



KATARZYNA MACKENZIE

PLASTIC SURGEON

Tendon Repair and Reconstruction

With so many bones, ligaments, tendons, and joints keeping hands and wrists working, there is ample opportunity for injury. In fact, the hand is one of the most commonly injured parts of the body. With a wealth of international experience in hand trauma surgery Dr Mackenzie can offer the latest techniques in nerve repair and reconstruction, tendon repair and reconstruction and neuroma management.

A deep cut on the fingers, hand, wrist, or forearm can damage the flexor or extensor tendons, which are the tissues that help control movement in the hand. Occasionally, the tendon is detached from the bone by a violent pulling injury to the finger.

A flexor or extensor tendon injury can make it impossible to bend or straighten your fingers or thumb. Surgical repair is necessary.

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|--------------------------------|---|
| Length of surgery | 1-3 hours, depending on the extent of injury |
| Anaesthesia | Regional or general anaesthetic |
| Hospital stay | Day case |
| Risks/complications of surgery | Frequent: Swelling, stiffness, discomfort on movement Infrequent: Infection, bleeding (haematoma), delayed wound healing, painful scar, damage to the nerve, recurrence, repair failure, adhesions, complex regional pain syndrome |
| Recovery | 6 to 8 weeks resume light activities, such as using a keyboard or writing with a pen 8 to 10 weeks resume medium activities, such as light lifting or shelf stacking 10 to 12 weeks resume heavy activities, such as heavy lifting or building work 10 to 12 weeks resume sporting activities 3-9 months until final result |
| Driving | 8-10 weeks |
| Hand position | Elevation above the heart level |
| Follow up | 1 week, 6 weeks, 3 months, 6 months |
| Duration of results | Permanent unless failure |

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Referral expectations

You need to bring with you to your appointment:

- Any letters or reports from your GP or hospital
- Any X-Rays, CT or MRI films and reports
- All medicines you are taking including herbal and natural remedies
- Your ACC number, if you have one

What is a tendon?

Tendons are tough cords that connect muscles to bone. When muscles contract, tendons pull on bones. This causes parts of the body (such as a finger) to move.

The tendons on the top of the hand straighten the fingers and thumb. These are known as extensor tendons. The tendons on the palm side bend the fingers. These are known as the flexor tendons.

What happens when a tendon is injured?

A torn or cut tendon in the forearm, at the wrist, in the palm, or along the finger will make it impossible move one or more joints in a finger.

If your extensor tendons are damaged, you'll be unable to straighten one or more fingers.

If your flexor tendons are damaged, you'll be unable to bend one or more fingers.

Occasionally, flexor tendons may be partially cut or torn. With a partial tendon tear, it may still be possible to bend your finger, but not completely. These types of tears can be difficult to diagnose.

What are the signs of a flexor tendon injury?

- A wound across the palm or fingers
- Inability to bend the finger either partly or totally
- Finger lying out straighter than the adjacent digits
- Pain when trying to bend the fingers
- There may also be numbness of the finger due to injury to the nerves, which lie close to the tendons

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What are the signs of an extensor tendon injury?

- A cut across the back of the wrist, hand or finger
- Inability to fully straighten the finger or thumb
- The finger or thumb drooping downwards
- Pain on trying to straighten the finger or thumb

What are the causes of flexor tendon injury?

In addition to cuts on the arm, hand, or fingers, certain sports activities can cause flexor tendon injuries. These injuries often occur in football, wrestling, and rugby. "Jersey finger" is one of the most common of these sports injuries. It can happen when one player grabs another's jersey and a finger (usually the ring finger) gets caught and pulled. The tendon is pulled off the bone. In sports that require a lot of arm and hand strength, such as rock climbing, tendons and/or their sheaths can also be stretched or torn.

Certain health conditions (rheumatoid arthritis, for example) weaken the flexor tendons and make them more likely to tear. This can happen without warning or injury — a person may simply notice that his or her finger no longer bends.

How is the tendon injury diagnosed?

Dr Mackenzie will test the tendons to ascertain their integrity and decide if a repair is needed. X-rays may be taken if the injury was caused by glass or if damage to a joint is suspected. Occasionally, ultrasound or MR scans are needed to give more information about the tendon.

What is the treatment?

After examining your hand, Dr Mackenzie will place your hand in a splint for protection. In general, the sooner surgery is performed, the better recovery will be.

Cut tendons do not heal by themselves; the tension in the tendon causes its cut ends to separate, sometimes by several centimetres. Without surgical repair, there is no prospect of regaining the movement that has been lost.

The repair may be performed under general anaesthetic or regional anaesthetic (injection of local anaesthetic at the shoulder). A tourniquet will be wrapped around your upper arm to stop the blood circulating so that bleeding at the wound doesn't make it difficult to see the relevant structures.

