

Thumb Extension Tendon Transfer

This protocol is intended to provide the clinician with a guideline for the postoperative rehabilitation course of a patient who has undergone **tendon transfer of palmaris longus (PL) or extensor indicis pollicis (EIP) to increase thumb extension**. 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.

Extensor pollicis longus (EPL) tendon actively achieves full thumb extension starting at the distal joint. Acute rupture or laceration of EPL will result in a repair but when a repair option is not appropriate due to extensive damage a tendon transfer is needed. Sometimes a nutritional deficiency can also rupture. A nutritional deficiency is related to spontaneous rupture of EPL weeks to months after distal radius fracture at Lister's tubercle, chronic synovitis or tenosynovitis of EPL tendon, and in patient with Rheumatoid arthritis. In these cases, a tendon transfer of either palmaris longus (PL) or extensor indicis pollicis (EIP) is performed to regain active thumb extension. The surgeon will choose which tendon transfer is

Postoperative Guidelines

Surgical Indication

- Significant laceration of EPL tendon with damage
- Delayed repair of EPL tendon
- Nutritional deficiency rupture of EPL tendon

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.

Thumb Extension Tendon Transfer

Phase I (initial)

Conservative

Early Active

Rehabilitation appointments	<ul style="list-style-type: none"> 1-2x/week or per therapist discretion 	<ul style="list-style-type: none"> 1-2x/week or per therapist discretion
Rehabilitation goals and priorities	<p style="text-align: center;">10-14 days after surgery</p> <ul style="list-style-type: none"> Activities of daily living (ADLs) per restrictions Edema management Scar management 	<p style="text-align: center;">3-4 days after surgery</p> <ul style="list-style-type: none"> Activities of daily living (ADLs) per restrictions Edema management Scar management
Suggested therapeutic exercises	<ul style="list-style-type: none"> ROM of uninvolved joints 	<ul style="list-style-type: none"> While protecting the thumb IP and MCP joints in full extension perform short arc of motion of wrist flexion and extension for proximal gliding of the tendon transfer With the thumb and wrist in extension, perform AROM IPJ flexion and extension with an emphasis on extension ROM of uninvolved joints
Precautions	<ul style="list-style-type: none"> No lifting, pushing, or pulling more than 2 pounds with involved upper extremity No weightbearing with involved upper extremity No AROM and functional use of the involved thumb 	<ul style="list-style-type: none"> No lifting, pushing, or pulling more than 2 pounds with involved upper extremity No weightbearing with involved upper extremity No functional use of the involved thumb
Orthotic management	<ul style="list-style-type: none"> Fabricate thermoplastic wrist/hand/finger orthosis (thumb spica) with IPJ included in hyperextension and wrist 30 degrees of extension and thumb in retroposition Wear orthosis all the time 	<ul style="list-style-type: none"> Fabricate thermoplastic wrist/hand/finger orthosis (thumb spica) with IPJ included in hyperextension and wrist 30 degrees of extension and thumb in retroposition Wear orthosis all the time except for exercises and bathing

Thumb Extension Tendon Transfer

Phase II (2 weeks after surgery)

Early Active

Rehabilitation appointments	<ul style="list-style-type: none"> • 1-2x/week or per therapist discretion
Rehabilitation goals and priorities	<ul style="list-style-type: none"> • Activities of daily living (ADLs) per restrictions • Edema management • Scar management
Suggested therapeutic exercises	<ul style="list-style-type: none"> • Initiate AROM thumb opposition with emphasis on extension with wrist in extension • Continue with past exercises
Precautions	<ul style="list-style-type: none"> • No lifting, pushing, or pulling more than 2 pounds with involved upper extremity • No weightbearing with involved upper extremity • No functional use of the involved thumb
Orthotic management	<ul style="list-style-type: none"> • Continue to wear orthosis all the time except for bathing and exercises
Progression criteria	<ul style="list-style-type: none"> • If the exercise above is easy for patient (due to lack of adhesions), consider holding on this exercise for 1 additional week

Thumb Extension Tendon Transfer

Phase II/III (3 weeks)

