

Anterior knee pain



Information for patients



What is anterior knee pain?

Anterior knee pain (AKP) is pain felt at the front of the knee around the knee cap area. The exact location of the pain may be difficult to describe and there may not be an obvious reason as to why the pain has started.

What are the signs and symptoms of AKP?

People who have AKP are likely to notice some or all of the following things:

- The exact onset of pain may not be obvious or relate to one specific event. The pain may have gradually built up over time.
- The exact area of pain is often difficult to define. Pain is usually felt somewhere around the front of the knee.
- People with AKP may feel that the knee collapses or gives way but this is usually as a result of muscle fatigue or pain and not due to an injury to the ligaments that stabilise the knee.
- People with AKP may notice a catching, seizing or clicking sensation during movements that involve bending the knee.
- Pain may be increased with activities that involve long periods of time spent with the knee in a bent position e.g. sitting, squatting and kneeling.
- Pain may be increased with going up or down stairs or steep hills.

What causes AKP?

It is often difficult to say what the exact cause of AKP is but it is thought that it is associated with a number of different factors. Often it is a combination of several of these factors that result in the symptoms of AKP which may include:

- **Reduced leg muscle strength.** Weakening of the muscles by having stopped participating in exercise is very commonly associated with the development of AKP symptoms. Many people with AKP think that they need to rest their knee which in fact makes the important muscles that support the knee joint weaker and in effect may make the symptoms of AKP worse, in the long term, not better.
- **Suddenly overloading the knee cap joint** with a new type of activity or exercise e.g. taking up a new sport or suddenly increasing the amount of sport / training being done.
- **Variations in the shape and structure of the knee cap joint** can change how the knee cap joint is used and can make some people more susceptible to the symptoms of AKP.
- **Being overweight or a sudden increase in body weight** e.g. the later stages of pregnancy, is a very strong risk factor in the development of AKP symptoms.

For people with AKP, the symptoms are often made worse with the following types of activities:

- Sitting with the knee bent for prolonged periods of time
- Walking up or down stairs or steep hills
- Squatting or kneeling
- Situations where the knee has to support more load e.g. carrying heavy loads at work or during hobbies.

How is AKP diagnosed?

Your doctor will ask you several questions to help rule out other conditions that could be causing your symptoms. They will also need to examine your knee to look for any swelling at the knee joint. If other conditions are ruled out then it is likely that the problem is AKP.

If your doctor finds that the knee joint is swollen (this is called an effusion) then it may be that something else is causing the symptoms. At this point the doctor usually suggests getting some X-rays of the knee joint and taking a blood test from you. The results of these investigations will help us to work out what might be causing the swelling and will help your doctor decide on the best way to manage your symptoms.

How is AKP treated?

The most common reason why people get this condition is due to weakness in the quadriceps muscles (thigh muscles). If this muscle is strengthened then it is likely that the symptoms of AKP will settle down and improve.

It is very important to note that the symptoms of AKP can take a long period of time to settle down and it is not unusual for symptoms to initially worsen when exercises are first started. It is expected that the following exercises will need to be continued on a regular basis over at least a 12 week period, and often longer, for benefits to be seen.

What exercises are recommended?

Although a number of different exercises can be done to strengthen the thigh muscles, one of the best ways to do this is by doing a mini squat. This exercise is demonstrated in a series of video clips found on our website (see 'Exercises for patients with anterior knee pain'):

- <http://video.sth.nhs.uk/orthopaedics>



Alternatively you can scan this QR code with your smartphone or tablet camera. You can also download a QR code reader for free on the GooglePlay or AppStore.

Which exercise should I start with?

This exercise can be graded into easy, moderate and hard versions.

It is sensible to start with the easy version of this exercise and progress to the moderate and hard versions as strength and symptoms allow.

In addition to this exercise, it is often beneficial to introduce the use of an exercise bike if there is one available (ask friends and family if one can be borrowed). This will allow the leg muscles to be strengthened without excessively loading the knee joint or making it too uncomfortable.

Are there other ways I can help my symptoms?

Symptoms of AKP can also be relieved by:

- Addressing any aggravating factors e.g. reducing the volume and intensity of a new exercise until your legs have gained sufficient strength to support the new activity.
- Identifying lifestyle changes that may be contributing to the symptoms e.g. reducing body weight if necessary; not carrying heavy loads where possible.
- Trying to avoid having your knee in a bent position for long periods of time until the symptoms are improving.

As the symptoms of AKP settle then it is sensible to gradually re-introduce normal day to day and sporting activities that may have been previously avoided.

What happens if the pain doesn't get better?

If symptoms are improving but are only doing so slowly then it is still a sign that the treatment is working. We recommend that the exercises are continued and that more time is allowed for the symptoms to improve.

If symptoms continue, despite exercises being attempted and all other factors being addressed, then we recommend you see your doctor for further advice. If your doctor agrees that you have completed your treatment then they may arrange for an appointment with a specialist physiotherapist or doctor. The physiotherapist/doctor will re-assess your symptoms, carry out a further examination and, if appropriate, consider further investigations such as ultrasound or an MRI scan.