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The wound is enlarged so that the cut ends of the tendon can be found and held together with stitches. At the end of the operation the hand and forearm are immobilized in a plaster splint that is placed over the bandages with the wrist and fingers in position depending on tendon injury, in order to protect the repair.

In some cases, it isn't possible to reattach the 2 ends of the ruptured tendon. This may be because the ends of the tendon are too frayed.

In these circumstances, surgery may be carried out to reconstruct the tendon or detach a tendon from one of your healthy fingers (each finger has 2 flexor tendons connected to it) and reattach it to the damaged finger or thumb. This is known as a tendon transfer.

Treatment for partial tears

Recent evidence suggests that partially torn tendons do not require surgery for good results. The same splinting and exercise programs that are used for surgery patients can be very effective for patients with partial tears, but with no surgery necessary.

This nonsurgical treatment option is appropriate only after the doctor has explored the wound to accurately assess the extent of the injury.

Flexor tendon reconstruction

It is not always possible to stitch the two ends together. This may be because the ends are too frayed, or diagnosis was either missed or repair has failed and now the two tendon ends no longer meet or would be too tight if repaired to be useful.

In these situations, tendon reconstruction is performed. It can involve to use a tendon graft and bridge the gap between the two ends of the damaged tendon. This may have to be done in two stages if the tunnel that the tendon normally runs in has closed down. In first stage, a silicone rod is temporarily placed to reopen the tunnel. Once this has occurred, the rod is removed and the tendon graft is used to repair the original tendon.

It may be possible to transfer the damaged tendon end to a neighbouring working tendon. The neighbouring tendon then takes on the work of both. This is done in some cases of rheumatoid arthritis and also in some nerve injuries where not all muscles can work anymore.

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What is the recovery after tendon repair?

It is very important to elevate your hand as often as possible, following your operation as it helps to reduce the swelling.

The hand therapist will usually replace the plaster splint with a light plastic splint and start a protected exercise programme within a few days of the operation. The therapy programme after tendon repair is crucial and at least as important as the operation itself, so it is vital to follow the instructions of the therapist closely. The objective is to keep the tendon moving gently in the tunnel, to prevent it sticking to the walls of the tunnel, but to avoid breaking the repair.

The splint is usually worn for five or six weeks for flexor tendon repair, after which a gradual return to hand use is allowed. For extensor tendons repair, the splint is usually worn for between three and six weeks, depending on the injury, after which a gradual return to hand use is allowed. However, the tendon does not regain its full strength until three months after the repair and the movement may improve slowly for up to six months.

You can expect some mild pain, swelling, and stiffness after your procedure. It may take from 4 to 9 months for swelling and stiffness in your hand and fingers or thumb to go away completely.

Although the scar may be red and tender for several weeks, it is seldom troublesome in the longer term.

You can have a bath or shower 48 hours after your operation, but keep your wounds dry until they have healed. It is helpful to wear a large plastic bag over your arm for showering or bathing.

When can I return to work?

How quickly you can return to work and resume normal daily activities will depend on the nature of your job, as well as the type and location of your injury.

The repaired tendon will usually be back to full strength after about 12 weeks, but it can take up to 6 months to regain the full range of movement.

In general, most people are able to:

- Resume light activities, such as using a keyboard or writing with a pen, after 6 to 8 weeks
- Drive a car or motorcycle after 8 to 10 weeks
- Resume medium activities, such as light lifting or shelf stacking, after 8 to 10 weeks
- Resume heavy activities, such as heavy lifting or building work, after 10 to 12 weeks
- Resume sporting activities after 10 to 12 weeks

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Long-term outcomes after flexor tendon repair

Over the last several decades, advanced research and experience in the treatment of flexor tendon injuries have resulted in improved patient outcomes. Flexor tendon injuries, however, can be very challenging to treat.

Despite extensive therapy, some patients have long-term stiffness after flexor tendon injuries. Sometimes, a second surgery is required to free up scar tissue and to help the patient regain motion.

Overall, flexor tendon surgery results in good return of function and high patient satisfaction.

What are the complications of tendon repair?

Complications associated with this surgery can include:

- Infection – this can be settled by taking antibiotics
- Swelling and stiffness
- Painful scar
- Bleeding
- Neurovascular injury
- Wound healing problems
- Delayed wound healing
- Repair failure (1 in 20)- it usually occurs soon after the operation, when the tendon is weakest. Tendon ruptures often happen in people who don't follow the advice about resting the affected tendon. Accidental trips falls or suddenly catching the splint on an object can also rupture the tendon
- Tendon adhesion- this can cause loss of movement, which is minor in most cases. More serious cases of tendon adhesion require surgery to free the stuck tendon
- CRPS-complex regional pain syndrome