

Infected Flexor Sheath (Pyogenic Flexor Tenosynovitis)

What you're feeling

You may notice your finger or thumb feels stiff and swollen. The swelling often looks uniform, wrapping evenly around the digit. This can make it hard to tell if you have this infection or another type of finger swelling. You might feel pain along the palm side of your finger. The area may feel warm to the touch.

Simple tasks become difficult quickly. You may find it hard to grip objects firmly. Picking up a mug or holding a phone can feel awkward because bending the finger causes discomfort. You might struggle to button your shirt or zip a jacket. Even light pressure on the palm side of the finger can feel sensitive.

The pain often flares up at night. You may wake up feeling that the finger is tight or throbbing. Activity during the day can make the stiffness worse. Resting may provide slight relief, but the swelling usually remains. Not all typical signs of infection appear at once. You might have some swelling but not all the classic symptoms doctors look for.

Because this is a closed-space infection, pressure builds up inside the tendon sheath. This space holds the tendons that bend your finger. When bacteria enter, often after a small cut or puncture, the area swells. The pressure causes pain and limits movement. You might feel like you cannot fully straighten or bend the finger.

Early treatment helps protect your hand function. Delaying care can lead to more stiffness later. Even with prompt treatment, you should expect some residual stiffness in the finger after the infection clears. This is common even in healthy patients. Your surgeon will guide you through recovery to help you regain movement.

What's actually happening

Your finger has a protective sheath that wraps around the flexor tendon. Think of this tendon as the rope that lets you bend your finger. The sheath acts like a tight sleeve or a sealed tube. It keeps the tendon lubricated and moving smoothly.

In pyogenic flexor tenosynovitis, bacteria get inside this sealed space. This creates a closed-space infection. Because the sheath is tight, pressure builds up quickly. The area becomes swollen and inflamed. You may notice uniform swelling in the finger. This swelling happens because fluid and pus have nowhere else to go.

This pressure cuts off blood flow and irritates the tendon. The result is pain and stiffness. You might find it hard to straighten your finger. The infection can spread if not treated. Early treatment is vital to prevent permanent damage.

We use ultrasound to check for this condition. It helps us see the swelling clearly. We can confirm the diagnosis quickly. This allows us to start treatment sooner.

Treatment usually involves surgery and antibiotics. We perform surgical decompression to open the sheath. This releases the built-up pressure. We clean out the infected area with irrigation. This is called debridement. We then close the wound and start antibiotics.

Even with prompt care, you may experience some residual stiffness. This is common after such an infection. The tendon needs time to heal and regain movement. Early intervention helps improve your final motion and function.

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. We begin by confirming the diagnosis, as signs of this infection can sometimes be subtle. If the infection is caught very early and there is no visible pus, we may manage it at the bedside with a small incision to drain the fluid. This is followed by a course of antibiotics to clear the bacteria. We monitor your progress closely to ensure the swelling and pain reduce. If you do not improve quickly, or if there is clear pus, we move to the next step.

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, including examination and imaging where needed, establishes the diagnosis. For acute infections, we usually do not rely on non-operative care alone. Early diagnosis and drainage through small incisions, along with continuous postoperative irrigation, appear to lead to the best functional outcome. We use ultrasound in the emergency department to help confirm the diagnosis quickly. This allows us to start treatment without delay. Expediency in surgical decompression potentially improves your final motion and function.

When conservative care has reached its limit, or if the infection is advanced, surgery is considered. We take patients with frank purulence immediately to the operating room for incision and drainage and a thorough washout of the flexor tendon sheath. Surgical decompression is the treatment of choice for nearly all cases. Even with aggressive and prompt antibiotic therapy and surgical intervention, otherwise healthy patients can expect some residual digital stiffness following flexor tendon sheath infection. We discuss this openly so you know what to expect. In rare cases involving specific types of infection, a standard two-stage flexor tendon reconstruction may be a reasonable option once the infection is fully treated. We aim to restore your hand's function while keeping the infection under control.

What to expect

Pyogenic flexor tenosynovitis is a closed-space infection affecting the tendon sheath in your finger or thumb. You may notice uniform swelling, though this symptom alone does not distinguish this condition from other finger infections. Early treatment provides clear clinical benefits. We recommend prompt management to improve your final motion and function.

If managed well with surgical decompression and systemic antibiotics, the procedure can provide lasting benefit, provided the infection does not return. A typical approach involves a single open debridement with irrigation and primary wound closure, followed by ten days of antibiotic therapy for uncomplicated cases. This pathway aims to resolve the infection quickly and effectively.

