Patellar Tendonitis and Running: Symptoms, Causes and Research-Backed Treatment Options

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The patellar tendon is a short but very wide tendon that runs from your patella (kneecap) to the top of your tibia. The reason you have a kneecap in the first place is to generate a bigger mechanical advantage at the knee—this allows your quadriceps to create strong forces at the knee, which are important in any sport with running or jumping elements.

However, the result of this is that the patellar tendon has to absorb a lot of this loading, and as a result, it’s prone to injury in runners and jumpers; one study found that patella tendonitis accounts for just under 5% of all running injuries. Unlike many common running ailments, patellar tendonitis is somewhat more common in men than in women.

Patellar tendonitis usually begins with a stiff feeling in the patellar tendon, especially when running downhill or descending stairs. Like most tendon injuries, it may go away once you get warmed up, but as the injury worsens, it will remain painful for the duration of your workout.

It is also important to distinguish patellar tendonitis from patellofemoral pain syndrome: patellar tendonitis does not hurt along the top or the side of the kneecap, and isn’t usually sensitive to the touch.

Epidemiology – Causes of Patella Tendonitis, what makes it worse, what’s going on

Because the patellar tendon absorbs so much force, the long strands of connective tissue that make up the tendon can become injured. As with Achilles tendonitis, the true problem seems to be not so much the inflammation, but the damaged and degraded tendon structure that results from chronic stress on the patellar tendon. Unfortunately, this can result in patellar tendonitis becoming a chronic issue that persists for months.

- Poor hamstring and quadriceps flexibility have both been connected with an increased risk for patellar tendonitis.
- Moreover, poor explosive leg strength may be related as well.
- Additionally, weak thigh muscles might be unable to adequately slow down your descent during impact, subjecting your knee to greater loads.

Conceptually, this makes sense, as tighter upper leg muscles would increase the tension on the knee, making it more difficult to flex and extend the joint.

Research backed treatment options for Patella Tendonitis

While the causes behind patellar tendonitis are not as well-understood as other injuries, there is fortunately very strong evidence for a treatment protocol.
The treatment of choice, a program of eccentric decline squats, was inspired by the success of eccentric heel drops in treating Achilles tendonitis.

Hypothesizing that eccentric activity encouraged the body to gradually replace and realign the damaged tendon fibers, researchers turned to a program of one-legged squats to eccentrically load the patellar tendon. However, they found that they were not as effective as expected, since the calf instinctively assists the knee when squatting, which takes some load off the front of the knee and the patellar tendon. To work around this, researchers devised the eccentric decline squat, which is done on a downward-slanted surface to unload the calf. Interestingly, this may also be why running with patellar tendonitis hurts more on downhills!

Like the eccentric heel drop protocol for Achilles tendonitis, subjects in the studies on eccentric decline squats were encouraged to continue doing the exercises even with moderate pain (though stopping if the pain becomes extreme), and to add weight with dumbbells or weights in a backpack once they could do the basic 3×15 protocol pain-free.

Unfortunately, eccentric decline squats do require some specialized equipment; namely, a slanted board at about 25° (which corresponds to a rise of one foot per two feet of horizontal distance).

If you have a calf stretching board on hand, it will work perfectly. If you’re handy with tools, they aren’t too difficult to build. But even if you aren’t, you can usually make do by leaning a wooden plank against the bottom step on a staircase or up against a curb (as pictured above).

To do one eccentric decline squat, stand on the decline board with your foot pointing “downhill.” While balancing on your injured leg, squat downward slowly to about 60° of knee flexion. Then use your good leg to rise back up to the starting position. Do not use the injured leg to return to the top!

Again, moderate pain with this exercise is okay. Just stop if it becomes excruciating. Once you can do the exercise pain free, you should add weight with a loaded backpack, again continuing into moderate pain.

Other possible treatment options

- In addition to the eccentric decline squat protocol, it makes a lot of sense to take steps to address potential tightness in your hamstrings and quads. Stretching them a few times a day is a very good idea, as is using a foam roller to loosen them up. You may find that a harder foam roller or even a 3” diameter plastic PVC pipe works better on your hamstrings, especially if you have muscular thighs.

- It’s also possible that a shoe with a lower heel-to-toe drop may load your patellar tendon less, since running in a standard shoe with a 12mm heel-to-toe drop is similar to running on a downhill. If you want to experiment with lower-drop shoes, be aware that the load that’s transferred from your knee will be reallocated to your forefoot, ankle, and Achilles, so exercise caution here. Here’s a great podcast we did with Doctor Mark Cucuzzella about transitioning to minimalist running.
Some very new pilot studies have suggested that platelet-rich plasma injections, a therapy which involves injecting a concentrated form of platelets found in your own blood, and extracorporeal shockwave therapy, a souped-up version of ultrasound, may be able to stimulate healing as well.8, 9 As the patellar tendon has poor blood supply, and hence a reduced capacity to repair itself, the idea behind platelet-rich plasma (or PRP) injections is that growth factors in the platelets accelerate healing.

Likewise, extracorporeal shockwave therapy (or ESWT) aims to selectively break down tissue to accelerate healing. While evidence to date suggests that these are a fairly safe and effective treatment for very stubborn cases of patellar tendonitis, there’s no data on long-term effects, and you’re unlikely to have it covered by insurance. Consider talking to your doctor about a PRP injection or ESWT if you’ve had little or no success with conservative treatment for several months.

Outline of treatment options

Conservative treatments

These are cheap, easy to perform treatments that you can do it home in your own time. You should try to do as many of these as possible each day.

1. Eccentric single leg decline squats—3 sets of 15 reps, twice per day. It’s okay if the decline squats hurt somewhat, but the pain shouldn’t be excruciating. Once you can do all three sets without pain, add weight using a weighted backpack. Return the starting position using your good leg. You’ll need to find, construct, or improvise a decline ramp to do these on, but it’s well worth it, as decline squats are much more effective than squats on flat ground.

2. Icing after each run.

3. Gently stretch your hamstrings and quads a few times a day.

4. Massage your hamstrings and quads with a foam roller, PVC pipe, or The Stick

Aggressive treatments

These treatments are a little more expensive or time consuming and are only suggested for if you suffer from chronic patellar tendonitis pain and the conservative treatments are not working for you.

1. Consider running in a lower-heeled shoe to transfer some stress from your knee to your foot, calf, and ankle. Exercise caution if you have had foot or calf injuries in the past.

2. Ask an orthopedist about platelet-rich plasma (PRP) injections or extracorporeal shockwave therapy (ESWT).

Return to Running

The standard program of eccentric decline squats calls for 12 weeks of eccentric decline squats before returning to sporting activity, but one encouraging study of volleyball players who trained and competed while doing the rehab program and still had good success rates indicates that you may be able to return to running as soon as your patellar tendon is ready to handle the loads associated with training10 (which will
likely depend on the severity of your injury—a mild case may only require a couple days off, while a more severe case might call for a longer break from running). Work with your doctor or physical therapist to devise a good return-to-running program.

References