Extensor Tendon Injuries: Ensuring the Best Outcome

Brad Palmer, MD
Allegheny General Hospital
Pittsburgh, PA

Disclosures

• Nothing to Disclosure
• in the past 12 months, neither my spouse nor myself have had a financial relationship with a commercial interest (any entity producing, marketing, re-selling, or distributing health care goods or services consumed by or used on patients; with the exception of providers of clinical service directly to patients)

Extensors of the Fingers

• Extrinsic
  – EDC, EIP, EDQ, EPL, EPB
• Intrinsic
  – Interossei, lumbricals
Extensor Mechanism: A complex interweave of tendon fibers controlled by 4 or 5 muscles

- Conjoined Tendon
- Central Slip
- Interossei (2)
- Extrinsic (1 or 2)
- Lumbrical (1)
- Lateral Band
- Terminal tendon

Zones

- Odd numbers are located over joints
- Even numbers are over bone
- Thumb has unique classification
Zone VI

- Over metacarpals
- Less risk of adhesions
- Multiple repair techniques
- Repaired with a core suture +/- an epitendinous suture

Repair Techniques

- No clear consensus
- Bunnell
- Becker
- Modified Kessler
- Figure of 8
- Horizontal mattress

Biomechanical Studies

Biomechanical Studies

• Modified Brunnell
  – Statistically strongest: highest load to 2mm gap and ultimate failure
• Modified Kessler
• Figure of 8
• Horizontal Mattress


Biomechanical study

• Comparison of 3 techniques


Running Locking Horizontal Mattress

Results

- RIHM suture:
  - Significantly stiffer (8506 N/m vs. 5971 N/m and 6719 N/m)
  - Significantly less shortening (1.7mm vs. 6.2mm and 6.3mm)
- Ultimate load to failure
  - No significant difference (53N, 48N, 51N)


Post op Splinting

- 33 patients treated with static splinting
- splint for 3 to 4 weeks
- 6 months of follow-up
- 95% excellent or good results


Dargen Criteria

- Excellent
  - No extensor lag with flexion of pulps to mid-palm
- Good
  - Extensor lag <15° with flexion of pulps to mid-palm
- Fair
  - Extensor lag 16-45° or pulp to palm distance <2cm
- Poor
  - Extensor lag >45° or pulp to palm distance >2cm

Static Splints

- 33 simple extensor tendon repairs treated with static splinting
- Good to excellent results in 64%
- Mean follow up 5 years


Static Splints

- 35 extensor tendon repairs
- 40% good to excellent results
- Follow up of 12 months


Dynamic Splints

- Nonrandomized trial prospective trial
- 100% excellent/good results with Dynamic splints
- 40% in static group

Active Motion with Volar Block

- 24 simple repairs zones IV to VII
- Start active motion POD#1
- Splint for 4 weeks
  - Then night 2 weeks
- 92% excellent or good result


Relative Motion Extension Splint

- Wrist at 25° of extension
- Repaired digit 15° of relative extension compared to other digits
- Wrist splint discontinued at 4 weeks

Relative Motion Extension Splint

- 140 patients
- Extensor zones IV to VII
- 96% excellent or good results


Comparisons

- Prospective Randomized Trial
- Dynamic splinting vs Static Splinting
  - 8 weeks
    • Improved Total Active Motion (TAM)
    • Improved grip strength
  - 6 months
    • No differences


Comparisons

- Prospective Randomized Trial
- 100 patients
- Dynamic Splinting vs Volar Block with motion
- No differences at 8 weeks
  - 97% vs 94% excellent or good results

Return to activities/work

• Relative Motion Extension splinting
  – 18 days
• Volar Block with active motion
  – 6 weeks
• Dynamic extension splints
  – 10 weeks


Take Home Points

• DES, Active motion, RME protocols provide early and possibly later improvements
• RME for 3 or less digits
• Active motion with volar block for 4 digits
• Pediatric and unreliable patients
  – Static splint
• Repair technique

Contact

• bpalmer1@wpahs.org