However, even with aggressive and prompt treatment, you should expect some residual digital stiffness following the infection. This is a common outcome, even in otherwise healthy patients. Without timely intervention, the infection may persist or worsen. The presence of pus within the flexor sheath is the only significant predictive factor for needing repeated tendon washouts.

Your outlook depends largely on how quickly you seek care. Early diagnosis and treatment offer the best chance for a full recovery of movement. While stiffness may remain, the goal is to prevent further damage and restore function. We will monitor your progress closely to ensure the infection is fully resolved and to guide your rehabilitation.

When to see someone

Pyogenic flexor tenosynovitis often follows a penetrating injury. It causes uniform finger swelling, but this alone does not distinguish it from other infections. Not all classic signs appear in every case. Because this is a time-critical infection that can spread to nearby sheaths, do not wait. Go to an emergency department if you suspect this condition. Your surgeon will use clinical examination and imaging, such as ultrasound, to confirm the diagnosis. Early assessment is vital to prevent serious complications.

In more depth

This section goes further than you need for your own treatment decisions. An infected flexor sheath is worth the extra reading because it is the one hand infection that is a genuine emergency, and because two of the things that most determine how it ends were decided before you reached hospital – one of them years before.

THE DIAGNOSIS RESTS ON FOUR SIGNS FROM THE 1930S THAT HAVE NEVER BEEN PROPERLY TESTED

Allen Kanavel described four signs of an infected flexor sheath: a **finger swollen along its whole length** rather than in one spot, held **slightly bent, tender all the way along the tendon sheath** rather than over one joint, and – the most useful of the four – **severe pain when someone gently straightens the finger** [1].

Nearly a century later, those four signs are still how the diagnosis is made, and their **sensitivity, specificity and interobserver reliability have never been properly established** [1]. That is a remarkable gap for a diagnosis whose delay costs fingers.

The practical consequence is the part worth carrying: **not all four signs appear in every case**, particularly in children, and **the absence of one or more does not exclude the diagnosis** [1]. A finger that fails only one of Kanavel's tests is not a finger that has been cleared.

HOW IT IS DRAINED CHANGES HOW WELL THE FINGER MOVES AFTERWARDS

Once the diagnosis is made the sheath has to be decompressed, and there are two broad ways to do it: open the sheath surgically, or pass a **fine catheter** into it and irrigate through a much smaller wound.

A systematic review covering **763 patients** found that **catheter irrigation produced better range of motion than open washout**, and that using **antibiotics as part of treatment** – rather than relying on drainage alone – also improved movement [2].

Note that this is the opposite of the position on a felon, where a properly drained pulp abscess needs no antibiotic at all. The difference is the anatomy: a felon is a closed pocket you can empty completely, while a sheath is a long tube lined with the very surface the tendon must glide against. You cannot debride it clean without damaging what you are trying to save, so the antibiotic does work the surgery cannot.

THE RISK OF LOSING THE FINGER IS MOSTLY A PROPERTY OF THE PATIENT

This is the least comfortable finding and the most useful one. In the pooled series, amputation rates were driven overwhelmingly by background health rather than by surgical technique: **39% in patients with diabetes, 64% with renal failure, and 71% with peripheral vascular disease** – all statistically significant [2].

Those numbers describe a different disease from the one a healthy person with a splinter injury has. They are why an infected sheath in someone with diabetes or poor circulation is treated with more urgency and a lower threshold for repeat washout, and why the honest answer to “will I keep the finger” depends more on the answer to “what else is going on with your health” than on anything that happens in theatre.

WHY THE DELAY MATTERS MORE THAN ALMOST ANYTHING ELSE

The sheath is a closed space with a poor blood supply and a tendon inside it that depends on gliding. Pus under pressure inside that space does two things at once: it strangles the tendon's blood supply, and it seeds the adhesions that later limit movement. Both are time-dependent, which is why **early treatment consistently improves outcomes** [2] and why the standard advice for this specific infection is an emergency department rather than a GP appointment [3].

Stiffness afterwards is common even when everything is done correctly and promptly. How much stiffness is set largely by how long the sheath was under pressure – which is the one variable a patient can influence, by coming in early.

REFERENCES

1. Kennedy CD, Huang JI, Hanel DP. In brief: Kanavel's signs and pyogenic flexor tenosynovitis. Clin Orthop Relat Res. 2016;474(1):280-284.
2. Giladi AM, Malay S, Chung KC. A systematic review of the management of acute pyogenic flexor tenosynovitis. J Hand Surg Eur Vol. 2015;40(7):720-728.
3. Goyal K, Speeckaert AL. Pyogenic flexor tenosynovitis: evaluation and management. Hand Clin. 2020;36(3):323-329.