ICAM Protocol Following Extensor Tendon Repair
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Introduction
- In the mid 1980’s post op care changes
  - Shift from immobilization to controlled motion
  - Use of dynamic extension assist splinting
  - Goal to allow tendon glide and prevent adhesions
  - Excellent results
  - Splints tend to be bulky, time consuming, costly

ICAM Protocol: Zone IV – VII
- Developed by Wyndell Merritt
- “Immediate Controlled Active Motion”
- Act as a “dynamic-assist” during finger extension to unload the tendon repair
- Pros
  - Low profile
  - Ease of fabrication
  - Cost effective
  - Increased pt compliance

[Image of hand with splint]
Background

- Merritt in 1979 demonstrated reduced tension on the repaired extensor when injured MPJ was kept in 25-30° more extension 'relative' to uninjured MPJ.
- Derived 'relative motion' yoke orthosis with combination of a wrist orthosis in 25° extension.
- This idea was overshadowed by controlled passive motion protocols.
- Introduced at ASHT in 1986.
- In 1997 at AAHS meeting, Merritt and Howell presented cases of 180 pt.

1997 AAHS Merritt and Howell

- 10 year study
- 180 pt
- 98.5% normal flexion
- 96.2% normal TAM
- No report of ruptures

Immediate Controlled Active Range of Motion Following Zone 4-7 Extensor Tendon Repair

- 2005, Howell, Merritt, Robinson published first article
- 140 patients, simple to complex injuries
- 96% had excellent/good outcomes (7wk post op)
- No tendon ruptures
- RTW 18 days
- 8 OT visits over 7 weeks
- Wrist splint and yoke
Orthotic Evolution from 1980’s

1st edition
- Wrist 25–30°
- Yoke 25–30° with linking strap

2nd edition
- No linking strap

3rd edition
- Wrist 20–25° extension
- Yoke 15–20° MP extension

Anatomical Trials

- Yoke splint limits gap
- With wrist extension = further reduction of gap

2008 Berry and Neumeister
- “Analysis of Limited Wyndell Merritt Splint for Extensor Tendon Injuries to Hand Immobilization”
- Presented at AAHS annual meeting Beverly Hills
- ICAM digital yoke splint only
- No ruptures with similar ROM
Case Example

Splint Fabrication
- 36 yo male
- EDC III zone 6
- Clean laceration
- Repair within one week
- Splint fabrication 10 days post op
- Goal to start within 3 days

Pencil Positioning and Orthosis
### Yoke Configurations

- **Phase 1** - 0–21 days
- **Phase 2** - 22–35 days
- **Phase 3** - 36–49 days

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### ICAM for RF repair

Figure 13.24. Example of an ICAM splint: wrist cock-up with yoke splint. Photo courtesy of Lisa Chase.

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### ICAM Therapy Protocol

- **Phase 1** - 0–21 days
- **Phase 2** - 22–35 days
- **Phase 3** - 36–49 days
Phase 1  
0–21 Days

- Both splints worn continuously
- Therapy focus
  - Edema control
  - Scar management (once sutures are removed)
  - AROM for digits in splint
- Goal
  - Full composite AROM within confines of the splint
  - Must obtain this before moving onto next phase

Phase 2  
22–35 Days

- Yoke splint worn all the time; wean from wrist orthosis
- Wrist orthosis on during medium duty tasks
- Therapy focus
  - Continue finger AROM, edema and scar mgmt
  - Begin isolated wrist ROM with fingers relaxed
  - Progress to composite wrist and finger movement if NO extension lag is present
- Goal
  - Full wrist ROM/finger ROM within limits of yoke

Phase 3  
36–49 days

- Wrist orthotic discontinued completely
- Yoke orthotic or buddy strap all the time
- Therapy focus
  - Continue wrist, digital ROM, edema and scar mgmt
  - AROM of digits outside of yoke orthotic
- Goal
  - Full ROM of wrist and fingers with no orthotic
Conclusion

- Plenty of research out there
- Immobilization and passive controlled splinting is safe with good outcomes
  - Longer rehab and increased cost
- ICAM allows for more movement without risk to the repair
  - Simple construction and cost effective
- Other roles of the ICAM yoke orthosis
  - Sagittal Band Injuries

References

- https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3574475/