Conservative

Early Active

Rehabilitation appointments	<ul style="list-style-type: none"> • 1-2x/week or per therapist discretion 	<ul style="list-style-type: none"> • 1-2x/week or per therapist discretion
Rehabilitation goals and priorities	<ul style="list-style-type: none"> • Activities of daily living (ADLs) per restrictions • Edema management • Scar management 	<ul style="list-style-type: none"> • Activities of daily living (ADLs) per restrictions • Edema management • Scar management
Suggested therapeutic exercises	<ul style="list-style-type: none"> • While protecting the thumb IP and MCP joints in full extension perform short arc of motion of wrist flexion and extension for proximal gliding of the tendon transfer • With the thumb and wrist in extension, perform AROM IPJ flexion and extension with an emphasis on extension • Initiate AROM thumb opposition to index and middle finger 	<ul style="list-style-type: none"> • Initiate or continue to progress thumb opposition • Consider mid-range grasp and release with plastic cup to initiate functional thumb extension • If EIP used, stimulate tendon transfer with active IF extension isolated
Precautions	<ul style="list-style-type: none"> • No lifting, pushing, or pulling more than 2 pounds with involved upper extremity • No weightbearing with involved upper extremity • No functional use of the involved thumb 	<ul style="list-style-type: none"> • No lifting, pushing, or pulling more than 2 pounds with involved upper extremity • No weightbearing with involved upper extremity • No functional use of the involved thumb
Orthotic management	<ul style="list-style-type: none"> • Wear orthosis all the time except for bathing and exercises 	<ul style="list-style-type: none"> • Wear orthosis all the time except for exercises and bathing

Thumb Extension Tendon Transfer

Phase III/IV (4 weeks)

Conservative

Early Active

Rehabilitation appointments	<ul style="list-style-type: none"> • 1-2x/week or per therapist discretion 	<ul style="list-style-type: none"> • 1-2x/week or per therapist discretion
Rehabilitation goals and priorities	<ul style="list-style-type: none"> • Activities of daily living (ADLs) per restrictions • Edema management • Scar management 	<ul style="list-style-type: none"> • Activities of daily living (ADLs) per restrictions • Edema management • Scar management
Suggested therapeutic exercises	<ul style="list-style-type: none"> • Initiate full AROM of the thumb • Consider mid-range grasp and release with plastic cup to initiate functional thumb extension • If EIP used, stimulate tendon transfer with active IF extension isolated 	<ul style="list-style-type: none"> • Initiate full AROM of the thumb • Perform gentle active combined finger and thumb motion to decrease extrinsic tightness • If PL was use, simulate the tendon transfer by perform wrist flexion and thumb extension • Initiate isometric strengthening of thumb and wrist
Precautions	<ul style="list-style-type: none"> • No lifting, pushing, or pulling more than 2 pounds with involved upper extremity • No weightbearing with involved upper extremity • No functional use of the involved thumb 	<ul style="list-style-type: none"> • No lifting, pushing, or pulling more than 2 pounds with involved upper extremity • No weightbearing with involved upper extremity • No functional use of the involved thumb
Orthotic management	<ul style="list-style-type: none"> • Wear orthosis all the time except for bathing and exercises 	<ul style="list-style-type: none"> • Wear orthosis all the time except for exercises and bathing
Progression criteria	<ul style="list-style-type: none"> • Per pain tolerance • Progress if no extensor lag of IP joint is present 	<ul style="list-style-type: none"> • Per pain tolerance • Progress if no extensor lag of IP joint is present

Thumb Extension Tendon Transfer

Phase V (5 weeks)

