Plastic Surgery & Skin Specialists by BayCare Clinic

Dr. Schmidt
Flexor Tendon Repair Zones 1-3
Early Mobilization

A deep cut on the palm side of the hand, wrist, or forearm can damage the tendons that bend the wrist, thumb and fingers. Repair of the damaged tendons is necessary to restore normal movement in the wrist and hand. Successful rehabilitation following flexor tendon repair requires the guidance of a highly trained hand therapist. The therapist provides the patient with safe exercises that promote tendon gliding while avoiding risk of tendon rupture as well as other important treatment to control scarring and swelling.

Phase 1 – Maximum Protection Days 1 - 14

Goals for phase 1

- Immobilize and protect repair
- Initiate ROM while protecting repair
- Minimize risk of scar adhesions
- Pain and edema control

Other considerations

- Dressings to be removed for ROM exercises to ensure tight composite passive flexion to maximize tendon excursion

Splint

Dorsal blocking splint is fitted for continual wear in the following position:

- Wrist: neutral, MP's: 70° flexion, IP's: full extension
- apply gutter splints as needed to maintain full extension
- If there is a nerve repair, position PIP joint at 30° of flexion

PROM

The following PROM exercises to be performed every two hours within the constraints of the splint, 25 repetitions each:

- MP flexion, active extension to splint
- PIP flexion, active extension to splint
- DIP flexion, active extension to splint
- Composite PIP/DIP flexion, active extension to splint
- Composite fist, active extension to splint
- Wrist flexion (passively flex wrist forward out of splint) with finger extension, followed by active wrist extension to splint with passive finger flexion

Edema Management

- Light compression with edema glove
  - **Do not use tubular digital compression sleeves**
- Elevation
- Manual Edema Mobilization (MEM)

Wound Care

- Educate patient in dressing changes

Plastic Surgery & Skin Specialists by BayCare Clinic

Phase 2 –Protect Repair with Controlled ROM 2 - 4 weeks

Goals for phase 2

- Continue to protect healing repair while achieving adequate tendon excursion to prevent scar adhesions
- Continue scar and edema control

Splint

- Continue dorsal blocking splint between exercise sessions and at night

ROM

- Continue Phase 1 Exercises within the splint
- Initiate the following exercises outside of the splint:
  - Wrist/finger tenodesis exercises –
    - passive composite finger flexion is provided then the patient actively extends wrist,
    - passive wrist flexion is provided then the patient actively extends digits
  - Passive wrist flexion with passive hook fisting to prevent intrinsic tightness
  - Place & hold for gentle tension in the following positions:
    - Wrist extension, MP's extended, IP's flexed (hook position)
    - Wrist extension, MP's & PIP's flexed, DIP's extended (straight fist)
    - Wrist extension, fingers in composite fist
- If patient is doing well in terms of ROM and swelling, reduce the frequency of exercises to every 3 hours or 6x/day

Scar Management

- After 2 days of suture removal, initiate scar mobilization
- Apply scar remodeling products as needed

Continue phase 1 edema management

Plastic Surgery & Skin Specialists by BayCare Clinic

Phase 3 –Maximize Active Range of Motion 4 - 6 weeks

Goals for phase

- Restore full active range of motion while protecting the healing repair
- Continue to control edema and minimize risk of scar adhesions

Splint

- Continue dorsal blocking splint between exercise sessions and at night

ROM

- Begin full active isolated and composite wrist and digit extension outside of the splint
- Begin AROM hand exercises outside of the splint (hand exercises may include thumb palmar abduction, thumb opposition, digit abduction/adduction, intrinsic plus/MP flexion, claw fist, gentle full fist)
- Week 5 - Initiate blocking exercises for PIP and DIP flexion except small finger DIP due to risk of rupture

Functional Activity

- Begin light prehensile activities in therapy sessions only

Continue Scar and Edema Management as needed

Plastic Surgery & Skin Specialists by BayCare Clinic

Phase 4 – Restore Full Motion and Progress to Strengthening 6 - 12 weeks

Goals for phase

- Restore full active and passive ROM
- Regain strength
- Return to ADL and full duty work

Other considerations

Educate patient that a tight sustained grip with or without resistance greatly increases risk of tendon rupture. The patient should be using the hand for light activity only at home until 10 weeks post-op or with MD consent.

Splint

- Discontinue dorsal blocking splint
- If limited PIP joint extension is present, splint PIP joint in full active extension at night only
- Dynamic or static progressive splinting may be initiated to PIP joint if contracture present

ROM

PROM is initiated avoiding aggressive composite wrist and digit extension until 8 weeks

Modalities

If needed, start NMES or ultrasound to enhance tendon excursion

Continue Scar and Edema Management as needed

Functional Activity

Begin light activity at home and gradually over a 4 week period of time return to functional use of the involved hand for high level work and home management tasks

Strengthening

- Initiate strengthening no sooner than 8 weeks post-op.
- It is important to begin with gentle pain-free hand strengthening using foam blocks or the lightest resistance putty
- Educate the patient in no prolonged repetitive hand strengthening with putty or other forms of hand exercisers. Putty exercises should be performed no longer than 2-5 minutes initially.

Work Conditioning

After 10-12 weeks and with MD consent a comprehensive work conditioning program for patients with high demand / heavy manual labor occupations may be appropriate

Plastic Surgery & Skin Specialists by BayCare Clinic

References

Brown, C. (2011). Zone II Flexor Tendon Repair: A Randomized Prospective Trial of Active Place and Hold Therapy Compared with Passive Motion Therapy. *Journal of Hand Therapy, 24*(1), 71.

Cannon, Nancy M. et. al. Diagnosis and Treatment Manual for Physicians and Therapists, 4th Ed. The Hand Rehabilitation Center of Indiana. Indianapolis, Indiana. 2001.

Chesney, A., Chauhan, A., Kattan, A., Farrokhyar, F., & Thoma, A. (2011). Systematic Review of Flexor Tendon Rehabilitation Protocols in Zone II of the Hand. *Plastic and Reconstructive Surgery, 127*(4), 1583-1592.

Farzad, M., Layeghi, F., Asgari, A., Ring, D. C., Karimlou, M., & Hosseini, S. A. (2014). A Prospective Randomized Controlled Trial Of Controlled Passive Mobilization Vs. Place And Active Hold Exercises After Zone 2 Flexor Tendon Repair. *Hand Surgery, 19*(01), 53-59.

Skirven ,T. M.,Ostermans, A. L., Fedorczyk, J . M., & Amadio, P. C. (2011). *Rehabilitation of the Hand and Upper Extremity* (Vol. 1). Philadelphia, PA: Elsevier.

Starr, H. M., Snoddy, M., Hammond, K. E., & Seiler, J. G. (2013). Flexor Tendon Repair Rehabilitation Protocols: A Systematic Review. *The Journal of Hand Surgery, 38*(9).

Suggested Reading:

Groth, G. N. (2004). Pyramid of progressive force exercises to the injured flexor tendon. *Journal of Hand Therapy, 17*(1), 31-42.

Steelman, P. J., Groth, G., & Taras, J. S. (2007). Individualized Rehabilitation Program for Flexor Tendon Repair: From Pyramid to Algorithm. *Operative Techniques in Orthopaedics, 17*(2), 148-154.

This protocol was reviewed and updated by Misty Carriveau, OTR, CHT and Steven C. Schmidt, MD May 2017.