

Physio Med Self Help for Anterior Knee Pain

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There can be many causes of knee pain. Anterior knee pain or patella-femoral pain is pain that is felt under the knee cap (patella) at the front of the knee. The patella, or kneecap, can be a source of knee pain when it fails to function properly.

Alignment or overuse problems of the patella can lead to wear and tear of the cartilage behind the patella. Patella-femoral pain syndrome (anterior knee pain) is a common knee problem that affects the patella and the groove that the patella slides in over the femur (thigh bone). The kneecap together with the lower end of the femur is considered to be the patella-femoral joint.

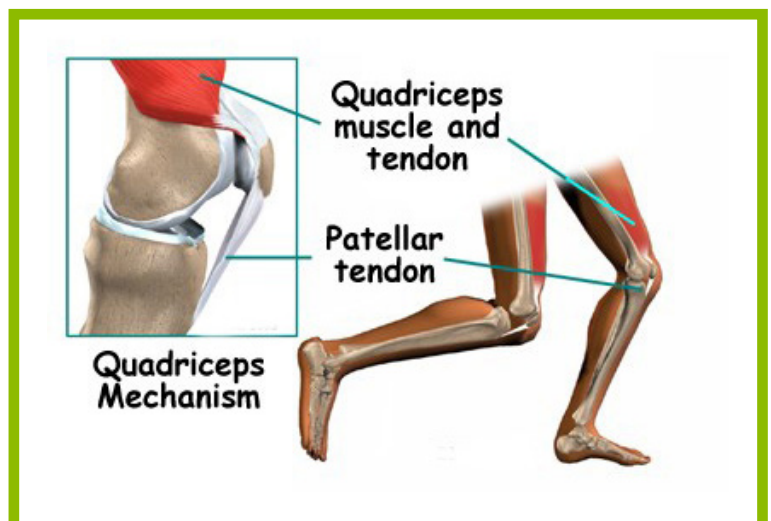
Anatomy of the Area

What is the patella, and what does it do?

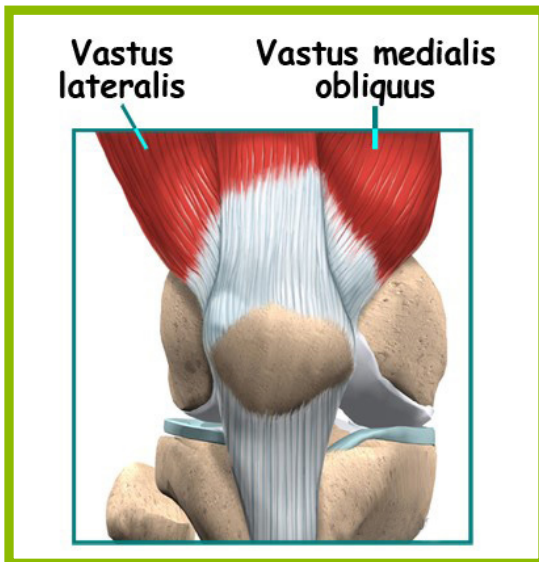
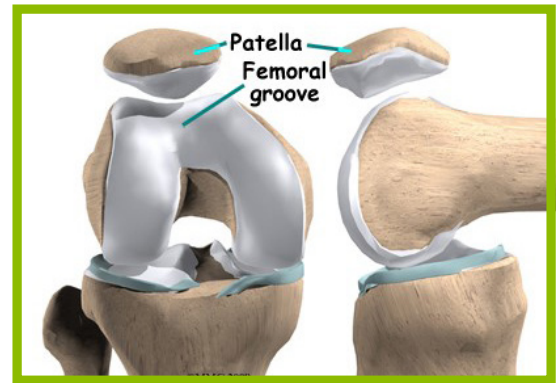
The patella (kneecap) is the moveable bone on the front of the knee. This unique bone is wrapped inside a tendon that connects the large muscles on the front of the thigh, the quadriceps muscles, to the lower leg bone. The large quadriceps tendon together with the patella and patellar ligament is called the extensor mechanism. Though we think of it as a single device, the extensor mechanism has two separate tendons, the quadriceps tendon on top of the patella, which connects the quadriceps muscle to the top of the patella, and the patellar tendon below the patella, which connects the lower portion of the patella to the shinbone (tibia).

The tendon above the patella is called the suprapatella tendon and the tendon below the patella is called the infrapatella tendon.

