TENDON TRANSFER
[EIP to EPL]

INDICATIONS
The EIP to EPL tendon transfer is indicated with EPL ruptures. The procedure is performed in rheumatoid or lupus patients with synovitis caused from increased friction along Lister's tubercle or from medications such as steroids. In addition, ruptures occur from distal radius fractures or other wrist injuries which may present with irregularities along the fracture healing site or from hardware utilized for fracture reduction.

The tendon transfer becomes necessary in those cases where direct repair is not possible due to tendon retraction and atrophy or fraying of the tendon.

SURGICAL PROCEDURE
A longitudinal incision is made along the dorsum of the wrist. The ruptured EPL is identified and dissected free, carefully protecting the superficial branch of the radial nerve. The EIP is then harvested distally over the ulnar side of the extensor expansion proximal to the index MP joint. The EIP is carefully mobilized and attached to the EPL tendon. Great attention is given to properly tensioning the transfer (not too loose-not too tight). A bulky compressive dressing is applied to protect the transfer with the wrist in 0°-15° of extension, the thumb midway between full palmar and radial abduction, the MP joint in neutral extension and the IP joint in ± 30° hyperextension.

5 – 7 Days Postop
The bulky compressive dressing is removed. A light compressive dressing or elastic bandage is applied to the hand and forearm, along with 1" Coban™ for the thumb. [Note: It is ideal to remove the bulky within the first week to ensure the proper thumb positioning is maintained in the early weeks postop. This positioning can change as the edema resolves and the dressing shifts.]

A custom-fabricated wrist and thumb static extension orthosis is fitted for continual wear. The wrist is positioned in 0°-15° of extension, the thumb midway between radial and palmar abduction, the MP joint in neutral extension and the IPJ in hyperextension (± 30°).

AROM exercises are encouraged for the shoulder, elbow, wrist and digits not immobilized in the orthosis (2-3 times a day for approximately five minutes).

The patient is encouraged to elevate the hand as much as possible, particularly when sitting and sleeping.

10 – 14 Days Postop
The sutures are removed, assuming the wound is closed. [Note: With RA and lupus patients, it is preferred to wait a full 14 days or more for suture removal. Often, these patients are on steroid medications that may delay soft tissue healing.]

Within 3-5 days following suture removal, *gentle* scar massage with lotion may be initiated. This should be performed 3-5 times a day for ± 3 minutes for the initial 8-12 weeks postop.

3 Weeks Postop
Gentle, *mid-range* AROM may be initiated to the wrist (flexion/extension), with the forearm in the neutral position, the wrist resting on the tabletop, and the thumb lightly resting on the radial side of the index finger. The exercise may be performed ± 4 times a day, 15-25 slow repetitions.

3 ½ – 4 Weeks Postop
Full arc AROM exercises may be initiated to the wrist in flexion and extension. Mid-range active flexion may be initiated to the thumb, while keeping the wrist in neutral to 30° of extension. [Note: Begin each thumb exercise with actively straightening the thumb as best as possible and following this with touching each fingertip. Subsequently, this should be followed with touching each flexion crease at the PIPJ level. *Avoid* attempts at full composite active flexion during the initial week of thumb exercises. The emphasis should be on full active thumb extension and mid-range active flexion to gently elongate adhesions and limit relative lengthening of the transfer.]

A valuable functional exercise to include is reaching for and grasping a cone shaped object or plastic glass (of proportionate size) followed by sitting the object down and releasing it.

Avoid simultaneous wrist flexion and thumb flexion to avoid the risk of elongating the transfer, until 6 weeks postop.

Tendon Transfer
EIP to EPL [continued]

5 Weeks Postop
Active radial and ulnar deviation of the wrist may be added, with the thumb resting on the radial side of the index finger. Gentle passive wrist flexion may be initiated, if limited.

Full arc AROM of the thumb may be initiated. Emphasis should be place on strong active extension of the thumb, followed by *less forceful* active flexion.

NMES may be initiated to facilitate tendon excursion.

Manual desensitization exercises may be initiated if hypersensitivity is present along the SBRN.

The custom-fabricated wrist and thumb static orthosis may be reduced to hand based, with the thumb in the same postop position. The orthosis may be left off for three, one hour sessions for light hand use.

5½ Weeks Postop
Passive ulnar deviation of the wrist may be added, should ulnar deviation be limited.

Composite active flexion of the wrist and thumb may be initiated, remembering to emphasize active thumb extension following the combined wrist and thumb flexion. The goal is to gradually resolve any extrinsic extensor tightness through active exercise. In addition, begin active reverse blocking for the EPL.

Self-passive flexion may be performed isolating the CMCJ separate from the MPJ and separately the IPJ.

6 Weeks Postop
Composite passive flexion exercises may be initiated to the thumb. During the first week it is recommended to perform the PROM for the wrist separate from the thumb.

Performing the taping procedure to increase passive thumb flexion may be initiated 2-3 times a day for ±15-20 minutes. [Note: Recommend moist heat for ± 10 minutes prior to taping.]

The hand-based orthosis is continued for night wear. [Note: Should there be an extensor lag or 15° or more, continue the orthosis ± 3 times during the day for an hour.]

6 ½ - 7 Weeks Postop
A custom-fabricated, forearm based dynamic wrist and thumb flexion orthosis may be fabricated in the presence of limited passive flexion and persistent extrinsic tightness of the tendon transfer. It would be common to wear the orthosis 3-5 times a day for 20-30 minute sessions. [Note: To heat prior to wearing the orthosis is recommended.]

Soft putty may be initiated for gripping 2-3 times a day for ± 5 minutes.

7 Weeks Postop
The hand-based orthosis should be discontinued altogether in the presence of a negligible lag at the IPJ (±10° IP joint extensor lag from neutral).

8 – 9 Weeks Postop
Soft putty may be added for *light* resistance to the thumb in extension (resistance along the thumb proximal phalanx – *not* the distal phalanx), to perform 2-3 times a day, ± 15 repetitions.

10 – 12 Weeks Postop
The goal is to eliminate all orthoses by this timeframe and wean off the home therapy exercise program.

RECOMMENDED READING:
Bjorkman, A., Jorgsholm, P., Rupture of the extensor pollicis longus tendon: a study of aetiological factors. Scandinavian Journal of Plastic and Reconstructive Surgery and Hand Surgery, Vol 38, 2004 – issue 1

Lee, J., et.al. A New Method to Control Tendon Tension in the Transfer of Extensor Indicis Proprius to Extensor Pollicis Longus Rupture. Annals of Plastic Surgery. December, 2015. Vol. 75 Issue 6, pp 607-609

Jung S., et.al. Standard versus over-tensioning in the transfer of extensor indicis proprius to extensor pollicis longus for chronic rupture of the thumb extensor. Journal of Plastic, Reconstructive & Aesthetic Surgery. July 2014. Vol. 67 Issue 7, pp 979-985