LSU Health Sciences Center

Occupational Therapy

Flexor Tendon Injury Treatment Protocol

[Diagram of hand showing zones 1 to 5 with labels T1, T2, T3, DIP, PIP, MCP]

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Day 1

- Dorsal Blocking Kleinert Splint (surgical plaster) molded by surgeon in OR. Wrist 15° flexion, MCP’s flexed 70-90°, IP’s full extension. With associated nerve injury MD determines wrist position.
- PROM exercises are shown to pt by Occupational Therapy
  PROM to all digits 15 reps/hour
- Education on care plan/treatment over next several weeks
- **Importance of no resistive X 6-8 weeks**
- **Importance of full passive flexion**
- Importance of full extension of the IP’s within the Kleinert splint
- Elevation for edema control
- Surgical splint care. Keep dry. Do not remove
- AROM to shoulder and elbow
- No use of injured hand in ADL’s. One-handed ADL techniques
- Fingers should not be restricted. **No ace wraps/straps crossing digits**
- Patient can be educated prior to surgery
For the Resident

Flexor tendons need to be followed **weekly for the first 3 weeks** then every 2-3 weeks during the initial 6 week period following repair.

The first post operative visit the surgical dressing is cut to view the wound. The plaster DBS should remain on until the patient is seen by OT.

Patients are followed every 1-2 months until MMI is reached with return of protective sensation and motor

Dr. A. Hollister, MD
Annular Pulleys and Cruciate Ligaments

Springer Images
1 week post op/ First post op visit

- Plaster Kleinert dorsal blocking splint (DBS) is discontinued. A thermoplastic DBS is fabricated with wrist flexed 15°; MCP’s flexed 70°, IP’s in full extension by Occupational Therapy.
- Kleinert DBS is worn continuously 3 weeks from time of repair.
- PROM exercises to all digits. **Achieve Full Passive ROM**
- Measure composite passive flexion lags of the tips to DPC.
- Achieve full active IP extension within the Kleinert DBS
- Patient performs exercises 15 reps every hour.
- Wound care
- Scar massage once incision is healed
- No use of injured hand in daily living tasks. One hand ADL’s
- Shoulder and elbow AROM
- **No strap across volar aspect of the digits at any time.** Should patient flex against a strap or ace wrap tendon rupture may occur.
- Educate on insensate precautions if nerve injury
- Associated nerve repair. Wrist flexion for Median nerve-degree determined per physician
  
  Wrist flexion and UD for Ulnar nerve- degree determined per physician
Kleinert Dorsal Blocking Splint
3 weeks post repair

- Thermoplastic Kleinert Dorsal Blocking Splint is discontinued.
- Volar wrist cock-up splint is fabricated by Occupational Therapy wrist in neutral.
- Splint adjusted weekly to increase extension of the wrist.
- PROM exercise continues especially if loss of passive flexion motion remains.

Achieve full PROM of flexion to DPC

- AROM starts--- GENTLE composite flexion and extension of the digits.
- 15 reps/hour. No wrist AROM
- No resistive exercise
- Continue scar massage
- Associated repair of nerve or digital nerve. Perform baseline Semmes Weinstein monofilament test
- Patient education on injury prevention with assoc. loss of sensation
- Check for Tinels. Document location
- Baseline motor examination
4 weeks post repair

- Occupational Therapy adjusts volar wrist splint to 25° of wrist extension.
- Continue AROM exercise to digits in composite extension and flexion.
- Perform intrinsic minus position exercises with flexion/extension of digits.
- PROM continues. **Full passive flexion to DPC**
- Scar massage
- Patient education in associated sensory loss/insensate precautions
- Add “lumbrical bar” component to volar splint if associated ulnar nerve injury.

Intrinsic Minus Exercise
5 weeks post repair

- Continue with volar wrist splint. Increase wrist extension to 35.
- Continue AROM composite flexion and extension of digits
- Begin place and hold exercises
- Begin differential tendon glide exercises
- Continue PROM. **Full passive flexion to DPC**
- Full IP extension
- Continue with intrinsic minus exercise
- Continue education for insensate hand with associated nerve injury

Differential Tendon Glide Exercises
6 weeks post repair

- Volar wrist splint is discontinued.
- Continue AROM of digits
- Begin AROM to wrist and forearm
- Continue PROM if lag persists
- Increase hand use in ADL’s. Lift < 1 #
- Begin gentle strengthening exercise
- Extrinsic tightness: progressive splinting to wrist and digits. Check with attending MD. May need to wait until 8 weeks post repair.
- Continue to instruct patient in injury prevention/insensate hand with associated loss of sensation
- Assess grip and pinch
6 weeks post repair continued:

