

Carpal Tunnel Syndrome

The median nerve passes through the carpal tunnel at the front of the wrist, alongside nine flexor tendons.

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What you're feeling

Carpal tunnel syndrome happens when the nerve running from your wrist into your thumb, index and middle fingers gets squeezed as it passes through a narrow tunnel in your wrist. The tingling and numbness usually sit in the thumb, index and middle fingers. Many people also feel pain in the hand, and sometimes the symptoms spread beyond those fingers.

The classic pattern is tingling and numbness that wake you at night. Symptoms often flare when you wake in the morning too, and they can come on after you have been using your hand a lot. Shaking your hand or letting it rest may settle the tingling for a while. As the squeezing continues over months or years, the numbness can become constant, and the muscles at the base of your thumb can waste and weaken.

That weakness shows up in everyday tasks. Turning a key, holding a phone, gripping a saucepan handle or doing up buttons can get harder. You may find yourself dropping things you would normally hold onto, because your grip is not as reliable and your fingers feel clumsy.

A few things raise the chance of this happening. Repeating the same hand movements often, and carrying extra body weight, both increase the risk. It is also more common in women and becomes more frequent through middle age. Some health conditions are linked with it too, including pregnancy, menopause, thyroid problems, kidney failure and diabetes.

If your symptoms are not settling, are getting worse over weeks, wake you at night, or stop you working or using your hand, see your GP or ask for a specialist review.

What's actually happening

Think of your wrist as a short tunnel with a floor of small bones and a tough band of tissue forming the roof. Nine tendons and one nerve, the median nerve, share that space. The tunnel has no give, so when anything takes up extra room inside it, the nerve is the softest thing in there and it gets squeezed first.

The squeezing can come from either side. Sometimes the tunnel itself narrows, for example when your wrist is bent for long stretches. Sometimes the contents swell, from fluid changes, inflammation or wear in the lining around the tendons. Either way, the pressure inside the tunnel climbs. At first it comes and goes, often at night or when your wrist is held still doing things like reading or driving. Over time the pressure can stay high all the time, and that is when the numbness stops coming and going and settles in.

This explains the pattern you have just read about. Pressure is highest when the wrist is bent right back or right down, which is why symptoms flare in fixed positions and wake you at night. The nerve carries feeling for the thumb, index and middle fingers, so that is where the tingling sits. As the squeezing continues, the nerve struggles to pass signals, feeling fades and the thumb muscles, which the nerve also powers, weaken and waste.

Doctors describe this condition as mild, moderate or severe, based on how much the nerve is affected. With mild or moderate compression, feeling usually returns once the pressure is relieved. When compression has been severe for a long time, some numbness and weakness can remain even after treatment, because the nerve itself has been damaged.

The aim of any treatment is the same: take the pressure off the nerve. For many people that starts with simpler measures, and when those are not enough, surgery opens the roof of the tunnel so the nerve has room again.

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 condition. 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. At your visit we take a history, examine your hand and arrange imaging or nerve tests if they are needed to confirm the diagnosis. For a long-standing problem like this, we usually try non-operative care first and consider surgery when that has not given enough improvement.

The first steps are things you can do yourself. Changing how you use your hand, resting it more often, and wearing a splint, especially at night, all take pressure off the nerve. Hand therapy teaches nerve and tendon gliding exercises, which help the nerve move smoothly through the tunnel. These simple measures work well for mild and moderate symptoms, and they are worth trying early and giving a fair go. The longer the nerve has been squeezed, the less well these measures tend to work.

If splinting alone is not enough, a cortisone injection into the tunnel can settle the inflammation around the nerve. It often works well at first, and about 45% of people still have relief months later, especially those who respond well to the first injection. Combining the injection with splinting reduces symptoms and helps nerve function more than the injection alone. Another option is platelet-rich plasma, or PRP, an injection made from

your own blood that can relieve pain and improve how the hand works. We will talk through which of these suits you.

When these measures have not given enough relief, surgery is the next step. Carpal tunnel release cuts the tight band forming the roof of the tunnel, which opens up space and takes the pressure off the nerve straight away. It relieves symptoms better than splinting, and operating earlier gives a better chance of a full recovery. We will discuss the operation with you fully on its own page, and any decision is one we make together.

What to expect

Carpal tunnel syndrome rarely stays still. For some people the symptoms settle on their own, and early, mild symptoms can often be managed without surgery. For many others the tingling and numbness keep coming back, and over months or years the numbness can become constant. If the squeezing has been severe for a long time, some numbness and weakness can remain even after treatment, because the nerve itself has been damaged.

