Modified Merritt Splint In Zone IV, Zone V and Distal Zone VI Extensor Tendon Injuries
Nine Years Rehabilitation Experience In A Single Center

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Introduction

Post-operative extensor tendon repair morbidity remains a significant problem despite the introduction of newer splinting methods. In 1978, Wyndel Merritt, demonstrated relieved tension on a repaired extensor tendon if the digit was positioned in 25–30° of additional extension relative to the uninjured MP joints. Despite the excellent results from Merritt splint; the wrist is kept immobilized leading to decreased compliance with the splint.

Objective

To assess outcome of patients treated with a “Modified” Merritt Splint in acute proximal zone IV-VI extensor tendon injuries

Methods

A retrospective chart review was conducted from January 2004 to March 2014. 615 Charts were reviewed independently by two authors. 55 patients met the inclusion criteria, whom completed the entire 10 week study protocol. Data collected for Age, PMHx/PSHx, Habits, Occupation, Time of repair, Method of repair, ROM, TROM, Grip strength.

Design

• Reserved for proximal zone IV, V and distal Zone VI
• Transverse sagittal bands and fibrous capsular insertion:
  • mechanically limiting tension to the repair site at extremes of motion
• MP Joint ROM:
  • Splint design limits active MP ROM to 80°
  • Through limited cadaveric studies ROM at the MCP joint did not induce tendon gapping at the repair site
• IP Joint ROM:
  • Unrestricted IP joint ROM
  • PIP and DIP extension should be assisted by the intrinsic muscles in injuries proximal to the joint and lateral bands regardless of MP joint position
  • Finger flexion should lead to antagonist relaxation to extensor tendon

Images

Results

All Tendon repairs were performed using a figure-of-eight 3.0 non-resorbable monofilament (Prolene or Ethilon) or braided absorbable suture (Polysorb). 

A Bulky dressing and volar splint applied following primary repair

Inclusion Criteria |
| Exclusion criteria |
|---|---|
| Single digit (excluding thumb) | Segmental loss > 1cm |
| Zone: Proximal Zone IV and Zone V, distal Zone VI | Associated fractures or digital nerve injury |
| Uncomplicated extensor tendon injuries: isolated tendon laceration | Human bites or infected wounds |
| Primary repairs (less than 1 week from time of injury) | Multiple digits or thumb |
| Patients aged 18-65 | Previous injury to affected digit or arthritis |

Rehabilitation protocol

• Patients followed prospectively for a 10 week period
  
  - 2 days:
    • Relative motion splint fabricated and full composite active digital extension and flexion performed within confines of splint
  - Week 1-Week 10:
    • ROM recorded weekly
  - Week 4:
    • Kinesia ROM commenced outside RM splint; splint continued between exercises and at night
  - Week 5-6:
    • Work and lifting allowed as tolerated with buddy taping in medium (< 50 lbs) to heavy demand jobs (continue until 6th week)
  - Week 7:
    • PIP ROM discontinued; increase in resistive exercises and ADL
  - Week 10:
    • Grip strength assessed

Discussion

• Our findings suggest that the use of the “Modified” Merritt Splint in uncomplicated, complete lacerations of the extensor tendons in Zones IV-VI results in excellent total active motion and prevents the formation of tendon adhesions.
• To our knowledge, our study is the largest retrospective review for the use of “Modified” Merritt splint for zones IV-VI extensor tendon lacerations
• Our results demonstrate similar findings published by Merritt and Saldana thus the “Modified” Merritt Splint is an appropriate method for post-operative treatment of Zone IV-VI extensor tendon injuries
• Wrist immobilization is not required in the dynamic splinting of Zone IV/V and distal Zone VI extensor tendon injuries as repair site tension is minimal

References

2. Howell JW, Merritt WH, Robinson SJImmediate controlled active motion following zone 4-7 extensor tendon repair, J Hand Ther. 2005