

# Tendon Transfer Surgery

## What is Tendon Transfer Surgery?

Tendon transfer surgery is a type of hand surgery that is performed in order to improve lost hand function. A functioning tendon is shifted from its original attachment to a new one to restore the action that has been lost.

## Who needs Tendon Transfer Surgery?

Many different conditions can be treated by tendon transfer surgery. Tendon transfer surgery is necessary when a certain muscle function is lost because of a nerve injury. If a nerve is injured and cannot be repaired, then the nerve no longer sends signals to certain muscles. Those muscles are paralyzed and their muscle function is lost. Tendon transfer surgery can be used to attempt to replace that function. Common nerve injuries that are treated with tendon transfer surgery are spinal cord, radial nerve, ulnar nerve, or median nerve injury.

Tendon transfer surgery may also be necessary when a muscle has ruptured or been lacerated and cannot be repaired. Common muscle or tendon injuries that are treated with tendon transfer surgery are tendon ruptures due to rheumatoid arthritis or fractures. Also, tendon lacerations that cannot be repaired after injury may be treated with tendon transfer surgery.

Tendon transfer surgery may also be needed if a muscle function has been lost due to a disorder of the nervous system. In this situation, the nervous system disease or injury prevents normal nerve signals from being sent to a muscle, and imbalance in hand function occurs. The muscle imbalance or muscle loss due to nervous system disease may be treated with tendon transfers. Common nervous system disorders treated with tendon transfer surgery are cerebral palsy, stroke, traumatic brain injuries, and spinal muscle atrophy.

Finally, there are some conditions in which babies are born without certain muscle functions. In these situations, the missing muscle functions can sometimes be treated with tendon transfer surgery. Common conditions treated this way include hypoplastic (underdeveloped) thumbs and birth brachial plexopathy (nerve problem with paralysis).

## What happens during Tendon Transfer Surgery?

Below the elbow, there are over forty muscles. Each different muscle has a different function. For example, there are 9 muscles that move the thumb. Each muscle has a starting point (origin), and tapers down from its muscle belly into a tendon that then attaches onto bone (insertion) in a specific place; when the muscle fires (contracts), it causes a certain motion (action).

During tendon transfer surgery, the origin of the muscle is left in place; the nerve supply and blood supply to the muscle is left in place. The tendon insertion (attachment) onto bone is detached and re-sewn into a different place. It can be sewn into a different bone, or it can be sewn into a different tendon. After its insertion has been moved, when the muscle fires, it will produce a different action, depending on where it has been inserted.

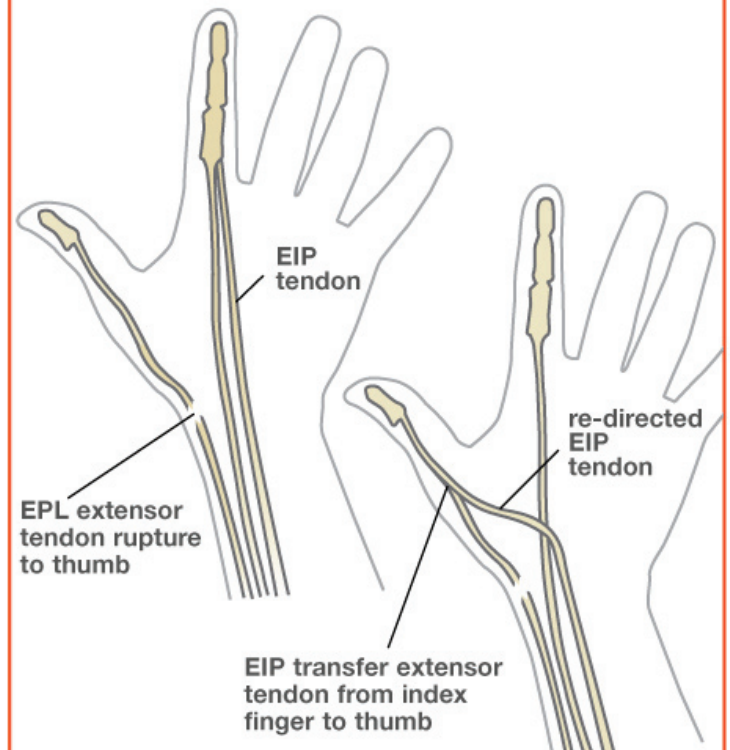
## What are the alternatives to Tendon Transfer Surgery?

You can discuss other treatment choices with your hand surgeon. Other options may include repairing the nerve that has been injured, or repairing the tendon or muscle that has been injured. In some cases, tendon grafts can be used, in which a portion of intact tendon is removed, without its muscle, and used to bridge a gap in an injured tendon. In other cases, tendon lengthening or bone fusions may be necessary as part of reconstructing hand function.

## What are the risks to Tendon Transfer Surgery?

All surgery has some risk, although those risks may be small. All surgeries produce a surgical scar. Surgical incisions may develop infection. All surgeries require the use of anesthesia, and will require a complete history and physical examination by your primary care physician to determine if you have medical risks associated with anesthesia. Evaluation by the anesthesiologist will help outline your risks and options.

Figure 1: Example of Tendon Transfer surgery.



When a tendon is transferred and sewn into another position, the tendon transfer will need a period of time to heal, usually about one to two months. A splint or cast may be used, followed by therapy to teach you the new tendon function. Finally, exercises will be needed to strengthen the muscle after your hand surgeon feels the tendon transfer has sufficiently healed. You will need to follow post-operative instructions. Movement too early can lead to rupture of the tendon transfer. Movement too late can lead to excessive scarring of the tendon with resultant stiffness. Discussion of your individual case with your hand surgeon will help you further understand the risks and benefits associated with tendon transfer surgery.

## What is an example of Tendon Transfer Surgery?

After a fracture of the wrist, the fragments of bone associated with the fracture may erode the tendon that straightens the tip of the thumb. In this situation, the thumb tip would not be able to move upward (extend). The muscle that extends the tip of the thumb is the extensor pollicis longus (EPL) (see Figure 1). In this example, the EPL tendon typically cannot be directly repaired because it is too frayed. There are two muscles that extend the index finger. Just like the body has two kidneys, so that one can be spared if necessary, the body also has two tendons that extend the index finger. One tendon is left intact on the index finger so that it won't lose extension, and the "extra" tendon can be transferred over to the thumb to replace the lost function. The tendon insertion of the "extra" index finger extensor tendon (Extensor indicis proprius—EIP) is detached. The EIP tendon is then re-directed and sewn into the thumb bone or thumb tendon (EPL). After this type of surgery, a splint or cast is used for one month, after which supervised therapy may be started to re-learn how to use the transferred tendon to extend the thumb. Gentle movement with a protective splint may be used for an additional month. If adequate progress is made, the therapy may be advanced one month later to re-learn activities and to strengthen the muscle, with restoration of the ability to extend the thumb. A supervised hand therapy program for retraining the muscles is extremely important to achieve the best possible function.