



YOUR GUIDE TO

# ANTERIOR KNEE PAIN

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## Introduction

**Please take note of the following before starting any of the exercises in this guide:**

- The information contained in this guide is intended to assist in managing your recovery.
- This guide is based on the latest medical research in the field and contains the best advice available to the best of our knowledge.
- This guide is complimentary to other medical services and is not intended as a substitute for a health care provider's consultation.
- Never disregard medical advice or delay in seeking advice because of something you have read in this guide.

● Many people have found quick and lasting relief from their Anterior Knee Pain by acting upon the information provided, but everyone decides for themselves what to do with this information. Should you doubt a particular exercise in your situation, please consult your health professional.

**When consulting your health professional, it is wise to take this guide with you to show them.**

# What causes Anterior Knee Pain?

**Anterior Knee pain** is pain in the front of the knee. Another term for this condition is patellofemoral pain syndrome, which involves pain in the joint between the knee cap and the thigh bone. This generally results from physical and biomechanical changes in this joint. It should not be confused with Chondromalacia, which is the actual fraying and damage to the underlying cartilage of the knee cap. It must be noted though that patellofemoral pain can become chondromalacia if it is not properly treated at an early stage. In general the literature and clinical experience of patellofemoral pain syndrome suggest that its cause is multifactorial including biomechanical, muscular and overload/overuse theories

## OVERUSE AND OVERLOAD

Because bending the knee increases the pressure between the knee cap and

its various points of contact with the thigh bone, patellofemoral pain is often classified as an overuse/overload injury which can affect both athletes and less active people. Repeated weightbearing impact (e.g. running), as well as steps, hills and uneven surfaces all tend to exacerbate the pain. With patients who have more severe patellofemoral pain, sitting for long periods of time may also exacerbate the pain due to the increased pressure at the joint when the knee is bent.

## BIOMECHANICAL AND MUSCULAR PROBLEMS

There are a number of anatomical features that have been identified as contributing factors to the cause of patellofemoral pain. Knock knees (genu valgum), abnormal twisting of the femur, and flat (pronated) feet all contribute to the onset of anterior knee pain.

The knee cap (patella) is a mobile, flat, triangular bone that sits within the tendon of the front thigh muscles (quadriceps) and glides over the groove on top of the thigh bone. When the knee cap is not centred in the groove of the thigh bone (patella malalignment), the imbalance results in increased pressures between joint surfaces and subsequent wear and tear. The most common tracking abnormality occurs when the knee cap tilts and glides towards the outside of the joint. The patella may slip outwards and stay there, in which case the knee will lock and you will not be able to straighten it (patella dislocation). Generally the knee cap will relocate itself spontaneously, but in some cases this will need to be done at an A&E department.

The potential muscular causes of anterior knee pain can be divided into "weakness" and "inflexibility" in the muscles that surround and stabilise the knee joint. Weakness or imbalance of the thigh muscles is most often seen as the main area of concern.

## Other Patellofemoral conditions:

### PLICA BANDS

Plica bands are folds of the membrane within the knee that are normal structures in most people. If the knee is injured however, they can become

painful as they rub against the thigh bone. When inflamed or torn, you can normally feel a thickened band as you bend and straighten your knee. Usually these do not cause any problems, but rarely enlarged and hard bands may require key hole surgery

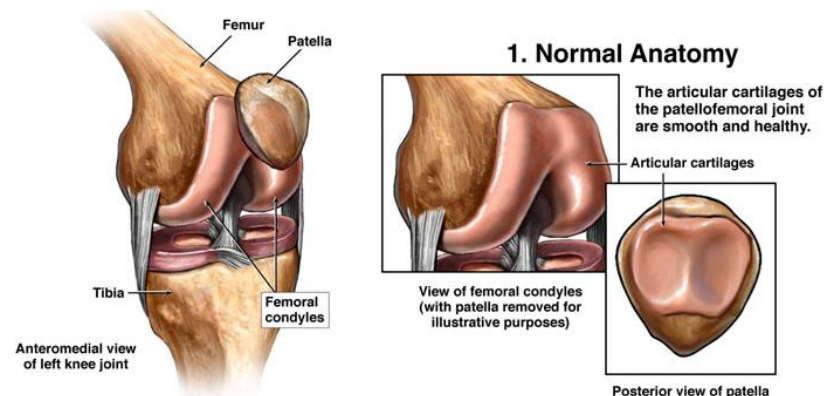
### PATELLA TENDINOSIS

This is a common medical condition seen in sports medicine. Originally known as 'jumpers knee', it is an overuse condition that results in the degeneration of the tendon. It is non-inflammatory, but can be very painful, with the pain being well localised at or near the lower border of the knee cap.

