



Rehabilitation Protocol:

Primary Flexor Tendon Repair LHMC Protocol for Zone 1 & 2

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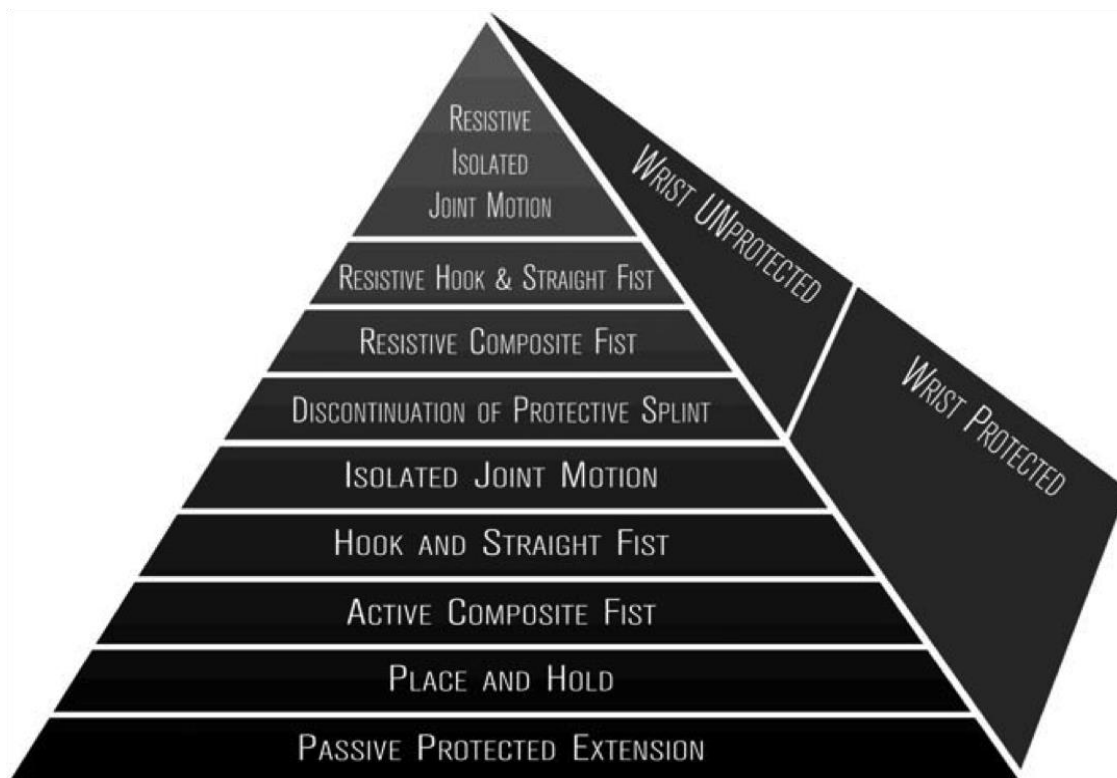
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◀ Overview

Appropriate therapist clinical reasoning and considerations of multiple client factors are imperative in implementing a successful rehabilitation protocol for optimal functional recovery.

Protocol developed in conjunction with Lahey Hospital and Medical Center Orthopedic Hand Surgery and Certified Hand therapists. Protocol progression based on the Pyramid of Progressive Force



Pyramid of Progressive Force Application
(Groth, 2004)

◀ Phase I Passive Protective Digital Extension Phase

Weeks 0–2

Goals

- Initiation of therapy started within 3-5 days of surgery postoperatively is ideal

Splint

- Dorsal Block Splint (DBS) is fabricated. Wrist; 10-20 degrees of flexion; MCP joints, 40-50 degrees flexion; interphalangeal joints, neutral (0 degrees).
- Splint is worn day and night for up to 5.5 – 6 weeks, and at night for an additional week

Manual Treatment

- Edema management including manual lymphatic drainage
- Dressing changes as indicated
- Other manual treatments as indicated by therapist

Therapeutic Exercises

- Finger PASSIVE ROM flexion of individual PIP and DIP joints of each digit, followed by composite Passive digital flexion. Each repetition is balanced with an active ROM extension within the DBS every 1-2 hours (modified Duran protocol)
- Gentle place and hold exercises started at 2 weeks plus (tensile strength of tendons decrease from days 5-15)
 - Depending on the compliance, tissue response, surgical suture, etc.
 - Initiated at the first post-op visit, following the above warm-up of passive flexion and protective active extension as described above
 - 10 repetitions every 2 hours
 - The patient removes the splint, places hand in gravity eliminated position with neutral wrist. The patient uses uninvolved hand to place fingers compositely in flexed position and patient holds position for the count of 2-3 seconds with minimal tension. This is repeated for the appropriate amount of repetitions as determined by therapist.
 - Frequency = variable from therapist in the clinic only, or prescribed up to 4 times a day as part of the HEP, depending on the compliance, tissue response, confidence of repair, etc.

Precautions

- Caution in initiation of place and hold with moderate to severe edema or stiff fingers, as increased drag on a newly repaired tendon will increase rupture potential

Therapy should be adjusted a Adhesion-Grading System (Groth,2004 Journal of Hand Therapy)

Absent	≤ 5 degrees discrepancy between digital active and passive flexion
Responsive	$\geq 10\%$ resolution of active lag between therapy sessions
Unresponsive	$\leq 10\%$ resolution of active lag between therapy sessions

- Therapy should be adjusted according to extent of injuries, tissue response and specific patient factors

◀ Phase II – Active Composite Fist Level

Goals

- Prescribed for patients with an unresponsive active tendon lag
- May start as early as 3 ½ to 4 weeks of therapy. If tendon is unresponsive, if there is no lag, this exercise may be delayed.

