

Flexor Tendon Staged Repair

This protocol is intended to provide the clinician with a guideline for the postoperative rehabilitation course of a patient who has undergone ***flexor tendon staged repair***. General time frames are given for reference to the average, but individual patients will progress at different rates depending on their age, comorbidities, pre-surgical range of motion, strength, health/functional status, rehabilitation compliance, learning barriers and complications. Specific time frames, restrictions and precautions are given to protect healing tissues and surgical reconstruction.

Return to Work

The timeline for returning to work can vary depending on the type of work performed, various accommodations that may be available within your work environment, and any postoperative complications. Your surgeon will discuss the timeline for returning to work after consideration of these factors.

Postoperative Guidelines

Surgical Indication

A two-stage flexor tendon repair is indicated with a failed primary or delayed primary flexor tendon repair of zone I or II. The surgery is performed on FDP tendons and usually FDS is injured as well. The surgery can be done with the FDS still intact, but it is a precaution due to the fact the tendon may be injured during surgery. Also pulley repairs in the first stage are usually performed; A2 and A4 pulleys must be intact or repaired. The involved digit must have excellent passive range of motion and strong motor unit.

Stage II is indicated 3-6 months following Stage I reconstruction with rod. Stage II needs a free tendon graft and the options are palmaris longus, plantaris, extensor digitorum longus to second, third, or fourth toes, flexor digitorum longus to the second toes, and FDS. Intrasynovial grafts (FDS, flexors of the toe) have been functional characteristics and have normal cellularity and collagen organization than extrasynovial grafts. However, both are viable for grafting. Early mobilization after Stage II is advocated to reduce adhesions and improve tendon excursion. However, this will depend on the quality of the repair performed by the surgeon.

Flexor Tendon Staged Repair-Stage 1

Stage I (surgery to 3-5 days after surgery)

Rehabilitation appointments	<ul style="list-style-type: none"> Once per week
Surgical Procedure	<ul style="list-style-type: none"> A silicone rod is placed through the pulley system. The distal end of the rod is attached to the end of FDP and the proximal end is left in the end of FDP in the hand and palm area. The proximal end is not attached to soft tissue structures. Pulleys A2 and A4 must be repaired if injured.
Suggested therapeutic exercises	<ul style="list-style-type: none"> PROM exercises are initiated to involved digit. Unrestricted A/PROM exercise for adjacent digits.
Precautions	<ul style="list-style-type: none"> No functional use of hand Keep wound clean and dry
Orthosis	<ul style="list-style-type: none"> An extension gutter or extension resting pain is fabricated If the A2 and A4 pulleys have been repaired, pulley tapes are wrapped circumferentially over the pulley repairs. The pulley tapes or pulley rings are worn continuously for 6-8 weeks following surgery.
Wound Care	<ul style="list-style-type: none"> Post op dressings are removed. Post-op dressing removed A light dressing is applied along with light compression bandage. Sterile technique is observed until the incision is healed. Dressings include non-stick gauze, xeroform, or Mepilex lite Stat wrap, compressogrip, or lightly wrapped coban finger bandage. Keep wounds clean and dry Elevate for swelling <p>10-14 days: Sutures removed</p>



Flexor Tendon Staged Repair-Stage 1

Stage 1 (3-4 weeks)

Rehabilitation appointments	<ul style="list-style-type: none">• Once per week
Rehabilitation goals and priorities	<ul style="list-style-type: none">• Full PROM
Suggested therapeutic exercises	<ul style="list-style-type: none">• Initiate AROM of digit for extension.• If FDS is still intact, perform active FDS glide• Continue PROM exercises to involved digit.
Orthosis	<ul style="list-style-type: none">• Initiate decrease wearing of orthosis

Flexor Tendon Staged Repair-Stage 1

Stage 1 (5-6 weeks)

Rehabilitation appointments	<ul style="list-style-type: none"> • If full PROM: once per month until free tendon graft surgery • If lacking full PROM: 1-2 times per week until free tendon graft surgery
Rehabilitation goals and priorities	Prior to Stage II reconstruction, it is important to achieve full PROM of digit, supple soft tissue along the surgical site, and maximum hand strength
Suggested therapeutic exercises	<p>6 weeks:</p> <ul style="list-style-type: none"> • Initiate buddy taping • Progressive strengthening
Orthosis	<ul style="list-style-type: none"> • 5 weeks: Initiate static/dynamic orthosis to increase PROM PRN

Flexor Tendon Staged Repair-Stage 2

Stage 2 (3-5 days post-op)

