Amputations of Fingers and Hand

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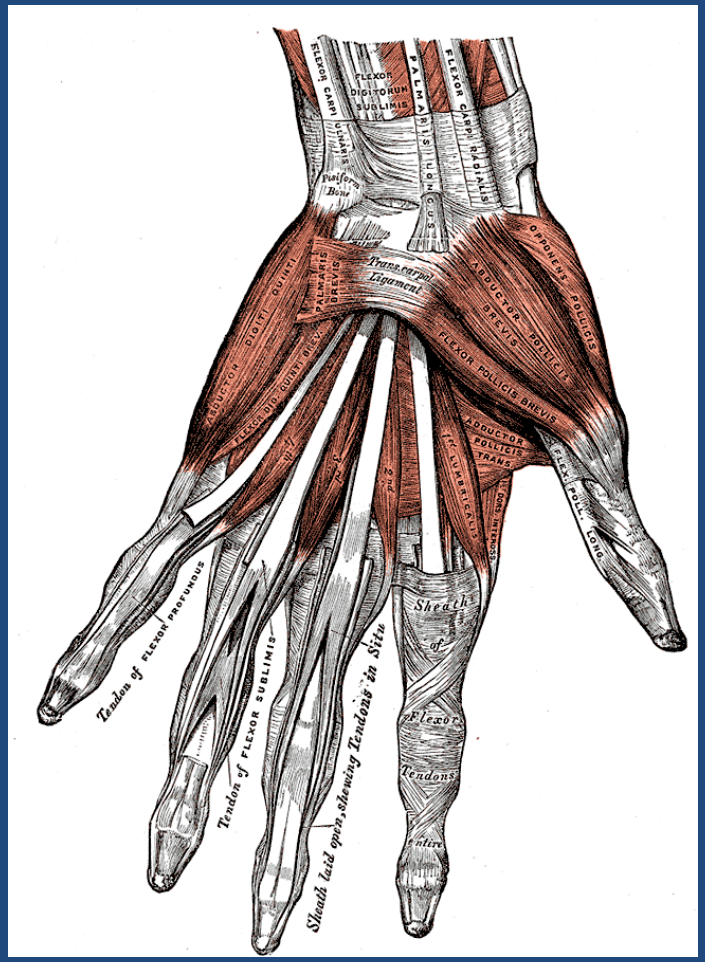
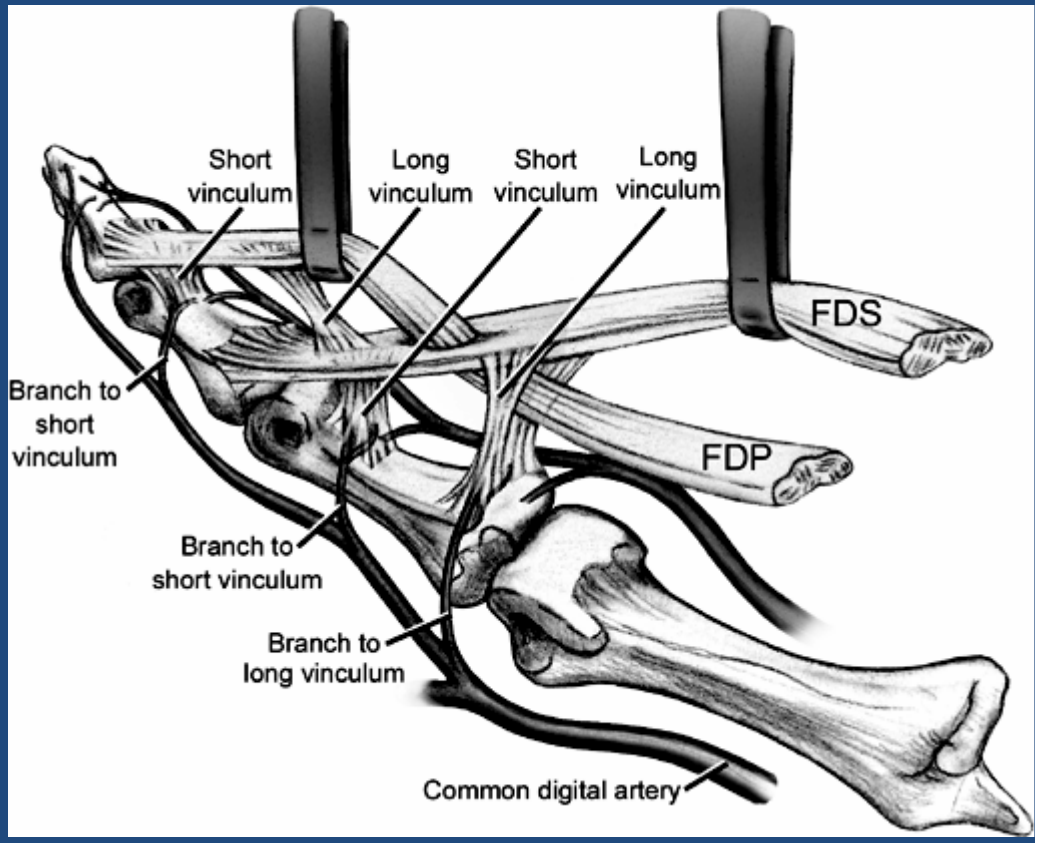
ST5