Splint

- The splint is continued at all times except for exercises and hygiene.
- Splint may be adjusted to wrist in neutral and/or digital extension. Determined on client and healing factors.

Manual Treatment

- Soft Tissue Massage
- Begin Scar massage after suture removal
- Manual Lymph drainage as appropriate
- Other manual techniques as indicated by therapist
- Modalities as indicated by therapist

Therapeutic Exercises

- Continued exercises in Phase I as above prior to AROM at each therapy session
- Wrist tenodesis and place and hold (may begin earlier than 3 ½ weeks if indicated per therapist)
 - performs a passive hand grasp and release mechanism, effected by wrist extension or flexion, respectively
 - frequency and duration variable due to tissue response and patient factors
- Gentle Active and Active Assisted flexion and extension exercises initiated
- Progression to very gentle grasp and release tasks (such as rice, elbow macaroni, etc.)

Precautions

- Caution in initiation of early AROM with moderate to severe edema or stiff fingers, as increased drag on a newly repaired tendon will increase rupture potential
- Therapy should be adjusted according to extent of injuries, tissue response and specific patient factors

◀ Phase III Hook and Straight Fist Level

Goals

- FDP/FDS tendon excursion
- Hook fist = maximum differential excursion between tendons
- Straight fist = maximum FDS gliding between sheath and bone

Splint

- The splint is discharged by 5 ½ -6 weeks. Splint may be worn for dynamic and/or unpredictable environments and situations up to 6 weeks.

Manual

- Soft Tissue Massage
- Continue scar massage and management
- Manual Lymph drainage as appropriate
- Other manual techniques as indicated by therapist

Therapeutic Exercises

- Continued exercises in Phase I and Phase II as above prior to progressing
- Tendon gliding exercises are initiated between hook and straight fist, alternating the wrist position to accommodate the individual's needs.
 - The hook fist position provides maximum differential glide between excursion between tendons
 - The straight fist position provides maximum FDS gliding between the sheath and the bone
 - The frequency and duration variable due to tissue response and patient factors

Precautions

- Alternating wrist position to accommodate individual's needs
- Maintaining wrist in neutral or slight flexion minimizes the motion of stress delivered
- Alternating wrist extension and flexion in a synergistic pattern provides greater stress in the finger flexion position vs. a neutral or slightly flexed wrist position minimizes the motion stress delivered
- Therapy should be adjusted according to extent of injuries, tissue response and specific patient factors

◀ Phase IV Isolated Joint Motion/Blocking

Goals

- Maximize motion stress to adhesions affecting tendon excursion

Splint

- The splint is discharged by 5 ½ -6 weeks. Splint may be worn for dynamic and/or unpredictable environments and situations up to 6 weeks

Manual

- Soft Tissue Massage
- Continue scar massage and management
- Manual Lymph drainage as appropriate
- Other manual techniques as indicated by therapist

Therapeutic Exercises

- Continued exercises in Phase I, II, and III as above prior to progressing
- Isolated PIP and DIP blocking exercises, lateral blocking followed by volar blocking
- The repetitions and frequency prescribed on an individual basis

Precautions

- Discontinue exercise if patient is overly straining against blocking
- Therapy should be adjusted according to extent of injuries, tissue response and specific patient factors

◀ Phase V Discontinuation of protective splinting

Goals

- To promote further AROM within the context of all ADL's to increase functional performance and load requirements
- Complete discontinuation is usually done by week 6

Precautions

- Weaning from the splint over a 7 day period will reduce sudden motion stresses and increase patient confidence
- Therapy should be adjusted according to extent of injuries, tissue response and specific patient factors

◀ Phase VI Resistive Composite Fist Level

Goals

- To incorporate isokinetic active composite flexion of the digits with an external resistance in order to improve range of motion
- This stage is continued until there is no limitation in function or that it is determined by therapist that there is no further benefit for formal therapy
- Patient is cleared for full dynamic tasks, interval sports/work without limitations at 12 weeks or as determined by MD and therapist

Manual

- Soft Tissue Massage
- Continue scar massage and management
- Manual Lymph drainage as appropriate
- Other manual techniques as indicated by therapist

Therapeutic Exercises

- Continued exercises in Phase I, II, and II as above prior to progressing
- Initiated approximately 8 weeks post operatively
- Multiple resistive mediums used to promote range of motion
 - Therapy putty, calibrated gripper, BTE, handy helper, etc.
 - Resistive isolated joint motion
 - Speed of compression force and position of digits with resistive tasks is variably described depending on the purpose/goal
 - Resistive extension can be prescribed to decrease intrasynovial adhesions and increase extension excursion
 - Dynamic splinting may be considered if passive joint motion is lacking
- The repetitions and frequency prescribed on an individual basis

AAROM = active-assisted range of motion, ADL = activity of daily living, AROM = active range of motion, PROM = passive range of motion, ER = external rotation, IR = internal rotation, ROM= Range of Motion G/H = glenohumeral