ANATOMICAL BASIS AND CLINICAL APPLICATIONS OF SYNOVIAL FLAPS IN THE WRIST AND DISTAL FOREARM

BACKGROUND

Median nerve problems after primary repair or Carpal Tunnel Release (CTR)
- Recurrent CTS occurs between 2.2-5% following surgery 1,2
- Neuroma formation reported between 1-7.8% after peripheral nerve repair 3
- After med n. release or repair, nerve dysfunction and pain may result from:
  - Perineural adhesions, intraneural fibrosis, fixation of the nerve to the transverse carpal ligament, neuroma formation, reconstitution of the TCL, recurrent tenosynovitis

Goals of Reoperation in Refractory CTS or Following Median n. Repair
- Release nerve from offending scar
- Protection of the nerve from recurrent fibrosis
- Establishment of smooth gliding surface
- Excision of symptomatic neuroma with appropriate grafting if necessary

Described Techniques to “Protect” Median Nerve at the Wrist
- Hypothenar fat flap, Local muscle flap (palmaris brevis, lumbrical), Dermal fat grafting
- Synovial Flap:
  - First described in 1980 (Wulle) as ulnar based flap, without description of anatomy

PURPOSE

- Describe the anatomical basis of the flexor tendon synovial flap with attention to its blood supply
- Present our clinical experience with this flap

METHODS

Cadaveric Dissections:
- 20 fresh cadaver upper extremities injected with intra-arterial microfil via brachial artery
- Dissected wrists and distal forearms with attention to: arterial anatomy, synovial flap dimension and arcs of rotation

Clinical Applications: Retrospective review of 18 clinical cases
- 14 cases of post-traumatic median nerve injury
  - 13 cases of symptomatic med. n. neuroma at the wrist
  - 1 case of acute med n. injury with overlying skin loss
- 4 cases of recalcitrant CTS

RESULTS: Cadaver dissections
- Consistent radial and ulnar pedicles arising 2.5-3.0 mm proximal to TCL
- 33% of specimens have a branch of the radial artery that directly penetrates TCL
- Post ligamentous pedicles arising form superficial palmar arch
- Flap dimensions 6.5 x 4.4 cm consistently elevated

RESULTS: Clinical Applications
- 4 Cases of recalcitrant CTS:
  - 100% with complete resolution of symptoms (n=4)
- 13 Cases of neuroma at site of previous med. n. repair:
  - 69% with complete resolution of symptoms (n=9)
  - 15% with improved but persistent neuroma symptoms (n=2)
  - 15% without significant improvement in symptoms (n=2)
- 1 Case of median nerve injury with overlying skin loss
  - Synovial flap supported split thickness skin graft

CONCLUSIONS

- The synovial flap is a reliable source of thin, vascularized tissue
- This flap has a consistent blood supply from the radial and ulnar arteries
- Anatomic dissections support the use of distally based flaps on branches from the superficial palmar arch
- Its use provides a very acceptable rate of symptomatic treatment