CQ HAND + UPPER LIMB
SPECIALIST ORTHOPAEDIC SURGEON

PATIENT INFORMATION

# Quadriceps and patellar tendon rupture

## What you're feeling

A quadriceps or patellar tendon rupture usually happens with a sudden load on a bent knee, such as landing from a jump or taking a forceful step down stairs. You may have felt a pop or tearing sensation, followed by sharp pain at the front of the knee. The knee quickly swells, and putting weight on that leg becomes difficult or impossible.

Many people notice warning signs beforehand. You might have had pain, tenderness or some thinning of the muscle around the lower or upper pole of the kneecap, or a history of jumper's knee. Pain that came on gradually after activity, then started bothering you during activity as well, is common with tendon wear. The tendon can weaken over time before it gives way.

The main problem is that you cannot straighten your knee against gravity or resistance. Straightening the leg to get out of a chair, climb stairs or stand from the toilet becomes hard or impossible. Walking may only be possible with help. The kneecap can also sit higher or lower than usual because the tendon holding it has torn.

Some people can still partly straighten the knee, especially if the tear is incomplete or only part of the tendon is affected. Even then, the knee usually lags behind the other leg when you try to hold it straight. Swelling inside the joint is common and can make the injury feel worse than it looks.

If your knee gave way during sport, other structures inside the knee can be injured at the same time. Your surgeon will check for this during the assessment.

These injuries need early treatment. When a torn tendon is repaired soon after the injury, the results are more predictable than when treatment is delayed.

## What's actually happening

Your knee straightens because a chain of structures works together: the thigh muscle, the tendon above the kneecap, the kneecap itself, and the tendon below it. Think of this chain as a rope-and-pulley system. The tendons are the ropes, and the kneecap is the pulley they run over. When the muscle pulls, the pulley glides and the leg straightens.

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In this injury, one of those ropes has torn. Most often it tears right where the tendon attaches to the kneecap, which is the weakest point of the whole chain. The tear usually happens when the muscle is tightening hard while the knee is bending, such as landing from a jump. The muscle keeps pulling but the tendon can no longer hold, so it snaps and the kneecap is pulled upward or left sagging where the tendon tore.

A healthy tendon is remarkably strong. It takes a force of more than 17 times your body weight to snap a normal patellar tendon, and under everyday loads the kneecap itself would usually break first. So when a tendon ruptures, it has often been weakening for some time. Tendon wear, sometimes called tendinopathy, makes the fibres disorganised and thin. The worn area also has a poor blood supply, which limits its ability to heal itself. This is why some people feel warning pain or notice the tendon looking thinner before it gives way completely.

The tear can be partial or complete. With a partial tear, some fibres still hold, so you may manage to straighten the knee partway, though it usually lags behind the other leg. With a complete tear, which happens in 97% of patellar tendon ruptures, no fibres remain to connect muscle to bone, so straightening against gravity becomes impossible. The swelling and sharp pain you feel come from the torn ends of the tendon and bleeding within the tissue.

Because the tendon cannot heal back to bone on its own while the muscle keeps pulling it apart, these tears generally need surgery to restore the chain.

## What we can do about it

Dr Kieran Hirpara, an upper-limb surgeon at Mater Private Hospital Rockhampton, matches the treatment to 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. Our assessment, which includes your history, an examination and imaging where needed, establishes whether the tear is partial or complete.

For a partial tear where you can still straighten the knee against gravity, we usually start without surgery. Your knee is braced straight for 4 to 6 weeks, with bending beyond 90 degrees avoided early to protect the tendon. After that, protected movement and strengthening exercises begin, roughly 6 weeks after the injury. Restrictions are lifted once your thigh muscle has good control and you can do a straight-leg raise without discomfort. If the tendon has been wearing rather than torn, activity change comes first, followed by flexibility and strengthening work. Taping or a strap under the kneecap can help, and anti-inflammatory medicine can settle pain and swelling.

A complete tear is different. Because the tendon ends pull apart and cannot heal back to bone on their own, surgery is the treatment we recommend, ideally within the first 2 weeks after injury. Repair done early, within 2 to 3 weeks of injury, is the factor linked with better results. When repair is delayed, the tendon ends retract and the muscle shortens, which makes any operation harder and the results less predictable. If you have already had a knee replacement and this tendon has torn, surgery is generally advised there too, because non-operative care tends to leave the leg unable to straighten.

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The operation itself reattaches the torn tendon to the kneecap or reconnects the torn ends, and it has its own page. If the tear is older and the tendon has retracted, we may need to mobilise the tissue and reinforce the repair with a graft, often a hamstring tendon from the same leg. We will talk through what your examination and scans show, which option suits your tear, and what each would involve, so you can decide together with us how to proceed.

## What to expect

The outlook after a tendon rupture depends a lot on timing. When the tendon is repaired soon after the injury, most people regain a working range of motion and good strength in the thigh muscle. Early repair, within 2 to 3 weeks of injury, is the factor most closely linked with better results. In people treated within the first week, almost all had good to excellent results. When repair is delayed, results are less predictable, and the thigh muscle tends to stay thinner afterwards.

Even after a well-done repair, some things may not return fully to how they were. The thigh muscle can remain smaller than on the other side, though this does not usually mean the knee is weaker. Some people also notice pain at the front of the knee where the kneecap glides, though most people with these changes have no symptoms at all. Athletes sometimes find they cannot play at quite the same level or duration as before.

If the tear is left untreated, the picture is different. The muscle keeps pulling, the tendon end retracts, and the kneecap rides up. Over time the thigh muscle wastes, and straightening the knee against gravity becomes weak or impossible. The leg can be left with a lasting lag when you try to hold it straight. Repairing a tear at this late stage is harder surgery, and the results are generally less reliable than repair done early.

Recovery takes months rather than weeks. Early on, your knee will be protected in a brace, with movement introduced gradually and weightbearing allowed as the repair strengthens. Many people walk without the brace by around 6 weeks. From there, strengthening work rebuilds the muscle, and it takes time before the knee feels dependable again.

If other structures inside the knee were injured at the same time, they will be addressed as part of your care, sometimes in stages. Your surgeon will talk you through what your particular tear means for your recovery, and what a realistic outcome looks like for you.

## When to see someone

This injury needs prompt assessment, ideally within the first 2 weeks after it happens. Go to an emergency department or ask for an urgent specialist review if you felt a pop or tearing in your knee, cannot straighten it against gravity, or cannot put weight on it. The same applies if you can still straighten the knee but it lags behind the other leg, or the kneecap sits higher or lower than usual. See your GP promptly if you have ongoing pain, tenderness or thinning around the top or bottom of the kneecap, especially with a history of jumper's knee, because a worn tendon can tear without warning. Tell your GP if the knee gave way during sport, as other structures inside the knee can be injured at the same time.

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