

Hand Tendon and Nerve Injuries

The tendons and nerves on the palm side of the hand sit in narrow channels close to the skin. Cuts and lacerations often involve more than one structure.

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What you're feeling

You may notice a mix of pain, weakness, and changes in sensation in your hand or wrist. If you have suffered a nerve injury, you might feel sharp, shooting pain or a burning sensation. This is often caused by a painful neuroma, which is a tangled bundle of nerve fibres that forms after the nerve is damaged. You might also feel tingling or numbness in specific fingers. For example, if the median nerve is injured, you may lose feeling in your thumb, index, and middle fingers. If the ulnar nerve is affected, your little finger and ring finger may feel numb or weak.

Your hand may feel stiff or difficult to move. Nerve injuries can stop your muscles from receiving signals, leading to weakness. You might find it hard to grip objects, hold a cup, or turn a key. In some cases, you may have preserved finger bending but still struggle with fine movements like buttoning a shirt or picking up small items. If you have a tendon injury alongside the nerve damage, you might hear a snap or feel a sudden pop at the time of injury. You may then be unable to straighten or bend a finger fully.

Pain often worsens with activity or when you use your hand for repetitive tasks. You might notice symptoms flare up at night, making it hard to sleep comfortably. If you have a high radial nerve injury, you may struggle to lift your wrist or fingers, a condition known as wrist drop. This can make daily tasks like washing your face or typing difficult. In cases of severe nerve damage, such as a complete cut across the wrist, sensation returns slowly. Regeneration typically begins within a month, moving at a rate of five millimetres per week or more for ulnar nerve repairs. However, sensory return is slower for median nerve repairs, with only two in five patients showing this steady progress.

If you have a fracture alongside these injuries, your risk of long-term disability increases. You may experience persistent pain or stiffness even after the bone heals. It is important to recognise these symptoms early. Prompt referral to an upper extremity specialist can help optimise your recovery. We aim to restore your function and reduce discomfort through tailored treatment plans.

What's actually happening

Your hand relies on a complex network of tendons and nerves to move and feel. Tendons act like strong ropes that connect your muscles to your bones, allowing you to grip and release objects. Nerves are the communication cables that send signals from your brain to tell those muscles when to contract. When these structures are injured, the smooth coordination of your hand breaks down.

Injuries to the flexor tendons, which bend your fingers, can disrupt the delicate balance needed for movement. We use grafts to repair these tears, ensuring they are strong enough to handle the forces of therapy immediately after surgery. The thumb has a special pulley system made of four bands that keep the tendon close to the bone. This setup acts like a gasket, preventing the tendon from bowstringing away when you make a fist. If this system is damaged, your grip weakens significantly, especially when holding smaller objects.

Nerve injuries cut off the signal pathway. Without these signals, your muscles cannot receive the command to move. In cases where the nerve cannot be directly repaired, we may use tendon transfers. This involves rerouting a working tendon to take over the job of the damaged one. For example, we might route a tendon to restore thumb extension and abduction, helping your thumb clear from your palm again.

Sometimes, we combine nerve repair with tendon transfer to improve function. This approach is particularly useful for high nerve injuries where the gap is large. We aim to restore sensation, which makes up 40% of the goal in thumb or fingertip repairs, alongside length and appearance. Accurate diagnosis through physical examination and imaging is essential. This helps us limit joint stiffness while preserving as much mobility and function as possible for your daily life.

What we can do about it

Dr Kieran Hirpara, an upper-limb surgeon at Mater Private Hospital Rockhampton, starts with the least invasive options that suit your specific injury.

Patients are generally referred to our clinic by their GP; if a physiotherapist has suggested you see us, you will still need a referral from your GP in order to be eligible for the Medicare rebate. A clinic assessment (history, examination, and imaging where needed) establishes the diagnosis. For degenerative or long-standing problems we usually try non-operative care – activity change, physiotherapy or hand therapy, splinting, and injections – and consider surgery when that has not given enough improvement. For structural or acute problems, surgery may be recommended straight away, without a preceding non-operative trial.

Physiotherapy aims to restore movement and strength while protecting the healing tissues. We often use splints to keep the injured area stable. If you have nerve pain, we may discuss pain medication or anti-inflammatory drugs to help you manage discomfort. Injections such as cortisone can reduce swelling and pain around the tendon or nerve. These treatments do not fix a torn tendon or severed nerve, but they can ease symptoms and allow you to stay active while your body heals.

Surgery is considered when conservative care does not restore function, or when the injury is severe enough to require immediate repair. We may repair the nerve directly, use a graft to bridge a gap, or transfer a healthy

tendon to replace a damaged one. In some cases, we combine nerve and tendon procedures to restore grasp and release. The choice depends on the location and severity of your injury. We discuss these options with you to ensure the plan matches your goals for daily function and return to work.

What to expect

Your recovery depends on the type and severity of your injury. If you have a high radial nerve injury with a gap of nine centimetres or greater, your surgeon may attempt nerve reconstruction within eight months before considering tendon transfers. For other nerve injuries, such as those to the median or ulnar nerves, tendon transfer is a useful option to restore function when direct nerve repair does not result in useful movement or is not possible.

