Anterior Knee pain - professional resource.

What is anterior knee pain?

Anterior Knee Pain (AKP) is pain that typically arises from the patella-femoral joint. In strict terms it applies to any condition causing pain from the extensor mechanism over the front of the knee. This may include quadriceps tendinopathy, patello-femoral joint pain, patella tendinopathy, bursitis or a tibial tuberosity condition such as Osgood Schlatters. In practice, the term is commonly used to describe anterior knee symptoms in patients with no significant underlying structural pathology and it is this group of patients that this information is intended to be applied. Previously the condition was often termed Chondromalacia Patellae. This simply describes softened articular cartilage. There is little evidence of a correlation between soft articular cartilage and symptoms so this term is best avoided.

AKP is pain felt at the front of the knee around the patello-femoral joint. The pain is typically difficult to localise and there may not be an obvious precipitant of symptoms. People with AKP may 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 around 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 flexing the knee.
- Pain may be increased with activities that involve long periods of time spent with the knee in a flexed position e.g. sitting, squatting and kneeling
- Pain may be increased with activities that load the knee joint in flexion such as going up or down stairs or steep hills

The underlying patho-physiology of this condition is poorly understood but it is recognised that there are several factors which may contribute to its development. The causes of this condition are typically multifactorial and patients frequently have more than one potential precipitant. Factors that can contribute to the symptoms of AKP are:

- A reduction in muscle strength. Deconditioning and weakness of the quadriceps or an imbalance of quadriceps and hamstring muscle strength or weakness in the gluteal muscles 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 patello-femoral joint weaker and in effect makes the symptoms of AKP worse in the long term not better.
- Sudden overload of the joint with a new type of activity or exercise. E.g. participation in a new sport or a sudden increase in the amount of sport or training being done.
- There may be some correlation with doing sport in inappropriate foot wear or doing sport with the foot in an inappropriate position e.g. cycling with the foot cleated into an inappropriate position. This may cause a change in the loading patterns at the patella-femoral joint and make it more susceptible to becoming irritated and painful.
- Anatomical variations such as significant Genu Valgum (knock knees) or femoral trochlear variations may result in a change in loading pattern at the patello-femoral joint and make it more susceptible to becoming painful.
- Female gender. The shape of the female pelvis, to facilitate child birth, results in a more lateral direction of pull of the lateral quadriceps, on the patella which can be further accentuated by weakness of the medial quadriceps and tightness of the ITB/gluteus medius (as above).
- Sudden changes in body weight e.g. becoming over weight, later stages of pregnancy can be associated with the development of AKP symptoms.

How is AKP diagnosed?

AKP is diagnosed through the process of excluding other conditions. Careful history taking will help start to identify patients presenting with AKP. Patients with AKP are likely to present in the following way:

- Pain is the principle compliant. It is often poorly localised and patients will describe it to be around the whole of the front of the knee. Patients may point non-specifically to the front of the knee when asked to demonstrate the site of the pain. More localised pain such as the distal pole of the patella with patella tendinopathy or pain over the tibial tuberosity with Osgood Schlatters disease should raise doubts about the potential diagnosis of AKP.
- This condition is not usually associated with significant trauma. If there is a history of significant trauma it is important to exclude other pathology such as a collateral or cruciate ligament injury. This must be excluded with a thorough physical examination to test ligament integrity. Giving way may be reported but with AKP this will be associated with pain inhibition and or fatigue. Commonly this will occur with straight line walking or be symptomatically worse on walking down hills or stairs. This differs from true giving way which is because of a structural laxity or instability and is most frequently reported with activities that involve a sudden change of direction.
- There should be no history suggestive of true mechanical symptoms such as true locking. True locking will only occur into the direction of extension (i.e. an inability to fully extend the knee as a result of a mechanical block). Catching, seizing or stiffening sensations during movements of flexion may be reported with AKP, this is not true locking.
- Pain is usually exacerbated with activities that involve prolonged or loaded knee flexion e.g. prolonged sitting, squatting, kneeling or descending stairs gain or a job that involves lifting heavy loads thus increasing the load placed directly through the patello-femoral joint.
- There may be a history of suddenly increasing the volume and intensity of exercise, however paradoxically there may also be a history of deconditioning and generally becoming weaker by stopping or reducing the amount of exercise being done.
- There may be a raised BMI or a sudden weight gain.

Physical examination:

If ligamentous and mechanical pathologies are excluded through a combination of a full history and examination, then the most useful clinical sign to help confirm the diagnosis of AKP is the absence of an effusion. If the patient has a demonstrable effusion this indicates some internal derangement or inflammatory process and does not fit with the diagnosis of AKP. A large effusion is usually visible and will be confirmed with a positive patella tap; however this test will not be sensitive enough to detect smaller more subtle effusions. The most sensitive test to detect for an effusion is the sweep test. This is described below and demonstrated in the video clip.