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


FLEXOR DIGITORUM SUBLIMIS
FLEXOR CARPI RADIALIS
PALMARIS LONGUS
FLEXOR CARPI ULNARIS
Pisiform Bone
Transverse Carpal Ligament
OPPONENS POLLICIS
ABDUCTOR POLLICIS BREVIS
FLEXOR POLLICIS BREVIS
ABDUCTOR POLLICIS LONGUS
Tendon of FLEXOR PROFUNDUS
Tendon of FLEXOR SUBLIMIS
Sheath laid open, showing Tendons in Situ
Sheath of
Flexor Tendons


Short vinculum
Long vinculum
Short vinculum
Long vinculum
FDS
Branch to short vinculum
FDP
Branch to short vinculum
Branch to long vinculum
Common digital artery

Goals of amputation

- Preserve functional length
- Preserve useful sensibility
- Durable coverage
- Prevention of joint contractures
- Prevention of neuromas
- Early return to work

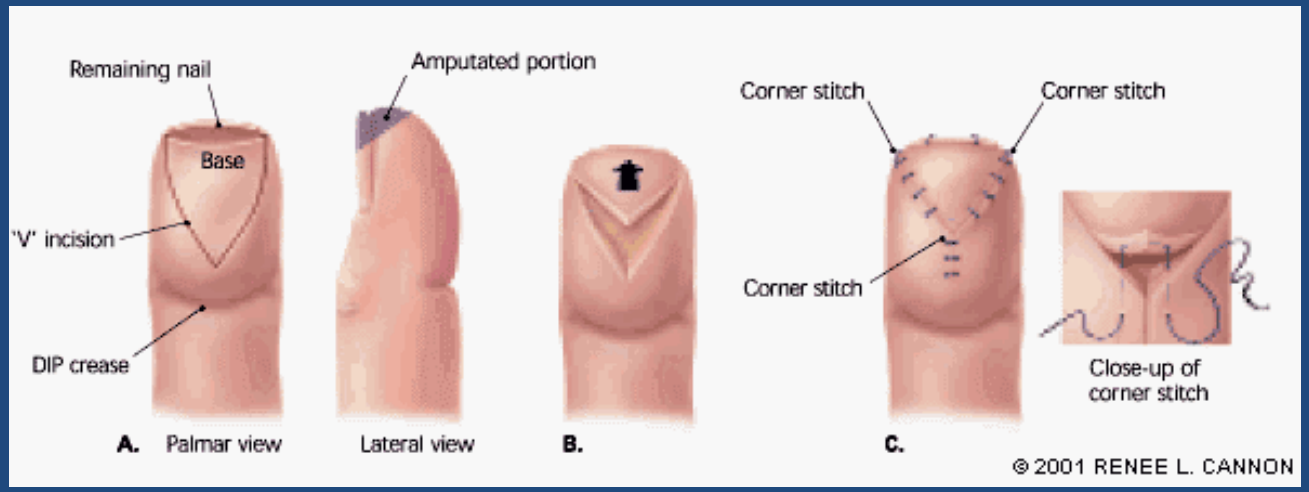
Fingertip amputations

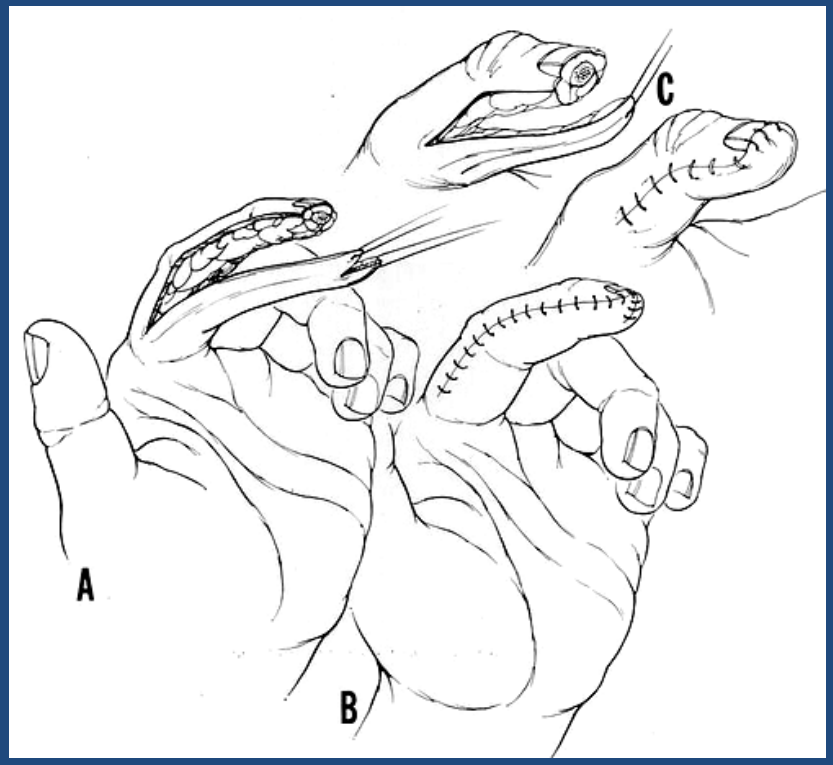
Fingertip amputations

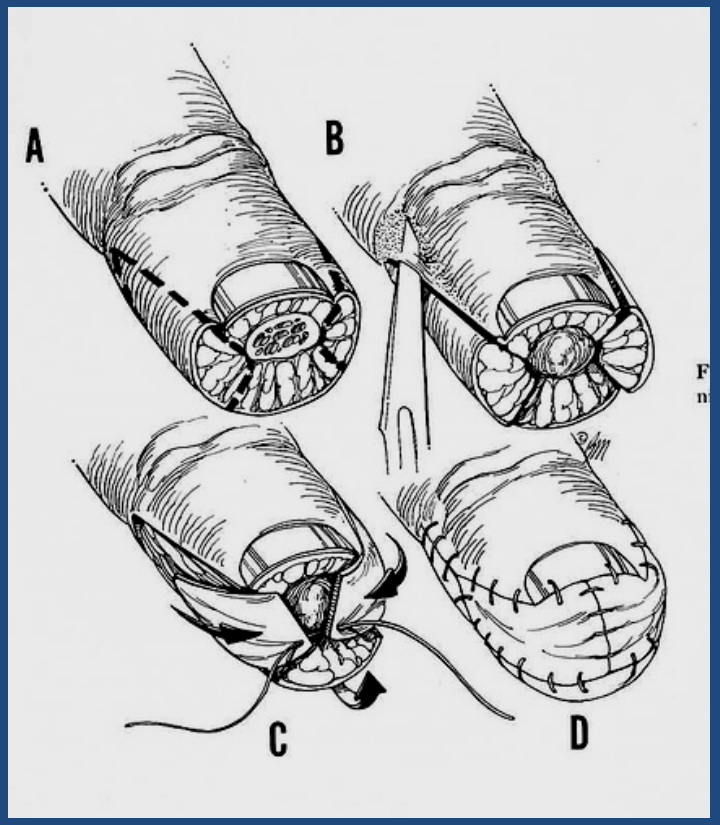
- Tip amputation without bone exposed
  - Primary closure
    - Rapid wound healing
    - Long term tenderness problem (Louis, 1980)
  - Healing by secondary intention (upto 1 cm^2)
    - Possibly less cold intolerance, hypoesthesia
    - Highest patient satisfaction
  - Skin graft (split/full)
    - 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


