Amputations of Fingers and Hand

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Overview

• Basic anatomy
• Goals of amputations
• Fingertip amputations
• Amputations through DIPJ to middle phalanx
• Amputations proximal to FDS insertion
  • Index finger
  • Central digits
• Ray amputations
• Thumb amputations
• Multiple digit amputations
Anatomy
Goals of amputation

• Preserve functional length

• Preserve useful sensibility

• Durable coverage

• Prevention of joint contractures

• Prevention of neuromas

• Early return to work
Fingertip amputations
Fingertip amputations

- Tip amputation without bone exposed

  - **Primary closure**
    - Rapid wound healing
    - Long term tenderness problem (Louis, 1980)

  - **Healing by secondary intention (upto 1 cm²)**
    - Possibly less cold intolerance, hypoesthesia
    - Highest patient satisfaction

  - **Skin graft (split/full)**
    - Sensation problems, fissuring of skin (Holm, 1974)
    - Donor site problems
Fingertip amputations

• Tip amputation with bone exposed

  – **Skeletal shortening + primary closure**
    • Good functional results (Mennen 1993)
    • Length sacrificed,
    • support to nail bed may be lost (hooked nail)

  – **Flap coverage (local/regional)**
    • Length preserved
    • Type of flap depends on orientation of amputation
    • Long term results no better than shortening + closure
    • Donor and recipient site morbidity
A. Pamar view  
B. Lateral view  
C. Close-up of corner stitch  

Remaining nail
'V' incision
DIP crease
Base
Amputated portion
Corner stitch
Corner stitch
Corner stitch

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Amputations through DIPJ and upto FDS insertion

- Skeletal shortening and primary closure (preferred)
  - Phalangeal Condyles contoured/not contoured (Whitaker, 1972)
  - If index finger, tip pinch generally transferred to middle finger so efforts to preserve length not warranted
  - Lumbrical plus finger especially index finger
  - NEVER suture FDP to Extensor to provide padding
QUADRIGA EFFECT
especially seen in ulnar 3 digits as common muscle belly of the 3 FDP tendons
Amputations proximal to FDS insertion

- Index finger
  - Proximal phalangeal stump under control of intrinsics (45° flexion) and doesn’t participate in grasping/pinch
  - Hinders transfer of function to middle finger
  - Even if amputation is through MCPJ, projecting metacarpal head impedes thumb web + nuisance
  - Therefore, consider 2nd ray amputation
What next?
Amputations proximal to FDS insertion

- Middle/Ring fingers
  - Proximal phalangeal stump important so small objects don’t slip through
  - Can shorten and primarily close if enough proximal phalangeal length available
  - Otherwise consider ray amputation +/- metacarpal transposition/transverse inter-metacarpal ligament approximation
Amputations proximal to FDS insertion

• Small finger
  
  – Plays a role in gripping and hooking objects
  
  – In a labourer, amputation at MCP joint more acceptable than ray amputation to preserve a broad palm
  
  – If grip strength not a concern, small finger ray amputation more aesthetic
Ray amputations

- Excision of the metacarpal along with phalanges

- Bases of metacarpals preserved as have tendinous insertions (except 4th)

- Narrower palm $\rightarrow$ weaker grip

- Possibility of non-union after metacarpal transposition
Thumb amputations

- Length important

- Skeletal shortening and closure rarely indicated

- Split skin grafts/advancement flaps (Keim & Grantham, 1969)

- If good proximal phalangeal length present, web space deepening by Z plasty may suffice

- MCPJ level amputation - reconstruction
Multiple digit amputations

• Preserve lengths of any remnants

• Preserve all viable tissue

• 1\textsuperscript{st} and 5\textsuperscript{th} ray lengths are important as hinge action between them promotes prehension

• Consider deepening 1\textsuperscript{st} web space-Z plasty

• ? Rotational osteotomies
Summary
Amputation

Fingertip (distal to FDP)
- No bone exposed
  - 1° closure

Proximal to FDP
- Bone exposed
  - Proximal to FDS
    - Shorten & close
    - Skin graft flaps
  - Distal to FDS
    - Heal by 2° intention

Proximal to FDS
- Flaps
Amputation

- Fingertip (distal to FDP)
- Proximal to FDS
- Proximal to FDP / Distal to FDS
  - Shorten & close
Amputation

- Ray amputation
  - Fingertip (distal to FDP)
  - Index finger
  - Middle / Ring fingers
    - Proximal to FDP / Distal to FDS
    - Preserve phalangeal stump
  - Ray amputation
    - (if amputation at MCPJ / no proximal phalanx length)
  - Proximal to FDS
    - Little finger
      - Preserve MCP (manual worker)
      - Ray amputation (if not)
Thank you?
References