Extrinsic tightness and with associated Ulnar Nerve repair

• When cleared for dynamic progressive splinting begin with wrist extension of 45°.
• Fabricate X-lite circumferential finger “sleeves” with the PIP/DIP’s in full extension. Attach to outrigger
• Adjust outrigger for increasing MCP extension.
• Fabricate hand based lumbrical bar splint to be worn when not in dynamic splint.
Dynamic splint with X-lite finger cuffs

Lumbrical bar splints for Ulnar Nerve
8 weeks post repair

- Progressive strengthening exercises are performed
- Continue with AROM to digits, wrist and forearm.
- No heavy lifting with the hand is permitted
- Repeat Semmes Weinstein Monofilament — if associated nerve repair
- Continue to monitor Tinels
- Continue to remind patient of insensate precautions
- Begin desensitization program for dysesthesia's.
- Repeat motor examination. Continue splint as necessary for motor deficits
- Bunnell blocking exercise for increasing pull through for passive flexion > active
- Splinting for IP contractures. Splint PIP and DIP joints only. Splint in full extension. Can use volar finger gutter or spring wire extension splint

Splint for IP contractures
10-12 weeks post repair

- Patients can generally return to full use of their hand and all daily activities.
- Instruct in safety issues if sensation remains impaired.
- Continue with splinting for motor deficits
- Continue to monitor sensation/motor return
- Repeat motor examinations monthly
- Repeat Semmes Weinstein, grip and pinch exams monthly
- Continue with desensitization / sensory re-education program
- Ulnar Nerve: Splint until full wrist extension and no extrinsic flexor tightness
  Continue with lumbrical bar splint
Flexor Pollicis Longus Repair

Post op day 1 to week 3 post repair

• PROM exercises to thumb.
• Active extension of the thumb back to DBS.
• AROM exercise to Index, Long, Ring, Small digits.
• No use of injured hand in ADL’s.
• Wound care progressing to scar massage.
• Check for digital nerve injury. Perform Semmes Weinstein.
3 weeks post repair - Flexor Pollicis Longus

- Volar thermoplastic wrist splint is fabricated with wrist in neutral. Radial based DBS is discontinued.
- Begin AROM exercises 15 reps/hour to thumb and digits
- Continue scar massage
- Continue Passive ROM.
- Repeat Semmes Weinstein as indicated
- Patient education if sensory involvement
- No use of hand in ADL’s

4-5 weeks post repair

- Increase wrist extension by 10 weekly
- Continue with AROM exercises
- Continue with PROM exercise
- Continue insensate education if sensation is impaired
- Stress no use of thumb in grip or pinch ADL’s
6 weeks post repair

• Volar wrist splint is discontinued.
• Continue AROM to thumb and wrist
• Continue to monitor any loss of sensation
• Begin hand use in ADL's
• Stress no resistive pinch with thumb
• Continue with PROM if lag is present
• Continue patient education if sensation is impaired

8 weeks post repair

• Progressive strengthening of grip and pinch
• Begin desensitization program for dysesthesias

10-12 weeks post repair

• Patients can generally return to full use of the hand
• Instruct in safety issues if sensation remains impaired
**Wrist flexors only.** (Flexor Carpi Radialis (FCR), Flexor Carpi Ulnaris (FCU), Palmaris Longus (PL))

Follow same timeline for digit flexors with the following exceptions:

- Kleinert Dorsal Blocking Splint can stop at the MCP’s.
- AROM of the digits can be started immediately
Treatment Goals Post-Operative Flexor Tendon Repair

- Provide protective splinting to prevent full combined wrist and finger extension
- Instruct patient in passive range and NO active fisting (first 3 weeks)

Achieve full passive composite flexion of all tips to DPC. Promote passive tendon glide
- Prevent gap formation
- Wound care management
- Edema reduction techniques
- Instruct patient in no use of the involved hand and in one handed ADL’s (first 3 weeks)
- Scar massage to improve scar pliability, decrease adhesions
- Determine baseline sensation if nerve repaired
- Assess for tendon glide and motor return when appropriate
- Begin AROM at 3 weeks to improve tendon glide, increase ROM for function
**Treatment Goals:**

- Strengthen when appropriate to return grip and pinch strengths to normal
- Provide desensitization/ sensory re-education for associated nerve repairs
- Corrective dynamic splinting as indicated
- Increase use of the involved hand in the performance of daily living tasks to promote functional independence in daily living tasks and IADL’s
References

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