Tightening up the quadriceps muscles places a pull on the tendons of the extensor mechanism. This action causes the knee to straighten. The patella acts like a fulcrum to increase the force of the quadriceps muscles as well as protecting the quadriceps tendon as it passes over the femur.



The underside of the patella is covered with articular cartilage, the smooth, slippery covering found on joint surfaces. This covering helps the patella glide (or track) in a special groove made by the thighbone, or femur. This groove is called the femoral groove.



The “v” shape on the underside of the patella and the “v” shape on the upper side of the femur fit together and assists the tracking of the patella on the femur during movement of the knee.

Two muscles of the thigh attach to the patella and help control its position in the femoral groove as the leg straightens. These two muscles are part of the quadriceps group and are called the Vastus Medialis Obliquus (VMO) and the Vastus Lateralis (VL). The VMO runs along the inside of the thigh, and the VL lies along the outside of the thigh. If the timing between these two muscles is off or one is stronger than the other then the patella may be pulled off track and uneven rubbing will occur on one side of the articular cartilage on the back of the patella.

Potential causes of Anterior Knee Pain and Advice to Prevent it

- As explained above, poor tracking of the patella in the femoral groove as the knee moves. This causes excessive stress on the back of the patella thus wearing and irritation of the cartilage. This can be due to:
 - » Muscle imbalance between VMO and VL (thigh muscles – see above) the patella gets pulled sideways by the stronger muscle, irritating the cartilage on that side.
 - * If you feel this is an issue, strengthen your thigh muscles to correct the imbalance
 - » Muscles within the lower extremity being too tight – e.g. quadriceps itself (front of thigh), hamstrings (back of thigh) and gastrocnemius (a calf muscle)
 - * If you feel that this is an issue, ensure adequate length of muscles and good range of movement at the knee by undertaking a regular stretching programme
 - » The muscles of the hip control the position of the knee. A weakness of the muscles that pull the hip out and away from the other leg, or turn the thigh outward (hip abductor and external rotator muscles,) can lead to imbalances in the alignment of the entire leg including the knee
 - * If you feel this is an issue, strengthen your hip muscles to correct the imbalance
 - » Poor foot control, flat feet or feet rolling inwards causes inward rotation of the knee and therefore poor tracking of the patella
 - * If you feel that this is an issue for you please visit your GP, Chartered Physiotherapist or Podiatrist to receive an expert opinion and appropriate intervention
- Wear and tear as a result of acute injury to the patella e.g. a fall or chronic friction between the patella and the femur such as during jumping

- Activities
 - » A sudden introduction or escalation in hill / stair activity
 - * Walk up stairs leading with your unaffected (pain free) leg, walk downstairs leading with your affected (painful) leg. This can be remembered easily by the saying 'the good leg goes up to Heaven, the bad leg goes down to Hell'
 - * Graduate or phase the increase in the activity. If this is not possible within a work environment make use of escalators / lifts where possible and reduce over time to create the phased approach
 - * Take regular short breaks and when safe to do so
 - » A sudden introduction or escalation in squatting
 - * Try to raise the area to waist height e.g. use raised beds in a garden / garden centre or place a case / box onto a higher workbench
 - * Use a low chair / stool where possible e.g. a teacher bending down at the side of a young child at school when he/she needs help in the classroom, should sit next to them on a chair
 - * Kneel using kneeling pads and alternate the kneeling position / leg
 - » Weight bearing through a bent knee
 - * Try to minimise this activity, but when you do so ensure that your patella is lined up with the midline of your foot (so when you look down you can see your big toe on the inside of your bent knee) and clench your buttock muscles for power
 - » Cycling with your saddle at the incorrect height and putting the pedal in your instep rather than on the ball of your foot
 - * Get your saddle height approved by a 'professional' i.e. bike shop assistant
 - * You should have a 5-10 degree bend in your knee when the ball of the foot is placed on the pedal and the pedal is positioned in its closest position to the ground
 - * Cycle with the ball of the foot on the pedal – not the instep / arch of the foot!
 - » Prolonged postures such as sitting and getting up from prolonged sitting
 - * Keep your knees moving when you are sitting down
 - * Ensure that your workstation is not cluttered and that you can stretch out your legs while you sit
- Clothing / Accessories
 - » Poor footwear - unstable or not fit for the activity undertaken
 - * Wear suitable shoes for the activity and also for your foot biomechanics (type, fit and condition of footwear)
 - » Restrictive clothing around the hips / knees e.g. tight pencil skirts
 - * Wear suitable clothing for the activity that allows a good knee position

Signs and Symptoms of Anterior Knee Pain

The most common symptom is pain underneath or around the edges of the patella. Often the pain radiates to the medial side of the kneecap (the side closest to the other leg) whereas others experience vague pain in the knee that isn't centred in any one spot.