How well treatment works depends a lot on where you start. The severity of your symptoms when you first come in is the most important factor in how much relief you can expect. People with mild or moderate symptoms find their daytime numbness and tingling settle sooner than people with severe symptoms. Age is not a barrier: older people improve at the same rate as younger people, and nobody should be turned away from treatment because of their age.

After surgery, the improvement is steady rather than instant. Symptoms and hand function keep improving for up to 12 weeks. Over the third to sixth months, as feeling and strength return, sleep improves too, because the night-time tingling that wakes you settles down. Relief is the usual result: 97% of people get complete or partial relief of their symptoms. Some symptoms do persist in a small number of people, and a small number come back later, sometimes after a long stretch of being symptom free. If that happens, further surgery can still improve hand function and quality of life.

A few other things shape the outlook. Diabetes does not change the result: people with diabetes improve just as much as people without it. People with metabolic syndrome, a cluster of conditions including high blood pressure and high blood sugar, recover more slowly at first, but by a year after surgery their symptom relief and hand function are similar to everyone else's. Some people develop the same problem in the other hand over time, so keep an eye on both hands.

If your symptoms are not settling, are getting worse over weeks, wake you at night, or stop you working or using your hand, see your GP or ask for a specialist review.

When to see someone

Most of the time, carpal tunnel syndrome is not an emergency. The signs that matter are the ones you have already read about: tingling and numbness in the thumb, index and middle fingers, often worse at night. See your GP if your symptoms are not settling, are getting worse over weeks, wake you at night, or stop you working

or using your hand. Ask for a specialist review if simple measures like a splint have not helped after several weeks, or if the numbness has become constant or the muscles at the base of your thumb are wasting. Go to an emergency department if a hand or arm becomes hot, red, swollen and painful, especially with a fever, or if your fingers turn pale, cold, white or blue, or if you suddenly lose feeling or movement in your hand.

In more depth

This section goes further than you need for your own treatment decisions. Carpal tunnel syndrome is worth the extra reading because it is the most reliably successful operation in hand surgery, which makes the three situations where it behaves differently the ones actually worth understanding.

DIABETES CHANGES LESS THAN YOU WOULD EXPECT

Patients with diabetes are frequently told their result will be worse, and it is a reasonable thing to assume: diabetes damages nerves, and this is a nerve operation.

The evidence does not support it. Pooling **2,869** patients, there was **no significant difference** in improvement across essentially all outcomes after carpal tunnel release between diabetic and non-diabetic patients, the single exception being sensory conduction velocity, an electrical measurement rather than something you would notice [1].

The honest framing is that diabetes may affect the nerve's baseline, but it does not appear to stop decompression from working. The authors' own conclusion is that better diabetic neuropathy care is what deserves attention, not withholding an operation that helps.

THREE WAYS TO DO IT, AND WHY THIS PRACTICE DOES THE OLDEST ONE

The carpal tunnel can be released through an open incision, endoscopically through one or two small portals, or percutaneously with a needle-sized blade guided by ultrasound. All three cut the same structure, the transverse carpal ligament, and the argument between them is about the first few weeks, not about whether the numbness resolves.

Open versus endoscopic has been compared repeatedly. Pooling randomised trials across **1,596** patients, the two were **similar in relief of symptoms**, but endoscopic release produced better recovery of function and **earlier return to work**, and was safer across the measured complications [2].

Ultrasound-guided release is the newer arrival, and it is the one you are most likely to meet in advertising, usually described as “incisionless” and offered in rooms under local anaesthetic rather than in an operating theatre. Two things are worth knowing before that framing does your thinking for you. It is not literally incisionless, there is still a small puncture, and the published trials measure it as a *shorter* incision, not the absence of one. And the evidence, while genuinely encouraging, is thinner than the confidence of the marketing suggests. The pooled analysis of randomised trials rests on **three studies and 221 patients**: function scores favoured ultrasound guidance, and patients returned to normal activities **20.8 days earlier** than after open release [4]. Two large 2026 comparisons matched on patient characteristics – 356 patients against open release [5] and 372 against endoscopic [6] – found it safe and effective, needing less anaesthetic, using fewer opioids

afterwards and leaving patients happier with the wound, though it took **longer to perform** than either alternative. Improvements have held out to **six years** [7].