Early Active

Rehabilitation appointments	<ul style="list-style-type: none"> • 1-2x/week or per therapist discretion
Rehabilitation goals and priorities	<ul style="list-style-type: none"> • Activities of daily living (ADLs) per restrictions. Initiate participation functional light activities that promote thumb extension and flexion • Edema management • Scar management
Suggested therapeutic exercises	<ul style="list-style-type: none"> • Intergrade light functional therapeutic activities for grasp and release and pinch and release
Precautions	<ul style="list-style-type: none"> • No lifting, pushing, or pulling more than 2-5 pounds with involved upper extremity • No weightbearing with involved upper extremity • No aggressive pinching and gripping
Orthotic management	<ul style="list-style-type: none"> • Wean from orthosis. Perform light activities with no orthosis in place with emphasis on thumb flexion and extension with activities. Continue to wear at night and moderate/heavy activities
Progression criteria	<ul style="list-style-type: none"> • Per ability and pain tolerance • If IPJ extensor lag present, do not progress

Thumb Extension Tendon Transfer

Phase IV/VI (6 weeks)

Conservative

Early Active

Rehabilitation appointments	<ul style="list-style-type: none"> • 1-2x/week or per therapist discretion 	<ul style="list-style-type: none"> • 1-2x/week or per therapist discretion
Rehabilitation goals and priorities	<ul style="list-style-type: none"> • Activities of daily living (ADLs) per restrictions • Edema management • Scar management 	<ul style="list-style-type: none"> • Activities of daily living (ADLs) per restrictions • Edema management • Scar management
Suggested therapeutic exercises	<ul style="list-style-type: none"> • Perform gentle active combined finger and thumb motion to decrease extrinsic tightness • If PL was use, simulate the tendon transfer by perform wrist flexion and thumb extension • Perform AA/PROM independent thumb and wrist • Isometric thumb and wrist strengthening 	<ul style="list-style-type: none"> • PROM of the wrist and thumb independent and then progress to combined if needed
Precautions	<ul style="list-style-type: none"> • No lifting, pushing, or pulling more than 2 pounds with involved upper extremity • No weightbearing with involved upper extremity • No aggressive pinching or gripping 	<ul style="list-style-type: none"> • No lifting, pushing, or pulling more than 2-5 pounds with involved upper extremity • No weightbearing with involved upper extremity • No aggressive pinching or gripping
Orthotic management	<ul style="list-style-type: none"> • Wean from orthosis. Perform light activities with no orthosis in place with emphasis on thumb flexion and extension with activities. Continue to wear at night and moderate/heavy activities 	<ul style="list-style-type: none"> • Wean from orthosis and perform all activities within restrictions. Wear orthosis at night. • Dynamic or static progressive orthosis to increase ROM if needed

UW Health outpatient rehabilitation guidelines

Progression criteria	<ul style="list-style-type: none">• Per ability and pain tolerance• If IPJ extensor lag present, do not progress	<ul style="list-style-type: none">• Per ability and pain tolerance• If IPJ extensor lag present, do not progress
----------------------	---	---

Thumb Extension Tendon Transfer

Phase VII (7 weeks)

Rehabilitation appointments	<ul style="list-style-type: none"> • 1-2x/week or per therapist discretion
Rehabilitation goals and priorities	<ul style="list-style-type: none"> • Perform all activities of daily living with involved thumb/hand within restrictions
Suggested therapeutic exercises	<ul style="list-style-type: none"> • Initiate resistive strengthening pinching and gripping
Precautions	<ul style="list-style-type: none"> • No lifting, pushing, or pulling more than 5 pounds with involved upper extremity • No weightbearing with involved upper extremity
Orthotic management	<ul style="list-style-type: none"> • Discontinue orthosis. Can consider use of oval-8 to support IPJ in extension to decrease tension of tendon at night or with heavy activities
Progression criteria	<ul style="list-style-type: none"> • Per ability and pain tolerance • If IPJ extensor lag present, do not progress

Thumb Extension Tendon Transfer

Phase V/VIII (8 weeks)

