

# PATELLAR TENDINOPATHY

Patellar tendinopathy is a source of anterior knee pain localised to the inferior pole of the patella. Pain is aggravated by loading and increased with the demand on the knee extensor muscles, such as running, jumping, stair climbing, squatting and prolonged sitting.

The quadriceps (thigh) muscles are connected to the inferior pole of the patella by the quadriceps tendon. The patellar ligament then connects the bottom of the patella to the tibial tuberosity on the shin.

A healthy tendon is composed mostly of parallel collagen fibres that are packed closely together. In a tendon that begins reacting poorly to the load placed upon it it becomes thicker and the collagen fibres become disorganised.

Your tendons are designed to withstand high, repetitive loading, however, when the load applied to the tendon is too great for the tendon to withstand it begins to become stressed. When tendons become stressed they sustain small micro tears, which can quickly heal if managed appropriately. However, if the load is continually applied to the tendon, these lesions occurring in the tendon can exceed the rate of repair. The damage will progressively become worse, causing pain and dysfunction. The result is a tendinopathy.

## Risk factors

- Increased training volume and/or frequency
- Reduced extensibility of quad and hamstring muscles
- Pronated foot
- Stiff ankle

## Symptoms

- Pain over the patella tendon
- Pain increases with jumping, landing, running, squatting and stair climbing
- Gradual onset of pain that is commonly related to an increase in activity
- Morning stiffness
- Pain during the warm-up of a sport/activity that settles. As the tendon pathology progresses it may not settle at all
- The tendon may appear thickened or swollen

## Rehab

### Stage 1: Isometric loading

- Isometric exercises are static holds to place the muscles under tension. This enables the control of load and pain.
- During isometric loading, pain can be 3/10 to begin with but do not let it progress to more than 4/10.
- The pain has to settle within 24 hours otherwise the *load tolerance* has been exceeded and the program needs to be modified.

- Complete 5x45 sec contractions, with the best position being the knee between 30-60 degrees of flexion
- Exercises include wall squat holds, Spanish squat (with band)

### Stage 2: Isotonic loading

- This phase begins when the movements can be performed without pain increasing about 3/10.
- To begin with keep the knee between 10-60 degrees of flexion and slowly progress to 90 degrees.
- The aim is to restore muscle bulk and strength. Movements are preferentially single-leg based to specifically target control and balance.
- Exercises may include *leg extensions, leg press, split squat or single leg squats*.
- Aim to complete 3-4 sets of 15 and slowly progress towards increasing weight and completing 3-4 sets of 6.
- Continue Stage 1 exercises on days off

### Stage 3: Energy storage loading

- Can be commenced when able to perform 4-8 reps of a single leg press at 150% BW with <3/10 pain and symptoms settling within 24 hours
- Movements become more sport-specific in this phase
- Exercises can vary from jumping, landing, changing direction, cutting, accelerating, decelerating and also vary in volume, frequency and intensity
- Start with 3 sets of 8-10 reps of low intensity jumps and lands, jump lunges, static hops, forward hops, jump and twist etc.

### Stage 4: RTS

- Return to training can be done when exercises are tolerated 3x per week without aggravation and symptoms settle within 24 hours
- Triple hop test and vertical jumps are great tests to measure suitability for RT training
- Slowly increase training to match the load and volume from Stage 3 and progressively increase without increased tendon symptoms longer than 24 hours
- No more than 3 high load training sessions a week to allow for sufficient recovery time

### **Tips**

- Avoid complete rest – then the tendon will have to start from scratch
- Load is good! We need load to recover – just the right amount!
- Get your pain settled within 24 hours of activity – this means the tendon is stable, not irritable. If pain continues for longer than 24 hours, the load needs to be reduced further
- The tendon is not inflamed or torn, it has just been overloaded and the collagen fibres that make up the tendon become disorganised, resulting in the tendon not working as it should
- Pain does not equal harm. It is the body's protectometer
- The process is not quick. Tendons do not like change and have to be loaded slowly. It can take up to 6 months to fully recover to the level an athlete/person wants to return to