### PREPATELLA BURSITIS

Plumbers, carpet layers, gardeners and others who spend a lot of time on their knees often experience swelling in the front of the knee. The constant friction and pressure irritates a small lubricating sac (bursa) located just in front of the knee cap. This bursa or sac, enables the knee cap to move smoothly under the skin, but if inflamed, it fills with fluid and causes swelling at the top of the knee

**Due to the multifactorial cause of anterior knee pain (patellofemoral pain syndrome), it is essential that each potential cause is evaluated and addressed appropriately to ensure that the correct treatment is given.**



# What treatment can I receive?

Non surgical management continues to be the main treatment for **Patellofemoral pain syndrome**. An initial conservative approach to patients with patellofemoral pain syndrome should include the following measures:

- **Relative rest** with consideration of temporary change to non-impact aerobic activity,
- **Quadriceps strengthening**
- **Evaluation of footwear**
- The **application of ice**, especially after activity

**It is essential however that treatment is individualised to the specific elements of your physical assessment.**

## PHYSICAL THERAPY

Consulting a therapist such as a; Physiotherapist, Osteopath or Chiropractor is advised to ensure that a full assessment of your knee is performed and that a treatment programme that is specific to your injury is provided. They will also be able to use specific treatment techniques that will serve to speed up the recovery process, promote a full return to function and provide you with advice on how to prevent future episodes of knee pain.

## EXERCISES

Exercises for patellofemoral pain are mostly focused on weakness in the quadriceps muscles especially the

inside quadricep muscle (VMO), which is very important for the control of movement (tracking) and stability of the knee cap. Hip, calf and other leg muscle stretching and pelvic stability exercises may also be important depending on the individual's physical examination. Compliance of the exercise programme is essential and you should not expect overnight success due to the chronic nature of the condition.

## RELATIVE REST

Initially knee activity should be reduced, at least relatively, due to the overload/overuse nature of the condition. Discontinuing the 'offending activity' until the pain decreases is important. If you are a runner and insist on continuing some rigorous activity, swimming or other non-impact aerobic activity can be a good substitute

## ICE AND ANTI-INFLAMMATORY DRUGS

Ice is an excellent form of anti-inflammatory 'medication', but its successful use requires discipline, and it is important that you check with your GP or therapist regarding the contra-indications that may be related to you.

**Anti-inflammatories have not conclusively been seen to be beneficial.**

## TAPING THE KNEE

Taping the knee cap into a position that will reduce friction and encourage the correct tracking of the knee cap,

can be beneficial. The technique used by many therapists is known as 'McConnell taping'. When performed correctly in selected patients, taping may offer short-term pain relief. Most physiotherapists are trained in taping, and can teach you how to tape effectively yourself if you find it beneficial in reducing your pain.

## FOOTWEAR

Generally speaking the quality and age of footwear are more important than the brand name. Gait (walking/ambulation) analysis is an important part of the physical assessment of knee pain and your therapist can refer you on to a podiatrist or recommend the appropriate footwear for you. Shoe supports can also be given which can be put in your shoes to improve the

alignment of your lower leg. It is however essential that you consult your health professional beforehand to ensure this is what you require.

## SURGERY

Surgery for patellofemoral pain is considered a last resort. True Chondromalacia can be amenable to key hole surgery to smoothen the undersurface of the knee cap. Unfortunately, Chondromalacia may return, especially if the correct rehabilitation is not followed after surgery. If the problem is clearly caused by excessive poor tracking of the patella to the outside of the joint, a lateral release is sometimes appropriate (especially in the case of repeated dislocations), but before surgery is done, other options and treatments should be considered.

# What exercises should I do?

The exercise programme should be specific to the factors contributing to your pain, and therefore one exercise programme may differ slightly from another. The main focus for all patients with anterior knee pain will be quadricep strengthening exercises. Initially, it is important with any of these exercises that you avoid exercising in the ranges of motion that are painful for you. This range of motion should be gradually increased as your pain and symptoms improve.

The combination of a range of treatments throughout your exercise rehabilitation programme is often very beneficial. For example, taping the knee cap, to encourage correct tracking patterns, while strengthening the appropriate muscle groups involved in joint stability, can be very beneficial to the rehabilitation programme.

