

Sore patella but no sign of injury? Classic runners' knee

By Paula Shingler, BSc, MCSP

Any pain around the kneecap (patella), I feel, can be classified as Runners' Knee. It is often only present while running, walking, going up and down stairs and kneeling but not present while lounging in front of the TV. There is often little visible sign and is not related to any recent trauma. This can add to the frustration!

Basic anatomy lesson first

Before we look at the causes and treatment, a little anatomy lesson. The patella is a lump of bone, triangular in shape at the bottom and curved at the top. It has a convex smooth surface in front and behind is oval shaped with a ridge down the middle. It is embedded in the tendon of the quadriceps (big thigh muscle). As the knee bends, the patella slides over the end of the thigh bone (femur) which has a specially shaped groove for the ridge of the patella to slide on - very clever! This is all controlled by the contracting of the quadriceps muscle. Let's take a closer look at that quadriceps muscle (so called as it is made up of four parts!) Firstly the main bulky part in the middle (rectus femoris), which forms the tendon that the patella sits in. Secondly the vastus medialis, on the inside of the thigh, this attaches to the inner edge of the patella. Thirdly the vastus lateralis on the outside of the thigh, which attaches to the outer edge of the patella and, lastly, the vastus intermedius which lies deep under the rectus femoris and attaches to the outside of the patella. These muscles are all synchronised to work together, contracting and relaxing to allow the knee to bend and straighten and move the patella while doing this. You can now see that if part of the quadriceps muscle is not functioning properly muscle imbalance occurs

allowing the patella to be tugged too much in one direction, pulling it out of the groove in the femur and leading to pain. How can this happen?

Favourite causes

There are lots of causes but here are a few of my favourites:

1. **Injury to ankle, hip, knee or back** which has meant that you have been unable to weight bear normally. Even if the injury is not to the knee directly it will still affect the quadriceps function. If you are compensating and not weight bearing as normal then the parts of the quads not being used as normal will lose strength through lack of use. Then, when the injury is better and you are trying to weight bear as usual, the parts of the quads that have weakened are unable to function normally so creating muscle imbalance and uneven pull on the patella.
2. **Tight ITB-(iliotibial band)** - this is a muscle and tendon that runs down the outside of the thigh and attaches to the tibia (the lower leg bone). Tension in this pulls the knee towards the outside. This can become tight due to poor abdominal strength or poor gait pattern.
3. **Sudden increase in volume of training** without a structured programme or a change of training surfaces e.g. going from soft squelchy bush in winter to pounding the streets in a summer series.
4. **Growth spurt** - this can lead to the muscles not growing as fast as the bones leading to weakness and imbalance. This is a common occurrence in the adolescent.
5. **Degenerative changes** - yes it must be mentioned! As we age

the cartilage wears away and the smooth surface on the back of the patella and femur roughens leading to friction when the knee bends. Strengthening the quads can help to hold the patella away from the femur and reduce the friction and the pain.

Curing that muscle imbalance

To cure muscle imbalance the muscles that are weak need to be strengthened. Having your knee assessed by a professional is a good idea as knee pain can be a sign of another problem e.g. referred back pain; and a specific programme for your particular problem can be developed. A programme of quadriceps' strengthening is usually enough to get the equilibrium back and remind each part of the quads muscle what its function is.

So Runners' Knee is really a sign of some weakness and muscle imbalance - not a disaster and certainly not a sign that it is time to hang up those trainers! Just a little tweaking of some 'resting' muscles and then there is no need for you to rest!

Paula Shingler is a Physiotherapist at The Clinic Physiotherapy at Macquarie University Hospital, Sydney and long time member of Big Foot Orienteers, keen fell runner and mother of 2