We find that in the majority of cases, patients simply require extra support with exercises and do not need further investigations. Investigations such as ultrasound and MRI scans are never a substitute for a careful examination by an experienced physiotherapist or doctor.

It is important to understand that:

- It may take some time (up to 6 months) of supervised rehabilitation from a physiotherapist for the symptoms to change.
- In the vast majority of patients the symptoms of AKP will improve by doing the correct exercise and doing them for long enough.
- In some cases of AKP, the pain may not completely go away and some symptoms may remain or fluctuate throughout life. This is normal and should not be a cause for concern. In most cases the symptoms can be kept under control with correct exercise.
- Although painful, AKP does not indicate a serious underlying condition or one that is likely to cause disability in later life.

Exercises for AKP

These exercises are designed to strengthen the muscles in the thigh and buttocks. There are 4 exercises to work through. These exercises are graded in terms of their difficulty - easy, moderate, hard and very hard. We recommend that you start with the easy version and progress to the more difficult exercises as your strength and symptoms allow.

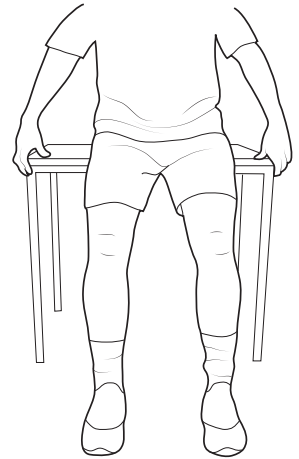
Important things to note:

- **It is normal to experience some increase in pain** whilst doing the exercise and initially afterwards. This should get less as you become more familiar with the exercise and as you become stronger. If you are concerned about the levels of discomfort that you experience, you may wish to discuss this with your GP.
- **It is likely to take several months of doing the exercises for benefits to be seen.** This means that the exercises need to be done frequently (twice daily) and for over a long enough period of time (several months). It is advised that you progress slowly and steadily through the different exercises and do not rush onto the more difficult level until you feel ready. Signs that you are ready to progress are that you no longer find the exercise difficult and that you do not feel any discomfort when performing the exercise.
- **It is normal to experience some fatigue of the muscles** whilst doing the exercises. In fact, this is often a sign that you are doing them correctly and working the right muscles. If the muscle is getting fatigued you will notice that your legs may start to shake whilst you are trying to do the exercise. If this happens, you should stop for a few minutes and then re-start when you feel ready.
- **You may find it helpful to do the exercises in front of a mirror,** get someone to watch you do the exercises or use your mobile telephone to video yourself. This can be very useful as it provides you with some visual feedback and helps to ensure that you are doing the exercises correctly.

Exercise 1 - Easy

Supported or seated squat

1. Find a table or edge of a chair that you can perch on as shown here which allows your knees to have a small bend.
2. Once you are in this position then the exercise is to contract your thigh muscles and buttock muscles. You may want to place your hands on to your thighs to feel the contraction. You may feel as though you lift up slightly as your buttock muscles contract. It is important to hold this contraction for 10 seconds and then relax.
3. Repeat the exercise 10 times.
4. This is one set, you need to build up to do 3 sets of 10 repetitions.



Once you have done 10 repetitions you may want to stand up, have a walk around and then when you are ready return to the starting position for the second or third set.

During the exercise it is important to make sure your hips and knees are in alignment as demonstrated here and not allow your knees to roll in towards each other.

Remember, it is normal to experience increased pain whilst doing the exercise and initially afterwards. This should get less as you become more familiar with the exercise and as you become stronger.

When you no longer experience discomfort or fatigue and you feel that this exercise has become easy then it is sensible to move on to the next level of exercise.

Exercise video:

To view the video for this exercise just type in the website address below and then click on the link to the video 'Exercises for patients with anterior knee pain: Easy (supported squat)':

Website: **<http://video.sth.nhs.uk/orthopaedics>**

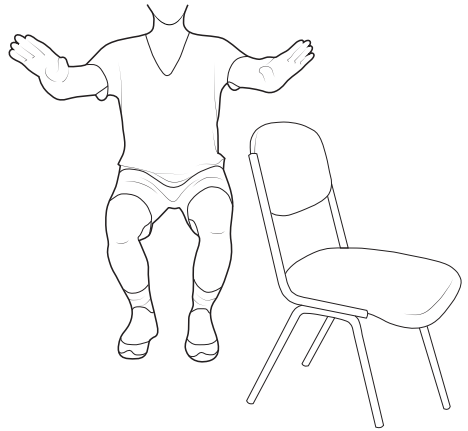


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Exercise 2 - Moderate

Double leg squat

1. You may find it helpful to have a chair placed in front of you, as demonstrated here, to help with your positioning during the exercise.
2. As you start to bend into a squat position, it is important to remember to keep your hips, knees and feet in alignment and to stick your bottom out as you go into the squat position.
3. When you first start doing this exercise you may feel that you are only able to squat down by a small amount. As your strength improves the aim is that you will be able to progress further into a squat position.
4. Once you are in the squat position, you must hold this position for 2-3 seconds and then return to the start position.
5. Repeat the exercise 10 times.
6. This is one set, and you need to build up to do 3 sets of 10 repetitions.



