

KNEECAP NIGHTMARES

Knee pain is a very common complaint, and can be due to a number of causes. One of the most common types of knee pain however is patello-femoral syndrome.

By Tanya Winter

Patello femoral syndrome is the term used to describe pain in and around the knee cap (patella). Pain is the result of abnormal position and movement of the patella on the thigh bone (femur) during knee flexion and is often referred to as maltracking. This movement can lead to damage of the surrounding tissue and cartilage underneath the kneecap.

Usually the patella sits in the groove between the condyles of the femur, facing straight forwards. In the case of patello-femoral pain, the patella is pulled laterally, sitting out of the normal groove, clicking and grating over the femur and underlying structures causing pain. If it is pulled too far laterally it can even dislocate.

This abnormal position and movement of the patella can be caused by a number of factors.

1. LOWER LIMB STRUCTURAL ALIGNMENT

The first contributing factor is genetic structural alignment of the legs. If a person has knock knees for example, the knees go inwards and the patella is then more likely to sit laterally. Patello-femoral pain is more common in females as women's hips are wider than men's, meaning the femurs have to travel on an inwards angle, making them more likely to have problems.

Hypermobility in the joints is another contributing factor – anyone who stands with their knees locked back is at increased risk. In hypermobile people the knee ligaments are not as taut, so this allows the patella to be drawn laterally more easily as the ligament doesn't hold it in place as well.

Foot alignment is one of the biggest factors as well. If the foot is pronated (rolls in) or is flat then the whole leg will also medially rotate

when walking or standing. As the leg rolls in, the kneecap then sits more laterally.

2. MUSCLE IMBALANCES AND POOR STABILITY

The muscles play a huge role in the support and stability of the patella.

Quadriceps: the quadriceps insert onto the patella so have a direct effect on its position. There is a "tug of war" that exists between the medial quadriceps (Vastus Medialis Obliquus or VMO) and lateral quadriceps (Vastus Lateralis). The VMO pulls the patella medially; the Iliotibial Band (ITB) and Vastus Lateralis pull it laterally. So if there is an imbalance between these muscles, ie weak VMO and tight ITB and Vastus Lateralis, the patella will be drawn laterally.

Buttock muscles: the Gluteus Medius muscle is the most important buttock muscle as it stops the knee from rolling in and also stabilises the pelvis and knee laterally. If the Gluteus Medius is weak, the knee not only rolls in medially causing strain, but also the Gluteus Maximus and Tensor Fascia Latae muscle (TFL) often become really tight to try to help stabilise the pelvis. They both insert into the ITB, so if they are tight it directly affects the kneecap position this way as well.

Abdominal muscles: these are very important for core strength and pelvic stability, and when weak will contribute to the problem.

*An abnormal patella position and poor stability combined with poor training techniques eg overloading the knee joint with a lot of running and squatting movements with poor technique will cause pain. Patello-femoral pain can occur in anyone, but is most common in females aged 10-30. »»

Symptoms include:

- Aching pain in the knee joint - particularly at the front of the knee
- Pain under the patella during knee flexion/extension
- Increased pain walking up/down hills/stairs
- Some swelling
- A clicking or cracking sound during knee flexion

Treatment includes:

- Rest & Ice – Rest from aggravating movements, especially movements involving loaded knee flexion like stairs, running, squats and lunges is important, along with the application of ice
- Taping the patella medially to hold it in the correct position
- Massage/stretches for tight muscles – ITB, TFL, Lateral Quadriceps, Gluteals. If stretching the quadriceps is too painful on the knee (which it often is), then rolling a foam roller or tennis ball up and down the lateral leg or a professional massage should be used instead
- Strengthening exercises for weak muscles (especially VMO, buttock and abdominal muscles) and pelvic stability
- Correction of any abnormal biomechanics - orthotics may be prescribed by a podiatrist if the person has flat/pronated feet.

PATELLO-FEMORAL PAIN - IMPLICATIONS FOR EXERCISE

This can be different in every person with patello-femoral pain and can also depend on the severity. Basically avoid any exercise that causes pain or clicking, weight bearing through the knee joint, kneeling on the kneecap or extreme ranges of motion at the knee. Exercises that are

the most likely to cause pain include: running, heavy squats, lunges and stair climbing, especially if performed with poor biomechanics and control.

Ultimately you need to progress to some of these exercises as the inflammation settles down and the strength and control improves, but not until the exercises cause no pain.