Rehabilitation appointments	Once per week
Surgical Procedure	The rod is removed and replaced with a free tendon graft, like the palmaris longus. It will be sutured proximally at the musculotendinous junction and distally with a button at the distal phalanx. The button will remain for 6 weeks.
Suggested therapeutic exercises	<ul style="list-style-type: none"> • Modified Duran PROM exercises are initiated (see Flexor Tendon Repair-Duran-Zones 1-3 Protocol) • Early active motion protocol is encouraged if cleared by surgeon (if good Stage 2 repair)
Precautions	<ul style="list-style-type: none"> • No functional use of hand
Orthosis	<ul style="list-style-type: none"> • Fabrication of dorsal blocking orthosis with wrist in 20 degrees of flexion, and MCPJ in 70 degrees of flexion with IPJs in full extension
Wound Care	<ul style="list-style-type: none"> • Post-op dressing removed-sutures removed 10-14 days • A light dressing is applied along with light compression bandage. • Sterile technique is observed until the incision is healed. • Dressings include non-stick gauze, xeroform, or Mepilex lite • Stat wrap, compressogrip, or lightly wrapped coban finger bandage. • Keep wounds clean and dry • Elevate for swelling

Flexor Tendon Staged Repair-Stage 2

Stage 2 (3-4 weeks post-op)

Rehabilitation appointments	<ul style="list-style-type: none"> Twice per week 												
Suggested therapeutic exercises	<p>3 weeks:</p> <ul style="list-style-type: none"> AROM exercises within orthosis-tendon excursion Scar management <p>4 weeks:</p> <ul style="list-style-type: none"> AROM of digits and wrist outside of orthosis Thermal US may be initiated to decrease adhesions 												
Precautions	<ul style="list-style-type: none"> No functional use of hand 												
Orthosis	<p>3 weeks: Orthosis at all times except hygiene</p> <p>4 weeks</p> <ul style="list-style-type: none"> Orthosis is continued to be worn between exercises If ROM is excellent, continue forearm based. If ROM is good, fair, or poor cut down orthosis to hand based. 												
Progression criteria	<p>Use Strickland's Percentage to track progress (.stricklands smartphrase)</p> <p>((Active PIP + DIP) - PIP extension lag) divided by 175) x 100 = % of normal active PIP and DIP motion</p> <p>Excellent = 85-100%</p> <p>Good = 70-84%</p> <p>Fair = 50-69%</p> <p>Poor = <50%</p> <p><i>*Measurements were taken actively, not after place and hold</i></p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>AROM</th> <th>Date</th> </tr> </thead> <tbody> <tr> <td>PIP</td> <td>***/**</td> </tr> <tr> <td>DIP</td> <td>***/**</td> </tr> <tr> <td>TAM</td> <td>***</td> </tr> <tr> <td>STRICKLAND'S %</td> <td>***%</td> </tr> <tr> <td>STRICKLAND'S RATING</td> <td>***</td> </tr> </tbody> </table>	AROM	Date	PIP	***/**	DIP	***/**	TAM	***	STRICKLAND'S %	***%	STRICKLAND'S RATING	***
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Flexor Tendon Staged Repair-Stage 2

Stage 2 (5-6 weeks)

Rehabilitation appointments	<ul style="list-style-type: none">• Depending on AROM and scar: 1-2 times per week
Suggested therapeutic exercises	<ul style="list-style-type: none">• Initiate gentle AROM blocking• If extension lag is present, fabricate extension resting pan orthosis to be worn at night• Continue scar management
Precautions	<ul style="list-style-type: none">• Light functional use only
Orthosis	<ul style="list-style-type: none">• Wean from orthosis

Flexor Tendon Staged Repair-Stage 2

Stage 2 (8-12 weeks)

Rehabilitation appointments	<ul style="list-style-type: none">Depending on AROM and scar: 2-4 times per month
Suggested therapeutic exercises	8 weeks: progressive strengthening
Precautions	12 weeks: Perform most functional activities with hand. Avoid activities with forceful, weighted resistance to hand

Flexor Tendon Staged Repair

Due to extensive surgery, severe adhesions are likely to appear.

The patient may need to undergo a flexor tenolysis three to six months after Stage II repair. It is important to maximize PROM, soft tissue extensibility, and strength before next surgery.

References

- Ahmad, T. et al. (2016, Sep-Dec). Silicone foley's catheter as an effective alternative to hunter's rod in stage flexor tendon reconstruction of the hand. *Indian Journal of Plastic Surgery* 49(3):322-328. DOI: 10.4103/0970-0358.197232.
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- Thompson, M.J., Owen, J.R., McDowell, C.L., & Wayne, J. (2015, Jan). Proximal tendon-prosthesis junction for active tendon implants of the hand: A biomechanical comparison of 2 techniques. *Journal of Hand Surgery America* 40(1):109-14. DOI: 10.1016/j.jhsa.2014.10.034.

These rehabilitation guidelines were developed collaboratively between UW Health and UnityPoint Health - Meriter Rehabilitation and the UW Health Orthopedic Surgeons.

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