The honest counterweight rarely appears in the advertising, and it is mostly about **who is holding the probe**.

A 2025 Innsbruck series described patients who needed a second, open operation after an ultrasound-guided release, for incomplete division of the ligament, nerve injuries and arterial injuries [8]. The detail that matters is the operator. Of the fourteen, the original procedure had been done by radiologists in eleven, by a general surgeon in one, and by experienced hand surgeons in two. What happened next differed accordingly. In one of the two hand-surgeon cases, an artery was caught during the release; the bleeding was recognised immediately, the surgeons converted to an open operation on the spot, stopped it, finished the release, and the patient had no further trouble. In the general-surgeon case, the woman had numbness from the moment she woke up, was given two cortisone injections that did nothing, and came back nine months later needing the median nerve rebuilt with **three sural nerve grafts**. That is the argument for experience in one comparison: not that complications never happen to skilled operators, but that a skilled operator recognises one and can rescue it in the same sitting.

Be careful how much weight you put on that series, though, because it has been publicly contested and partly corrected. A high-volume interventional radiology group replied that its central recommendation was “not supported by the data provided”, the series reported no denominator, no total number of procedures and no comparison rate, so it cannot be turned into a risk. That group has performed **more than 2,000** of these releases under a standardised protocol, and pointed out that even if all eleven radiologist cases had needed revision, that would be a revision rate below **5 per 1,000** [10]. The original authors then conceded that three of those cases had been misclassified and were not examples of incomplete release at all, describing it as “a critical error in both the data and its interpretation” [10].

Where the two sides agree is the useful part, and it is worth stating plainly: this operation should be done by someone with real expertise in nerve ultrasound working to a standardised technique, with hand-surgical help immediately available if something has to be converted to an open procedure partway through. The learning curve is roughly **30 procedures** before operating time settles [9]. If you are considering it, those are the fair questions to ask, how many the operator has done, to what protocol, and what happens if it has to become an open operation today rather than in nine months.

On the safety comparison the marketing leans on hardest, the pooled complication rate was 7.1% for ultrasound guidance against 5.6% for open release, a difference whose confidence interval ran from 0.04 to 15.10 [4]. That interval is so wide it tells you almost nothing. “No difference in complications” here means “nobody has yet measured this well enough to say”.

Dr Hirpara performs open carpal tunnel release. The reason is the thing open surgery uniquely offers: the ligament and the nerve are seen directly, the release can be confirmed complete under vision, and any anatomical variation, an extra muscle belly, an unusual branch of the nerve, is dealt with as it is found rather than worked around. It needs no special equipment, and it remains the technique of choice for revision surgery and for unusual anatomy whichever approach a surgeon normally favours.

The trade is real and you should hear it stated plainly: the evidence above suggests you would probably get back to work sooner after an endoscopic or ultrasound-guided release. What the evidence does not suggest is that

you would end up in a different place. If a faster return matters more to you than direct vision of the nerve, that is a legitimate preference, and it is worth raising at your appointment rather than deciding from a website.

THE NERVE THAT STILL HURTS AFTERWARDS MAY NOT BE THE ONE THAT WAS RELEASED

This is the finding most worth carrying away. In a cohort of **7,867** patients undergoing surgery for nerve compression, approximately **3%** underwent decompression of a **different** nerve in the same arm within a year [3].

Three percent is small in absolute terms and large in what it implies. Nerve compression is frequently not a single-site problem: the same person can have median nerve compression at the wrist and ulnar nerve compression at the elbow, and the symptoms overlap enough that one can mask the other. When the hand is still not right after a technically successful release, the question is not always “did the operation fail”, sometimes it is “was there a second site all along”. The authors specifically note that patients with both carpal and cubital tunnel syndrome may benefit from simultaneous decompression [3].

WHY THE OPERATION WORKS SO WELL

The mechanics are unusually simple, which is much of the explanation. The carpal tunnel is a closed space with a rigid floor of carpal bones and a tough transverse carpal ligament as its roof. Pressure inside it rises, the median nerve is the softest structure present, and it suffers. Dividing the ligament converts a closed compartment into an open one and the pressure falls immediately.

That is why relief of night pain is often nearly instant while numbness takes months: the compression stops the day of surgery, but the nerve then has to repair itself, and nerve recovers slowly and from the top down. Persistent numbness at six weeks is usually a nerve healing on schedule rather than an operation that did not work.

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