# Exercises phase 1

When starting an exercise programme it is important that you **start slowly**, and don't try to do too much too quickly. It is also very important that throughout your exercise programme, you work in **pain free** ranges of movement. You will note that these ranges gradually increase as you get stronger.

**Trying to work in painful ranges will only prolong your recovery.**

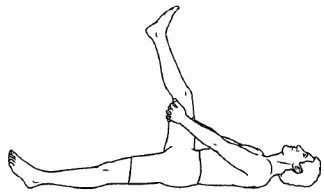
Exercises at this stage include both stretching and strengthening exercises. It is however important that you are aware that this is a general exercise programme for patellofemoral pain, which can be adjusted depending on advice that you have been given by your health professional on assessment of your knee.

## STRETCHING EXERCISES

- **Hold each stretch for 30 seconds and repeat 2-3 times each side**
- **Do not bounce the stretch and do not stretch into pain**

### HAMSTRINGS

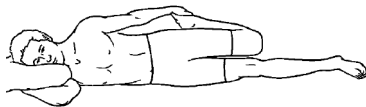
Lying on your back with one knee bent and the other straight. Raise the bent knee towards your chest until your knee is in a straight line



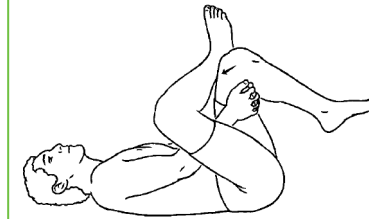
with your hip (i.e. 90° to your body). Clasp your hands behind your knee and straighten at the knee. You can use a towel to assist you in raising your leg by placing it around the back of your knee. Your foot should be flexed and you should feel a stretch at the back of your leg which may continue into your calf. You should not take your knee past the line of your hip, as you may overstretch your hamstring

### QUADRICEPS

Lying on your side, extend your arm to support your head, use your other hand to grasp your top ankle as you

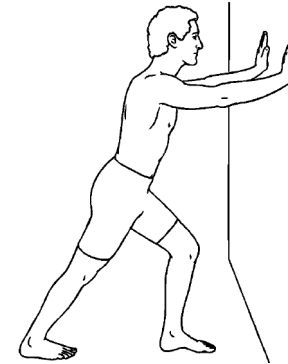


bend your knee backwards. You should feel the stretch along the front of your thigh. It is important that you keep your top knee in line with your hip, and do not hyperextend your back. A towel can be used to aid you in this stretch if you are unable to bend your knee too far.



### BUTTOCKS

Lying on your back, rest your right ankle on your left knee. Using your hands lift your left leg into the air, bending the knee at 90°. Pull your left leg gently towards your body. You should feel a stretch in the upper back part of your right leg. A towel can be used to aid you in this stretch if you are unable to reach your leg.



### CALF STRETCH

Stand about a meter away from a wall. Place both hands against the wall with one foot further back than the other. Now lean in towards the wall, bending the front knee and keeping the back knee straight and the heel on the floor. Now bend your back knee slightly, still keeping your heel flat on the floor. You should feel the stretch lower down your leg in your calf muscle.



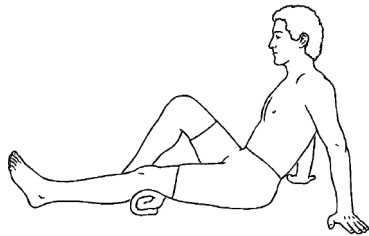
### ILLIOTIBIAL BAND STRETCH

Standing upright, with one leg in front of the other (the injured leg behind first). Now push your hips out towards the side of the leg that is behind (i.e. your injured leg), while your upper body goes in the opposite direction.

# Exercises phase 1 (continued)

## STRENGTHENING EXERCISES

- Repeat two sets of 10-12 repetitions on each leg unless otherwise stated within the exercise
- Be aware of your pelvic position (do not arch your back - keep your hip bones facing forwards) and ensure that all movements are controlled and pain free



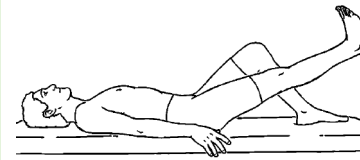
### TERMINAL LEG EXTENSIONS

Sitting on the floor with one leg outstretched in front of you and a pillow/rolled up towel under the knee. Lift the heel off the floor straightening the leg, hold for 10 sec. (contract the VMO muscle group), and then relax. Repeat 10 times per leg.



