensibility, a painless scar, satisfactory appearance, and early return to activity. Similar good outcome and high success rates have been reported in many series.<sup>4–6</sup> Even in avulsion injuries, several recent series provide good outcome, including ring avulsion injuries.<sup>7,8</sup>

Cost-benefit analyses of performing replantation versus shortening and closure of the amputation stump, patient satisfaction levels, and the incidence

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