Initially, focus on improving the core with abdominal and buttock exercises as you can safely do these whilst resting the knee, then progress to loaded VMO exercises like squats and light leg press. Just make sure that when you are doing these VMO exercises you check the leg alignment is correct, and feel that the VMO is working, not just the lateral quads, and that there is no pain. The VMO can be felt medially just above the kneecap. Pressing through the heels or squeezing a towel, pillow or small ball between the knees when performing squat type exercises can really help the VMO activation.

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STRENGTHEN THE CORE WITH THESE EXERCISES

HUNDREDS

Lie on your back, with your knees bent and holding the knees. Curl your ribs to your hips by lifting your head and shoulders. Bring your hands down by your hips and simultaneously extend your legs straight up towards the ceiling or to challenge yourself, slightly lower than upright (pictured). Draw your belly button in towards your spine to flatten your abdominals. Hold this position for 10 breaths – breathe IN for the count of five and breathe OUT for the count of five to get to 100. Keep the eyes on the knees and shoulders away from the ears. If the neck strains, place one hand behind the head to support it.



PLANK ON THE BALL

Kneel on the floor and place the ball under the belly, then place the hands on the floor in front of the ball and begin to walk the hands forwards with the legs straight as pictured. Lift up through the abdominals preventing any sagging, bowing or dipping through the body and lower back. Only go out as far as you can, keeping good technique and ensure there is no pain in the back. If the wrists are straining, take the hands slightly further apart and turn the hands outwards. Hold this plank position for as long as possible with perfect technique. Use a mirror to check technique.



TARGET THE BUTTOCK STABILITY WITH THESE EXERCISES

CLAM

Lie on the side with the knees bent, with the legs half in front and half behind. Roll the top hip forward slightly and keep it forward. Create a small space between your waist and the floor, and take the feet up in the air. Squeeze the top buttock and slowly raise the top knee up towards the ceiling keeping the feet together. Return the knee back to the starting position. Repeat 30 times each side.



CLAM KICK OUT

Lie on the side with the knees bent, feet back in line with the body, knees in front of the body. Roll the top hip forward slightly and keep it forward. Create a small space between your waist and the floor, feet up in the air. Squeeze the top buttock and slowly raise the top knee up towards the ceiling keeping the feet together then extend the top leg out straight and in line with the body. Return the feet back together keeping the knee high, and then bring the knees back together to the starting position. Do 30 times each side.



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LEG CIRCLES

Lying on the side with the arm extended under the head and the head relaxed on the arm, place the top hand in front to support and stabilise. Take your top leg and extend it out in line with the body and at hip height. Keeping the leg straight, take the leg in front of the body, then raise it towards the ceiling and then back to the starting position in line with the body. Repeat 20-30 times. Keep the abdominals strong to prevent arching the back, keep the hips stacked vertically at all times. Ensure there is no work in the TFL; the target area is the side of the buttock around the hip joint.



KNEELING SIDE KICK

Kneel on one knee, with the other leg held out straight and lifted to hip height. Place one hand on your hip and the other on the mat, directly under your shoulder, so that your hand, head, hip and lifted leg are all in one straight line. Raise the leg up and down, squeezing the buttock muscles Repeat 50 times with a 10 second hold at the end and then change sides.



STRENGTHEN THE LEGS WITH THIS

WALL SQUATS WITH A BALL

Place a ball in the small of the lower back between you and the wall. Your feet should be slightly forward in front so you are leaning back into the ball. Feet hip width apart, feet straight, then slowly squat down keeping the knee in line with the middle toes and slowly squat back up. Press all of the body weight through the heels and the big toe joint and ensure there is an arch in the foot. Ensure the knee is pain free through the range of movement.

PRESSING THROUGH THE HEELS OR SQUEEZING A TOWEL, PILLOW OR SMALL BALL BETWEEN THE KNEES WHEN PERFORMING SQUAT TYPE EXERCISES CAN REALLY HELP THE VMO ACTIVATION.



STRETCH IT OUT...

GLUT STRETCH

Lying on the back, cross the left ankle over the right knee. Place the left hand through the gap in the legs, hold onto the knee, and take the right hand around the outside of the same leg. Use both arms to draw the right knee in towards the chest and feel the stretch in the left buttock. You can bend the left elbow and place it on the left knee pressing it outwards to get a little more stretch. Ensure the tailbone is on the floor. Breathe deeply and with each breath out stretch a little further. Continue for 10-20 deep breaths.



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