Remaining nail
Base
'V' incision
DIP crease
Amputated portion
A. Palmar view
Lateral view
B.
Corner stitch
Corner stitch
Corner stitch
Close-up of corner stitch
C.
© 2001 RENEE L. CANNON


A
B
C


A
B
C
D

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

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 4^{th})
- Narrower palm → weaker grip
- Possibility of non- union after metacarpal transposition

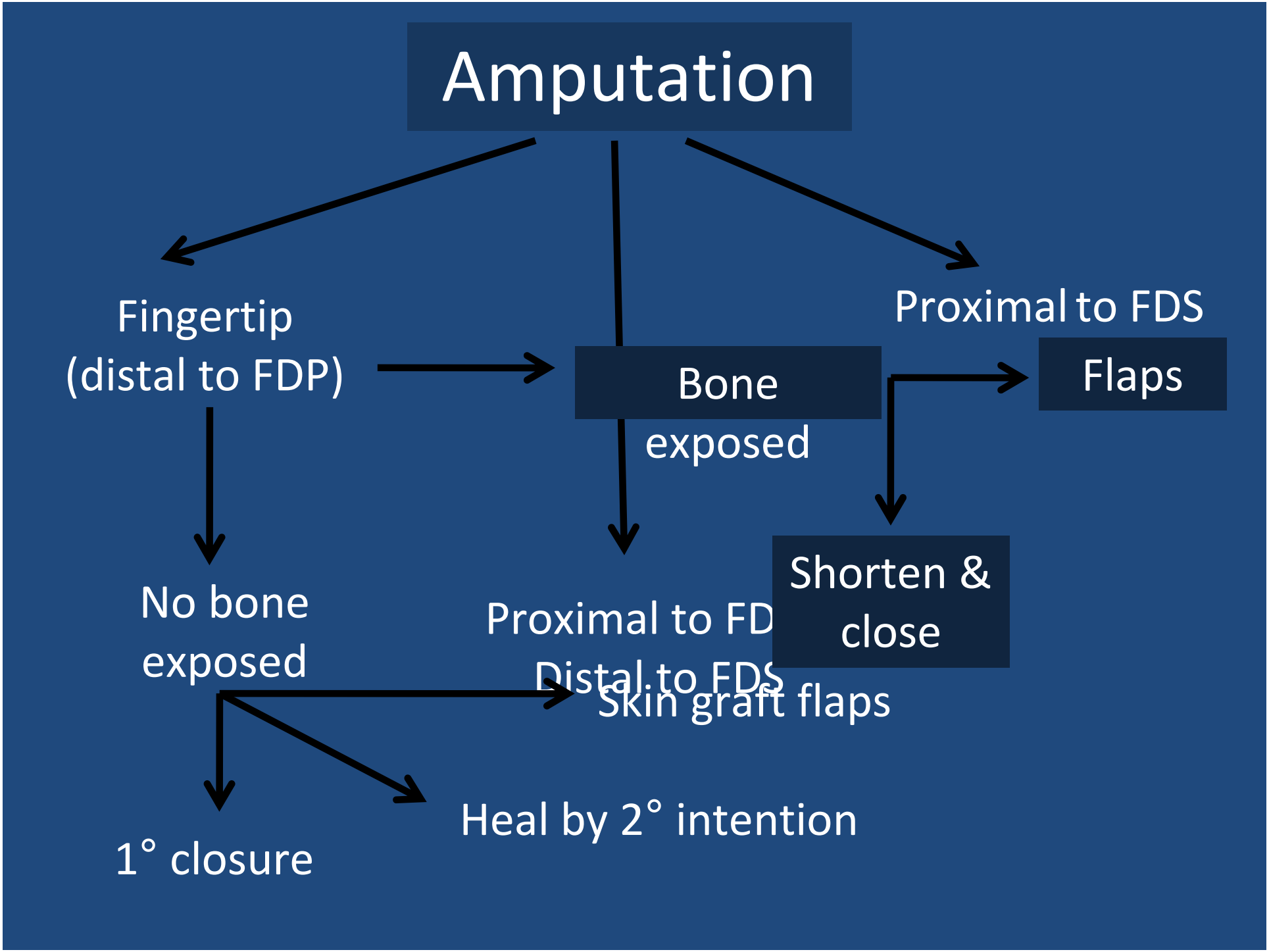
Thumb amputations

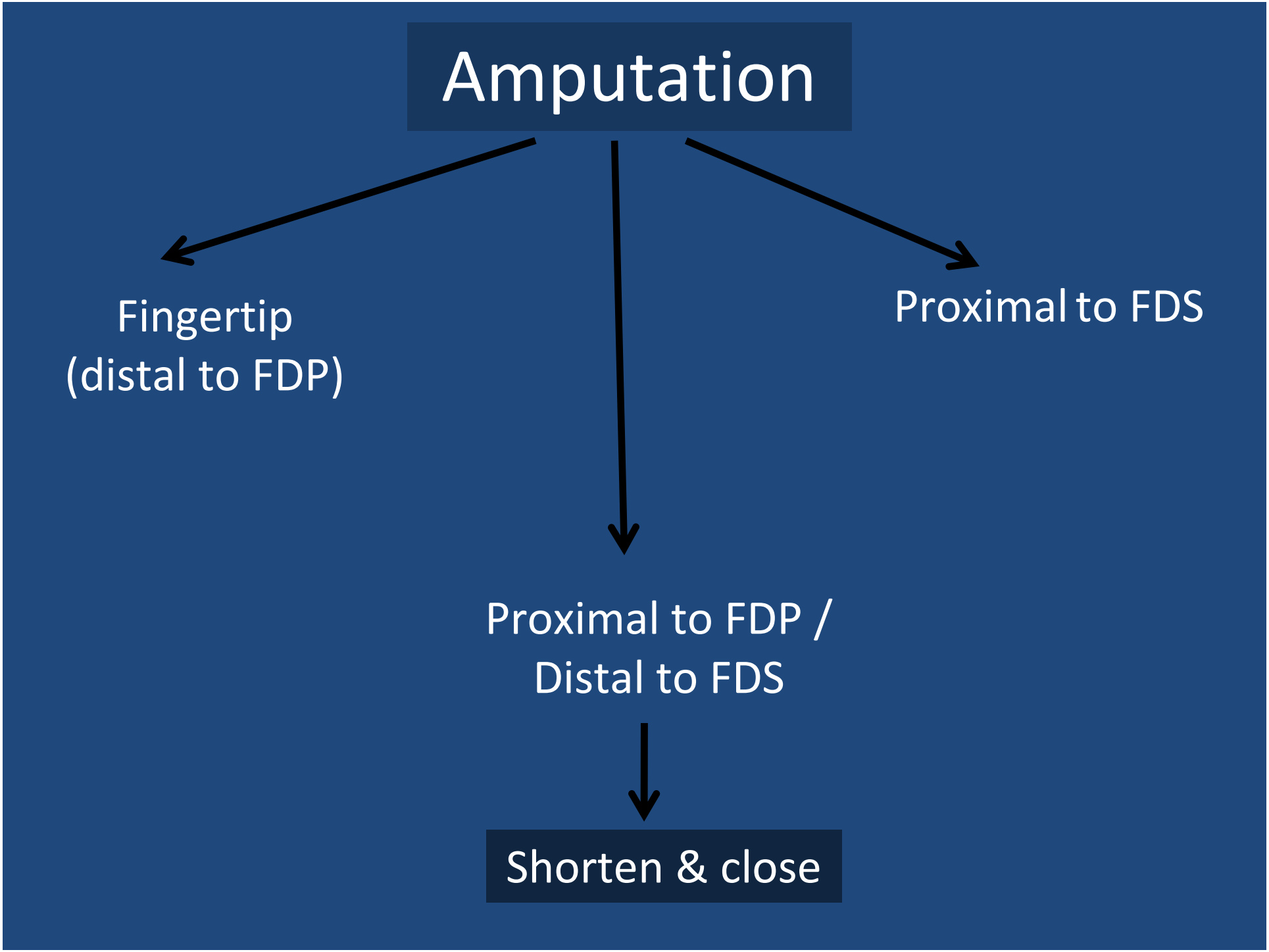
- Length important
- Skeletal shortening and closure rarely indicated
- Split skin grafts/advancement flaps (Keim & Grantham, 1969)
- If good proximal phalangeal length present, web space deepening by Z plasty may suffice
- MCPJ level amputation -reconstruction