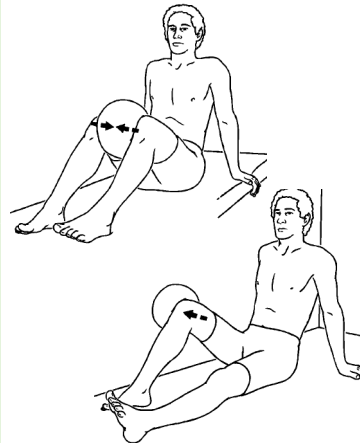
### HEEL SLIDE

Start lying on your back with one knee bent and the other straight. Now contract your quadricep on the straight leg, as above, and keeping your heel dug into the floor, slowly slide this leg up to the height of your bent knee. Only work in your pain free range and if necessary gradually build up to the height of your other knee.



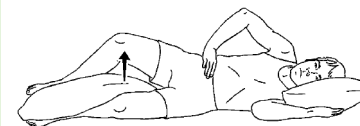
### STRAIGHT LEG RAISES

Lie on back with one knee bent and the other straight. Now raise your straight leg 20cm off floor, keeping knee straight and toes pointing to the ceiling. Repeat 2 sets of 10-12 reps. Now change toe position so toes are pointing outwards. Make sure that the rotation of your foot is from your ankle and not simply flopping your hip out. Repeat 2 sets of 10-12 reps.



### BALL SQUEEZING AND PUSHING

Lying on your back with your knees bent, firstly place the ball between your knees and squeeze. Hold for 10 seconds and repeat 5 times. Now place the ball between your knee and the wall, push out for 10 seconds and repeat 5 times on each leg



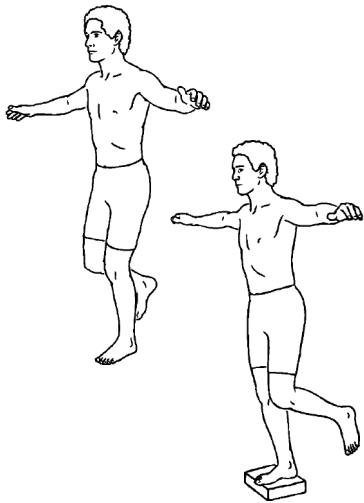
### GLUTES WITH THERABAND

Assume a side lying position with knees bent and a black theraband tied around both knees. Keeping the feet together, lift the top knee up against the band as high as possible without the hips opening out, i.e. hips stay square and forward. Hold for 5-10 seconds. Repeat 10 on each side



### STEP-UPS

Stand on one leg on a step facing up the stairs. Slowly lower yourself by bending your knee. Return to starting position without pushing off from the ground with the opposite leg. Be aware that your knee and foot do not roll inwards, and that your knee stays in line with your second toe throughout the movement. Only work in a painfree range of movement.



### STORK STANDING

- Balance on one leg for 30 seconds and repeat with the other leg.
- Repeat the above with your eyes closed.
- Progress the above to standing on an unsteady surface, e.g. a cushion or a narrow piece of wood.

Start with 30 seconds and progress this to 1min

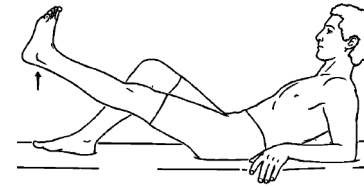
## Exercises phase 2

Before starting **phase 2**, ensure that you are **pain free** with all phase one exercises and are able to work in a full range of movement. If you progress on to phase 2 and find that you don't quite have the control or your knee is painful, do not be scared to go back to phase one, or combine some of phase

one and phase 2 exercises. In this phase ensure that you work in a pain free range and that you maintain control throughout your available range of movement. Continue with the stretches of phase one before and after the exercise programme.

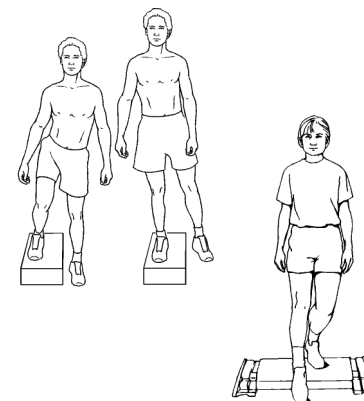
### STRENGTHENING EXERCISES

- Repeat two sets of 10-12 reps on each side
- Ensure that you have control of your knee throughout the range of movement and be aware of your pelvic position



### STRAIGHT LEG RAISES

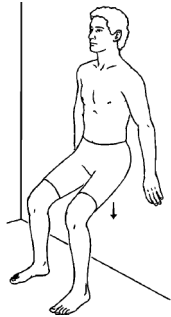
Repeat as in phase one, but this time change your body position to half sitting, and then to full sitting. Use your arms to support your back in each position. With each change of position, keep the exercise the same, i.e. knee straight and change your foot position each set.