Sweep test:

- The patient is asked to lie supine on the examination couch with the leg exposed from above the knee.
- With firm contact, sweep along the medial aspect of the knee to empty out any fluid from the medial gutter (the hollow on the medial side of the knee).
- With equal firm contact, sweep down the lateral side of the knee and watch for a "re-fill" and bulge of fluid on the medial aspect of the knee.
- This can be subtle and the test may need to be repeated several times to confirm the results.

The presence of an effusion suggests the presence of intra-articular pathology and further investigations should be arranged. The absence of an effusion doesn't exclude an intra-articular pathology but makes it less likely and helps to confirm a diagnosis of AKP.

Further investigations:

If an effusion is present, the following investigations should be arranged:

- Plain knee radiographs. A weight bearing antero-posterior (AP), lateral view and a skyline view of the patello-femoral joint should be requested.
- CRP blood test to help assess whether an inflammatory arthropathy could be a cause of the joint effusion.

Results:

If all results are normal, reconsider the diagnosis of AKP and consider management as described in **stage I of the AKP pathway.**

Abnormal radiograph results, depending on the radiograph report and on individual presentation, direct the patient to other appropriate management pathways. For example if confirmed patello-femoral osteoarthritis consider usual osteoarthritis management strategies.

Raised CRP, if this relates to a known or existing inflammatory disorder continue to treat and monitor this patient in the usual way in accordance with their normal management plan for that condition.

If CRP is raised for the first time;

- If there is no obvious alternative explanation for a significantly raised CR, consider whether the knee effusion could be related to a new inflammatory arthropathy and discuss with one of the rheumatologist and / or make a rheumatology referral via MSK Sheffield.
- Consider repeating the test if there is any doubt.

Managing AKP.

See STH patient information booklet and exercise video clips.

As already described, the aetiology of this condition is often multifactorial but a common feature is weakness of the quadriceps muscles. If this muscle is strengthened then it is likely that the symptoms of AKP will improve.

There is no evidence that surgery is of any benefit for this condition and it is best managed with patient education and self-help. It is important to reassure the patient that the symptoms do not indicate a serious underlying pathology and that with self-management and an understanding of the condition it will usually improve. This condition may be associated with intermittent recurrences but not associated with progressive structural damage.

It is very important to note that the symptoms associated with this condition can take a long period of time to improve or resolve and it is not unusual for symptoms to initially worsen when the 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 frequently longer, for benefits to be noted.

Unfortunately there are patients who develop a chronic cycle of pain which does lead to physical disability as a consequence of a chronic localised (or generalised) pain syndrome.

Quadriceps Strengthening Exercises

An easy to explain and effective way to strengthen the quadriceps muscle is to ask the patient to do a mini squat. 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. This exercise is described in the patient information booklet and demonstrated in the video clips.

In addition to this exercise, it is often beneficial to introduce the use of an exercise bike and patients should be encouraged to do this. If the patient has no access to an exercise bicycle or gymnasium, (a list of available gyms can be found at movemoresheffield.com) consider a referral to the Sheffield Physical Activity Referral Scheme. Using an exercise bike will usually allow the leg muscles to be strengthened without making the knee too uncomfortable

Other management strategies to consider include:

- Addressing potential aggravating factors such as the volume or intensity of a new exercise until the legs have gained sufficient strength.
- Identify lifestyle changes that may be contributing to the symptoms in particular give advice on weight reduction in overweight patients.
- Avoid positions of prolonged knee flexion and loading until the symptoms are improving.

As the symptoms of AKP settle then it is appropriate to encourage gradual reintroduction of normal day to day and sporting activities.

What happens if the symptoms persist?

If symptoms are improving but only slowly, it is a sign that the exercise is working and it is appropriate to encourage the patient to continue to exercise and manage the condition independently. If symptoms persist, despite the correct exercises being attempted for a sufficient length of time, and if all other contributing factors have been addressed, then consider **stage II of the AKP pathway.**

- Firstly it is important to confirm the diagnosis of AKP. Repeat the history and examination and then refer onto MSK Sheffield where additional support can be provided.
- In some situations it may be necessary or appropriate to refer to MSK Sheffield for additional support at an earlier stage in the process e.g. poor health literacy, difficulty engaging with the diagnosis or management plan as indicated on the AKP pathway.
- When referred to MSK Sheffield for additional support it is important that patients understand that it may still take up to 6 months of supervised / supported rehabilitation for symptoms to improve or change.
- It is important that patients understand that is some cases of AKP the pain may not completely subside and may fluctuate from time to time and that this isn't considered unusual or a cause for concern.
- If patients are referred onto MSK Sheffield, second opinions and appropriate onward referrals will be made if deemed necessary.