Once you have done 10 repetitions you may want to stand up, have a walk around and then when you are ready, return to the starting position for the second or third set.

Remember, it is normal to experience increased pain and or fatigue whilst doing the exercise and initially afterwards. This should get less as you become more familiar with the exercise and as you become stronger.

When you no longer experience discomfort or fatigue and you feel that this exercise has become easy then it is sensible to move on to the next level of exercise.

Exercise video:

To view the video for this exercise just type in the website address below and then click on the link to the video 'Exercises for patients with anterior knee pain: Moderate (double leg squat)':

Website: **<http://video.sth.nhs.uk/orthopaedics>**

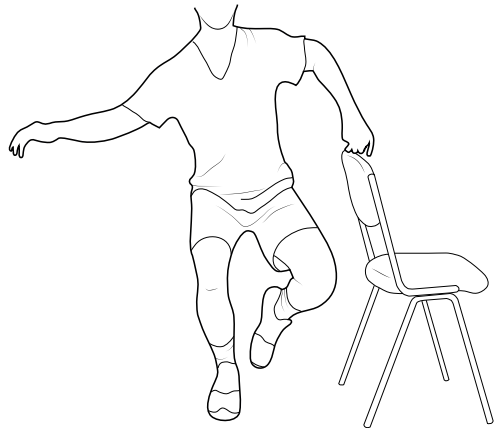


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Exercise 3 - Hard

Single leg squat

1. You may find it helpful to have a chair placed in front of you, as demonstrated here, to help with your positioning during the exercise.
2. As you start to bend into a single leg squat position, it is important to remember to keep your hips knees and feet in alignment and to stick your bottom out as you go into the squat position.
3. When you first start doing this exercise you may feel that you are only able to squat down by a small amount. As your strength improves the aim is that you will be able to progress further into a squat position.
4. Once you are in the squat position, you must hold this position for 2-3 seconds and then return to the start position.
5. Repeat the exercise 10 times.
6. This is one set, and you need to build up to do 3 sets of 10 repetitions.



Once you have done 10 repetitions you may want to stand up, have a walk around and then when you are ready, return to the starting position for the second or third set.

Remember, it is normal to experience increased pain and or fatigue whilst doing the exercise and initially afterwards. This should get less as you become more familiar with the exercise and as you become stronger.

When you no longer experience discomfort or fatigue and you feel that this exercise has become easy then it is sensible to move on to the next level of exercise.

Exercise video:

To view the video for this exercise just type in the website address below and then click on the link to the video 'Exercises for patients with anterior knee pain: Hard (single leg squat)':

Website: **<http://video.sth.nhs.uk/orthopaedics>**



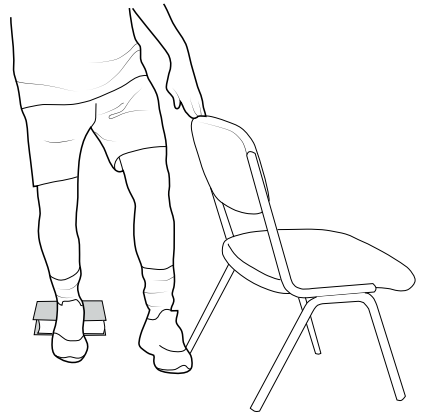
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Exercise 4 - Very hard

Decline single leg squat

This is the hardest exercise to do as it places the biggest load through the knee cap joint but it is very important in helping to address the pain and control problems associated with walking down stairs or hills as it replicates the demands placed onto the joint during these activities.

For this reason you may notice that pain and fatigue are easily provoked. If you experience pain and or fatigue then start with performing a shallow squat on a small decline and then as symptoms allow progress to a deeper squat on a greater decline.



1. To do this exercise you will need to place a small book under your heel.
2. In this position move into the small squat, remembering the importance of keeping your hips, knees and feet in alignment and to stick your bottom out as you go into the squat position. If you feel unsteady then you may want to place one hand on a wall to help provide some balance support as you do the exercise.
3. Once you are in the squat position, you must hold this position for 2-3 seconds and then return to the start position.
4. Repeat the exercise 10 times.
5. This is one set, and you need to build up to do 3 sets of 10 repetitions.

Once you have done 10 repetitions you may want to stand up, have a walk around and then when you are ready, return to the starting position for the second or third set.

As this exercise becomes easier you can progress into a deeper squat and gradually increase the decline by using a thicker book.

Exercise video:

To view the video for this exercise just type in the website address below and then click on the link to the video 'Exercises for patients with anterior knee pain: Very Hard (decline single leg squat)':

Website: **<http://video.sth.nhs.uk/orthopaedics>**



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Useful contact numbers

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Northern General Hospital: 0114 271 5799
0114 226 6457

Royal Hallamshire Hospital: 0114 271 3090

PhysioWorks: 0114 237 1030 - then press 1 for
NHS PhysioWorks

Patient Advice and Liaison Service (PALS)

- 0114 271 2400
- sth.pals@nhs.net



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