### LATERAL STEP-UPS

Standing on the edge of the step, with your foot parallel to the edge. Slowly lower yourself off the step, controlling the movement of your knee, bending as far as you can pain free and controlled. Control on the way up as well ensuring that you don't push off with the opposite foot. You can also face down the step and step off forwards, again controlled and in a functional, pain free range.

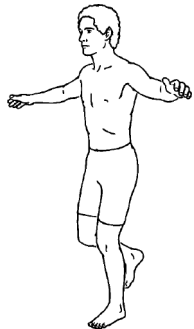
## Exercises phase 2 (continued)



### WALL SLIDES

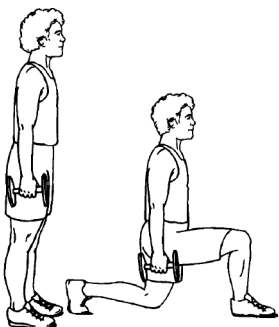
(can also be done using a fitball)

Stand leaning up against a wall, your feet a little away from the wall shoulder width apart and pointing slightly outwards. Keep your back against the wall throughout the movement. Place a ball between your knees and squeeze. Slowly lower your body into a seated position and hold this position (knee to 90°) for 5-10 seconds. Complete 10 repetitions.



### STORK STAND PICK-UP

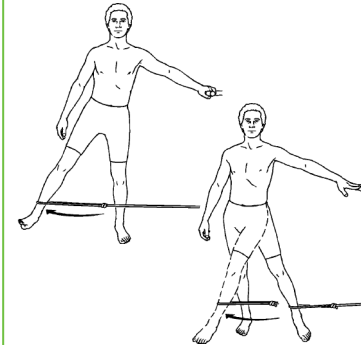
Standing on one leg, with your weight on your heel, bend down to pick up a weight with the opposite hand ensuring that your weight stays on your heel, and that your knee goes down in line with your second toe. Also ensure that your knee and not your back does the bending work. Repeat 10 times on each leg (up and down is one repetition)



### LUNGES

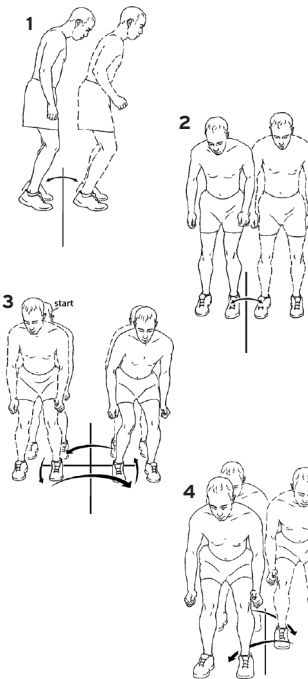
(can be done statically as well)

Lunge with one foot forward keeping the knees 90° (or at least attempt to reach 90°). Ensure that your front knee does not go over your front foot when bending to 90°. Return to the starting position. Perform 10 reps with the one foot forward before changing to the other foot forward. Try to be as stable as possible during the exercise.



### HIP ABDUCTION AND ADDUCTION

Attach a theraband around the table leg. Place the furthest leg in the loop of the band and raise it out to the side away from your body. Keep your knee straight and pelvis stable. Now turn around and bring your leg away from the table towards your midline (the other leg). Make sure you keep your body stable and just use your leg.



### HOPPING SEQUENCE

Hop from one point to another in the following sequences

1. Forward and backward
2. Side to side
3. Jump in a square both clockwise and anticlockwise
4. Jump diagonally forwards and backwards across a central imaginary line

Start by hopping with both legs and as you feel strong enough, progress to one legged hopping. Repeat the sequence 10 times on each foot. These exercises are important to improve functional proprioception (awareness of the body in space), and are essential for effective return to sport. You can also include shuttle running exercises, including zig-zag running, forward backward running, fast and slow interval running etc.

## Contact us

This guide is designed to assist you in the self-management of your injury/condition.

We are here to assist your recovery in the shortest but safest possible time. If you have any uncertainties or queries regarding the information, please do not hesitate to contact us on:

Phone 017890400999 / 07870166861  
[www.mdphysiotherapy.co.uk](http://www.mdphysiotherapy.co.uk)