Conservative

Early Active

Rehabilitation appointments	<ul style="list-style-type: none"> 1-2x/week or per therapist discretion 	<ul style="list-style-type: none"> 1-2x/week or per therapist discretion
Rehabilitation goals and priorities	<ul style="list-style-type: none"> Perform all activities of daily living with involved thumb/hand within restrictions 	<ul style="list-style-type: none"> Perform all activities of daily living with involved thumb/hand within restrictions
Suggested therapeutic exercises	<ul style="list-style-type: none"> Initiate PROM combined of wrist and thumb Initiate resistive strengthening 	<ul style="list-style-type: none"> Continue Strengthening Progress to weightbearing
Precautions	<ul style="list-style-type: none"> No lifting, pushing, or pulling more than 5 pounds with involved upper extremity No weightbearing with involved upper extremity 	<ul style="list-style-type: none"> No lifting, pushing, or pulling more than 5 pounds with involved upper extremity No weightbearing with involved upper extremity
Orthotic management	<ul style="list-style-type: none"> Wean from orthosis and perform all activities within restrictions. Wear orthosis at night. Dynamic or static progressive orthosis to increase ROM if needed 	<ul style="list-style-type: none"> As needed
Progression criteria	<ul style="list-style-type: none"> Per ability and pain tolerance If IPJ extensor lag present, do not progress 	<ul style="list-style-type: none"> Per ability and pain tolerance If IPJ extensor lag present, do not progress

Thumb Extension Tendon Transfer

Phase VI/IX (10-12 weeks)

Conservative

Early Active

	Conservative	Early Active
Rehabilitation appointments	<ul style="list-style-type: none"> As needed 	<ul style="list-style-type: none"> As needed
Rehabilitation goals and priorities	<ul style="list-style-type: none"> Perform all activities of daily living with involved thumb/hand. Initiate participation in leisure and heavy work activities 	<ul style="list-style-type: none"> Perform all activities of daily living with involved thumb/hand within restrictions. Initiate participation in leisure and heavy work activities
Suggested therapeutic exercises	<ul style="list-style-type: none"> Progress to weightbearing Continue strengthening Progress to leisure and heavy work strengthening 	<ul style="list-style-type: none"> Progress to leisure and heavy work strengthening
Precautions	<ul style="list-style-type: none"> No restrictions at 12 weeks 	<ul style="list-style-type: none"> No restrictions at 10 weeks
Orthotic management	<ul style="list-style-type: none"> Discontinue, as needed 	<ul style="list-style-type: none"> As needed
Progression criteria	<ul style="list-style-type: none"> Per ability and pain tolerance If IPJ extensor lag present, do not progress 	<ul style="list-style-type: none"> Per ability and pain tolerance If IPJ extensor lag present, do not progress

Additional Notes

An exercise for facilitating IP joint extension is to passively flex the wrist and thumb MP joint while actively extending the thumb IP joint. Progress exercises by gradually extending the wrist, keeping the MP joint flexed while instructing patient to actively extend the IP joint.

Be careful to avoid passive stretching or allowing a patient to passively stretch the thumb too early as this could lead to overstretching the tendon, making it less effective at extending the IP joint.

Consider progressing faster actively if there is significant scar tissue formation that is limiting the tendon from gliding.

Initiate NMES at 4 weeks to increase activation of tendon transfer.

References

1. Cannon, N. M., Beal, B., & Walters, K. (2001). Diagnosis and treatment manual for physicians and therapists. Indianapolis: The Hand Center of Indiana PC.
Elliot, D. and Southgate, C.M. (2005). New concepts in managing the long tendons of the thumb after primary repair. *Journal of Hand Therapy*, 18(2), 141-156.
2. Kim, C.H. (2012). Spontaneous rupture of the extensor pollicis longus tendon. *Archives of Plastic Surgery*, 39(6), 680-682. DOI: [10.5999/aps.2012.39.6.680](https://doi.org/10.5999/aps.2012.39.6.680)
3. Kutsumi, K., Amadio, P.C., Chunfeng, Z., Zobitz, M.E., and Kai-Nan, A. (2004). Measurement of gliding resistance of the extensor pollicis longus and extensor digitorum communis II tendons within the extensor retinaculum. *The Journal of Hand Surgery*, 29A(2), 220-224.

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

Content is for informational purposes only and does not replace the guidance, diagnostic or treatment options or educational materials your healthcare provider gives you. Call your health provider immediately if you think you may have a medical emergency. Always seek the advice of your health provider prior to starting any new treatment and contact them immediately with any medical emergency.