Current Reconstruction Options for Traumatic Thumb Loss

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Continuing Medical Education

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Disclosures for this Article

Editors

David T. Netscher, MD, has no relevant conflicts of interest to disclose.

Authors

All authors of this journal-based CME activity have no relevant conflicts of interest to disclose. In the printed or PDF version of this article, author affiliations can be found at the bottom of the first page.

Planners

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Learning Objectives

Upon completion of this CME activity, the learner should achieve an understanding of:

- Classification of traumatic thumb defects
- Potential reconstructive options at each thumb level of amputation
- Osteoplastic thumb reconstruction with pedicle flaps
- Nuances of toe-to-thumb transfer
- Role of soft tissue free flaps

Deadline: Each examination purchased in 2016 must be completed by January 31, 2017, to be eligible for CME. A certificate will be issued upon completion of the activity. Estimated time to complete each JHS CME activity is up to one hour.

Traumatic loss of a thumb results in notable functional impairment. Multiple reconstructive procedures have been described to address these deficits. Compared with no reconstruction, any procedure is of benefit. However, each of the described methods offers subtle benefits and downsides and may be more applicable in certain situations. We present a review of current reconstructive options for traumatic thumb amputation in 2016. *(J Hand Surg Am. 2016;41(12):1159–1169. Copyright © 2016 by the American Society for Surgery of the Hand. All rights reserved.)*

Key words Thumb, amputation, traumatic loss, reconstruction.

Additional Material at jhandsurg.org

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The thumb has a role in approximately 40% of hand function[1]; traumatic loss therefore results in considerable functional impairment. Between 2007 and 2010, 3,341 traumatic thumb amputations were reported in the United States.[2] These injuries predominantly occur in working-aged men and most often result from machinery accidents.

GOALS AND PRINCIPLES OF SURGERY

A reconstructed thumb ideally would: (1) have adequate length; (2) have a sensate, nontender tip; (3) have stability; and (4) be positioned to meet the other digits, with an adequate first web space. Simply put, when reconstructing a thumb, we need to have a sensate stable post that is offset from the other digits but that still can oppose them.

Littler[3] analyzed these attributes and believed that although all of them are important, strategic positioning of the thumb is the key factor to achieving optimal function. Emphasizing this, he stated, "It is not the full length of the thumb, nor its great strength and movement, but rather its strategic position relative to the fingers and the integrity of the specialized terminal pulp tissue which determines prehensile status."

The reconstruction should be cosmetically acceptable and have minimal donor site morbidity.

Classifications

Several classification systems exist for traumatic thumb amputations. Lister[4] divided thumb defects into 4 groups: (1) acceptable length with poor soft tissue coverage, (2) subtotal amputation with questionable remaining length, (3) total amputation with preservation of the basal joint, and (4) total amputation with loss of the basal joint.

Group 1: Amputation at or distal to the interphalangeal (IP) joint rarely results in a functional deficit and is termed a compensated amputation. These cases require a sensate and supple tip, which can be provided by glabrous and nonglabrous skin flaps. Glabrous flaps include Moberg, VY advancement, neurovascular island (Littler), and a free toe pulp transfer. Nonglabrous skin flaps include the first dorsal metacarpal artery (FDMA)—Foucher, cross-finger, dorsoulnar—dorsoradial, and distant or free flaps, such as the posterior interosseous artery, reverse radial forearm, free groin flaps.

The Moberg flap is appropriate for volar defects of the distal phalanx. It measures less than 1.5 cm. However, it often requires IP joint flexion, which can be overcome with a VY flap.[a]

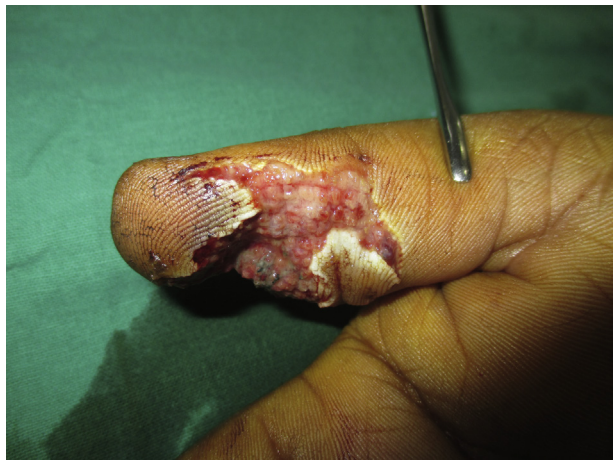

FIGURE 1: Group 1 defect.

FIGURE 2: First dorsal metacarpal artery FDMA flap.

FIGURE 3: Donor site.

The FMDA[b] flap is based on the first dorsal metacarpal artery and can be innervated on the superficial radial nerve; however, it leaves a conspicuous donor site (Figs. 1—3).