CHAPTER
# 172

# Reconstructive Surgery of Individual Digits (Excluding Thumb)

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Fingers enable us to interact with our environment—to touch it, to sense it, to hold it, and to manipulate it in a uniquely human way. As a direct extension of our forebrain, fingers are the organs through which our thoughts and intentions are actualized. They are the terminal actuators and sensors of a complex upper extremity neuromuscular apparatus upon which they critically depend for motoring and positioning. When digits lose function, the entire upper extremity becomes ineffectual. The hand is also a vital part of our social interactions and the only uncovered part of our self that is constantly exposed to our own sight. Injuries and deformities of the hand are therefore compounded by our own sense of aesthetics and self-image and in many ways affect our social functioning.

Fingers are our most exposed appendages and the most susceptible to injury. In today's society, industrial, construction, firearms, and motor vehicle accidents are the most common cause of severe mangling injuries of the digits.[1-4] In dealing with severely injured fingers, the first and most complex decision the surgeon has to make is whether to attempt salvage and to embark on a potentially lengthy reconstruction path, or to proceed with an early amputation.[5,6] This is a difficult process that must take into account multiple factors with neither exact nor perfect guidelines. Any decision needs to be highly individualized and must take into account the patient, his needs, his wishes, and his motivation; the injury; and the surgeon's technical ability to deliver an acceptable result (Table 172-1).[5,7]

The only absolute indication for an immediate amputation after trauma is the inability to restore perfusion. For the fingers that are technically amenable to revascularization, the surgeon cannot be too patronizing. He has to educate the patient about the prospect of salvage, and it is up to the informed patient to make the ultimate decision. In many situations, the patients refuse to burn any bridges and request that the surgeon proceed with the reconstruction, realizing that if the functional result is poor, an amputation can be performed at a later date.

The goal of reconstruction is an aligned digit, free of pain, with adequate coverage and sensation and a functional range of motion. Compromise, however, is the norm. For instance, even if ideal motion is not likely to occur after reconstruction in severe and multidigital injuries, a "flexor hinge" digital function with painless metacarpophalangeal (MCP) joint motion might be useful.[8-12]

The more advanced the degree of injury and the extent of tissue damage in a digit, the worse the prognosis.[13] McCormack,[14] in 1959 (before microsurgery and replantation), described some early but still useful guidelines. Since fingers have five systems (integument, vasculature, nerves, tendons, bones and joints), he found that simultaneous and segmental damage to three or more of these components may be a strong indicator for early digital amputation in severely injured hands. Severity injury scores designed for the lower extremity correlate with outcome and have proved their usefulness.[15-17] However, severity scores designed for the upper extremity, such as the Hand Injury Severity Score[18] and others,[19] have tended to confirm McCormack's observations but have not proved to be very useful (Table 172-2).[6,14]

Crushed, devitalized tissue must be excised.[20] Contamination requires more extensive débridement. However, no matter what procedures are necessary to reconstruct a digit, it is important to apply the concept