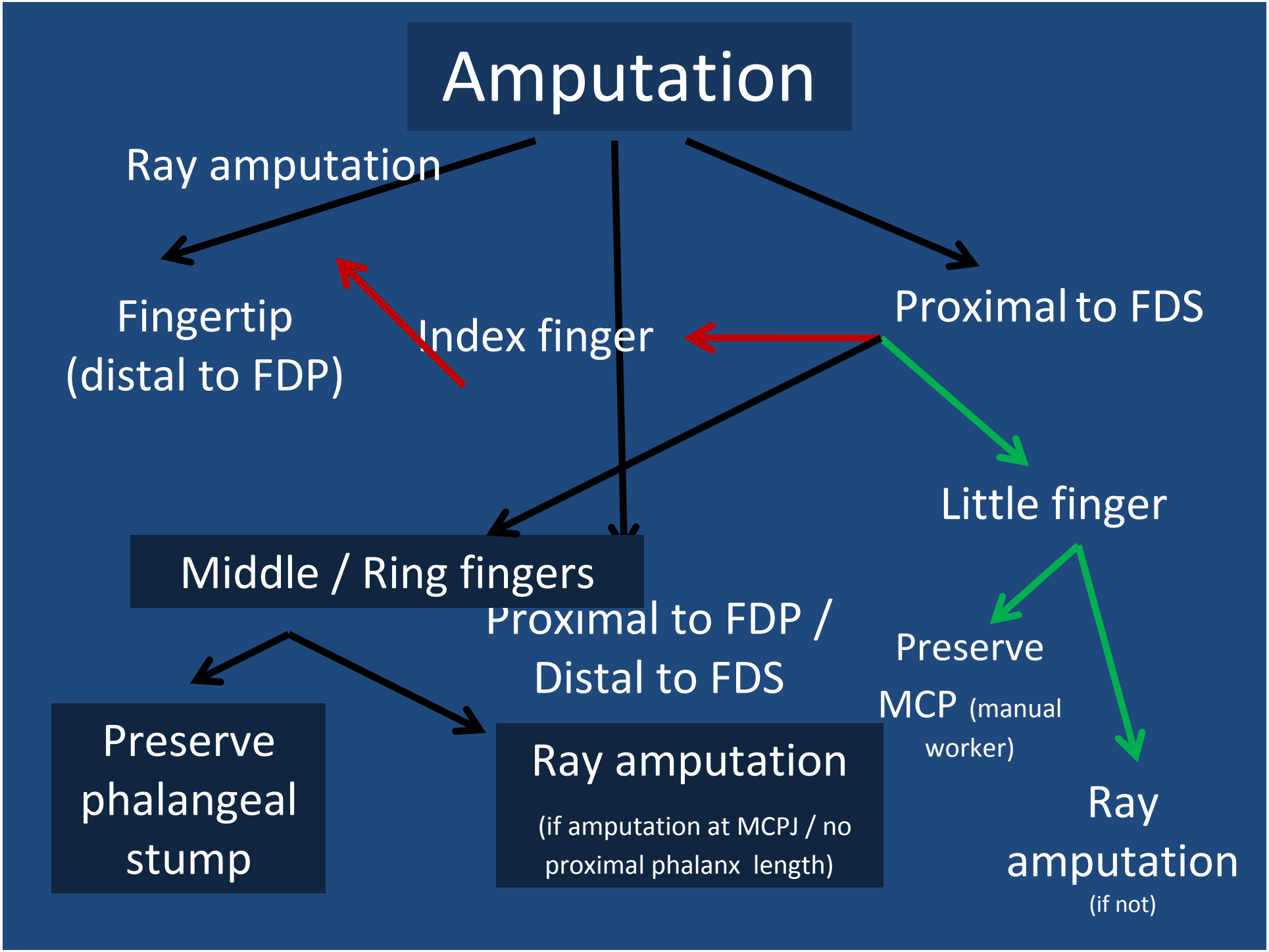
Multiple digit amputations

- Preserve lengths of any remnants
- Preserve all viable tissue
- 1st and 5th ray lengths are important as hinge action between them promotes prehension
- Consider deepening 1st web space-Z plasty
- ? Rotational osteotomies

Summary


Amputation
Fingertip
(distal to FDP)
Bone
exposed
Proximal to FDS
Flaps
No bone
exposed
Proximal to FD
Distal to FDS
Shorten &
close
Skin graft flaps
1° closure
Heal by 2° intention


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


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

Questions?

References

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