The pain is made worse by any activities that load the patella-femoral joint, such as running, hill walking, or going up and down stairs. Kneeling or squatting is often too painful to even try. Keeping the knee bent for long periods, such as when sitting in a car or during a movie may also cause pain.



Sometimes there may be a sensation like the patella is slipping or giving way on activities such as jumping or running. Most often this is thought to be a reflex response to pain and not because there is any instability in the kneecap.

The knee may grind, or you may hear a crunching sound when you squat or go up and down stairs. In most cases this is nothing to worry about if pain is not present in the knee. If there is a considerable amount of wear and tear, you may feel popping or clicking as you bend your knee. These sounds are caused by the uneven surface of the underside of the patella rubbing against the femoral groove. The knee may swell with heavy use and become stiff and tight. This stiffness can be because of fluid accumulating inside the knee joint, sometimes called 'water on the knee'. This swelling is not unique to this condition but sometimes occurs when the knee becomes irritated.

Aiding Recovery with a Home Exercise Programme

FIRST AID ADVICE (IMMEDIATELY AFTER THE INJURY)

The best results after a knee injury come when treatment is started right away. A simple way to remember the essential steps of initial treatment is by the letters in the word RICE. These stand for rest, ice, compression, and elevation

REST

The injured tissues in the knee need time to heal. Rest prevents further injury and reduces the stress on already inflamed tissues. If the injury is severe crutches or a walking stick (placed in the opposite hand to the injury) will prevent too much weight being placed on the knee in the early days of injury when walking is essential.

ICE

Applying ice will help ease pain and reduce the swelling and warmth. You should apply the ice as soon after the injury as you can to prevent as much of the inflammation developing as possible. This will help ensure a speedy recovery. It is advised to apply ice in the form of crushed ice cubes, frozen peas or an ice pack. DO NOT apply directly to your skin, oil can be applied to protect the area. All of these are to be wrapped in a damp tea towel and applied to the knee for approximately 15 minutes every 2 hours. It is advised that you check the skin every 5 minutes to avoid the possibility of an ice burn from the cold temperature. Apply frequently in the first 2 days

COMPRESSION

Use tubigrip (elasticated tubular bandage available at the chemist) on your knee, this will help prevent inflammation and swelling. Apply the tubigrip from mid thigh to mid calf, make sure it is not too tight and take it off at night time.

ELEVATION

Supporting your knee above the level of your heart helps to control swelling by aiding your body to reabsorb the fluid that has leaked into the tissue. Ideally lie on your bed or the sofa or floor and prop your knee up on pillows or a chair so that it is higher than your heart. Even propping your knee up on a chair if you are unable to lie down (e.g. at work) is beneficial.

Further Self Help

- If swelling in the knee is severe, self-massage can help. Apply massage strokes from the knee toward the hip with your leg kept in an elevated position. This helps get the excess tissue fluid moving out of the knee and back into circulation.

- Gentle mobilisations of the patella from side to side can aid pain relief and reduce swelling and stiffness. You must sit up straight with your back supported (hips bent to 90 degrees) and your legs straight. This can be done while sitting on your bed with your back supported by the headboard, or sat on the floor with your bottom against the skirting board and your back supported by the wall. Reach out to your knee with your arm while your back is still resting on the wall. Your sitting position is important as if you lean forward away from the wall, your thigh muscles will tighten and you will not be able to move your patella!
- Mild pain relievers may help with the discomfort. Anti-inflammatory medications can help ease pain and swelling and get people back to activity sooner. These medications include common over the counter drugs such as ibuprofen. Talk to your Doctor or Pharmacist if you have specific questions about which pain reliever is right for you.
- Avoid repetitive activities or prolonged activities (such as sitting for a long time) that aggravate your symptoms until you are feeling more in control of the pain and slowly reintroduce these activities. For example driving long distances, break up the drive by taking frequent breaks.

RANGE OF MOVEMENT AND STRENGTHENING EXERCISES

Please discuss with your Physiotherapist which exercises are right for you. The type, duration and frequency of the exercises will depend on the structure and grade of your injury and where you are in the recovery phase.

Please remember to use this advice under the guidance of your Physiotherapist.

To find out even more about knee problems,
visit the 'Know Your Body' section of our site.

www.physiotherapyinleeds.co.uk/body-parts/knee