Recovery is a gradual process. For single digital nerve repairs in adults, evidence shows that only 24% of repaired nerves regain sensory recovery close to or equivalent to estimated pre-injury levels. However, significant improvements in function are seen throughout the follow-up period after median or ulnar nerve repair. If you present early and can tolerate a longer time to functional recovery, you may be an optimal candidate for nerve transfers over tendon transfers in radial nerve palsy.

Outcomes vary based on timing and wound conditions. Primary tendon repair is permissible only when strict criteria are met, including early presentation, minimal contamination, and favourable wound conditions. Otherwise, secondary repair via tendon graft is recommended. A carefully executed primary repair in a sharp wound reduces the time to maximum recovery and usually results in better function than previously recommended secondary grafting. Delayed repair often requires grafts with far from perfect results.

Simultaneous nerve repair and tendon transfer showed no detrimental results and may provide improved function over tendon transfer alone. Most adverse outcomes in surgery for idiopathic trigger finger are short-term pain, stiffness, and swelling, with major complications such as nerve injury or deep infection being uncommon. Follow-up time and age significantly influence the outcome following nerve repair. Your surgeon will discuss which approach offers the best chance for restoring your hand function based on your specific injury.

When to see someone

Seek urgent care if you have a deep cut, especially near the wrist or fingers, or if you notice numbness, tingling, or weakness in your hand. These signs suggest possible nerve or tendon damage. Fractures often accompany these injuries and increase the risk of long-term disability. If you experience severe pain, swelling, or inability to move your fingers, do not wait. Early assessment by an upper extremity specialist is critical. Delaying treatment for more than six months can significantly reduce the chance of nerve recovery. Prompt evaluation helps your surgeon plan the best repair to restore function and sensation.

In more depth

This section goes further than you need for your own treatment decisions. Tendon and nerve repair in the hand is worth the extra reading because the operation is only half the treatment – what happens in the following weeks determines the result as much as the repair itself, and the evidence there has become quite specific.

MOVING EARLY BEATS PROTECTING

After a flexor tendon repair, two things compete. Move the finger and the repair may rupture; keep it still and the tendon scars to its sheath, so it heals intact but cannot glide – a stiff finger with a healed tendon inside it.

Across **569** patients, the **early active motion group obtained greater total active motion** than the early passive motion group. The qualification matters as much as the finding: a **higher risk of rupture** was noted in the active flexion-and-extension subgroup where the repair used only a **2-strand core suture** [1].

That is the trade stated precisely. Early active movement produces better final motion, but it demands a repair strong enough to withstand it. This is why the number of strands crossing the repair is discussed at all – it is not technical detail for its own sake, but what determines whether the safer, better rehabilitation can be used.

THE RELATIVE MOTION APPROACH, AND WHERE ITS EVIDENCE ACTUALLY APPLIES

Relative motion orthoses hold the injured finger in slightly different alignment from its neighbours, unloading the repair while allowing the hand to be used. It is a considerable advance in tolerability over immobilising a hand for six weeks.

The evidence base is uneven, and worth knowing accurately. There is now **good evidence that the relative motion approach is safe in zones V-VI extensor tendon repairs**, but **limited evidence for zones IV and VII extensor and for flexor tendon repairs** [2].

So an approach well supported for extensor repairs on the back of the hand is not, on current evidence, equally established for flexor repairs in the finger. Where it is used there, it is reasonable extrapolation rather than demonstrated practice.

FOR NERVES, THE TECHNIQUE MATTERS LESS THAN THE GAP

Digital nerve repair has attracted a range of techniques – direct suture, autograft taken from elsewhere, processed allograft, and synthetic conduits.

Across **625** repairs, **all available techniques have reasonable outcomes**, and where there is a gap – excluding direct repair – **autograft and allograft performed comparably** [3].

The decisive variable is therefore whether the nerve ends can be brought together without tension. If they can, direct repair is done. If they cannot, the gap must be bridged, and the current evidence does not compel taking a nerve from elsewhere in the patient to do it – which spares a donor site and the numb patch that comes with it.

WHY RECOVERY IS MEASURED IN MONTHS

Both tissues heal on a biological timetable that no technique shortens. A repaired tendon is at its weakest around three weeks, when the initial fibrin has been resorbed and new collagen has not yet matured – which is precisely when the finger feels better and people are most tempted to use it.

Nerves regenerate by growing axons down the remaining sheath at roughly a millimetre a day. From a cut at the base of a finger, reaching the fingertip therefore takes several months, and sensation returns gradually and imperfectly – often as an unpleasant hypersensitivity before it becomes useful feeling. That sequence is expected recovery, not a complication.

REFERENCES

1. Xu H, Huang X, Guo Z, Zhou H, Jin H, Huang X. Outcome of surgical repair and rehabilitation of flexor tendon injuries in zone II of the hand: systematic review and meta-analysis. *J Hand Surg Am.* 2023;48(4):407.e1-407.e11.
2. Shaw AV, Verma Y, Tucker S, Jain A, Furniss D. Relative motion orthoses for early active motion after finger extensor and flexor tendon repairs: a systematic review. *J Hand Ther.* 2023;36(2):332-46.
3. Herman ZJ, Ilyas AM. Sensory outcomes in digital nerve repair techniques: an updated meta-analysis and systematic review. *Hand (N Y).* 2019;15(2):157-64.