

Hands On

Practical advice on management of rheumatic disease



ANTERIOR KNEE PAIN

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How should anterior knee pain be described?

This term describes acute knee pain for which there is no specific identifiable cause. It is assumed that anterior knee pain is synonymous with the descriptive terms retropatellar and patellofemoral pain.

Are there any clinical features to help diagnose acute knee pain?

The diagnosis of anterior knee pain is by exclusion of all other causes. Unfortunately the tests used in routine clinical assessment for the diagnosis of acute knee pain lack sensitivity and specificity.

Knee pain is a symptom commonly presented to general practitioners (GPs). Patients may have knee pain at any age, and there are lists of differential diagnoses for the various age groups (Table 1). This article will concentrate on anterior knee pain. Pain arising within the tibiofemoral joint, and referred pain (usually from the hip), will *not* be considered. The majority of anterior knee pain is seen in adolescents, before skeletal maturity, and in young adults, after skeletal maturity, and could be said to be biomechanical in nature. It tends to occur in very active sportspersons who are growing rapidly, and can be described as a mismatch of bone length and muscle length. Treatment probably 'buys time' for this mismatch to resolve naturally.

Adolescents

Osgood-Schlatter disease and Sinding-Larsen-Johansson syndrome

The pull of the patellar tendon on its attachments can cause traction apophysitis. At the tibial end of the tendon this is known as Osgood-Schlatter disease, and at the patellar end Sinding-Larsen-Johansson syndrome. Both conditions are

usually due to overuse, and typically occur in youngsters who are engaged in numerous sporting activities. While the pain may be constant, it *invariably* gets worse with exercise. Clinically, there is tenderness over the tibial tubercle or the lower pole of the patella: these may be enlarged. It is unnecessary to x-ray the knee, as the diagnosis is usually obvious on clinical examination, but if done the x-ray may show a characteristic fragmentation at the attachments. Management is an explanation of the benign nature of the condition and moderation of sporting activities. The adolescent, and parents, should be reassured that in traction apophysitis the natural history of the condition is for the symptoms to disappear after 1–2 years, but that the prominence – especially of the tibial tubercle – will remain, although this is of no functional significance. Immobilisation and surgery are last resorts. In a very few persistent cases, an ossicle may be found within the patellar tendon, removal of which may be curative.¹

Bipartite patella

This is quite common in adolescence, and may be a normal variation. It can occur at three sites, with important soft tissue attachment at each site:

1. the distal pole of the patella (attachment of the patellar tendon)
2. the lateral margin of the patella (attachment of the lateral retinaculum)
3. the superolateral aspect of the patella (attachment of the vastus lateralis).

The third site is the commonest site for symptoms. Symptoms may be due either to overuse or to acute injury. The synchondrosis separating the two parts of the patella becomes painful and tender and in severe cases a fracture along the line of the synchondrosis may occur. If this is suspected the patient should be referred for an orthopaedic opinion, as surgery may be necessary.

TABLE 1. Common causes of knee pain relevant to age (adapted from Panayi G, Dickson DJ. *Arthritis. In Clinical Practice Series. Edinburgh: Churchill Livingstone; 2004. p.34, Fig.15, with permission from Elsevier*)

Age	Joint causes	Around the joint	Referred pain to the knee
10–18 years	Osteochondritis dissecans Torn meniscus Anterior knee pain • Hypermobility • Patellar malalignment	Osgood-Schlatter disease Sinding-Larsen-Johansson syndrome Osteomyelitis Tumours	Slipped upper femoral epiphysis
Early adulthood 18–30 years	Torn meniscus Anterior knee pain • Hypermobility • Instability Inflammatory conditions	Overuse syndromes Bursitis Sports injuries to tendons	
Adulthood 30–50 years	Meniscal tears Anterior knee pain • Hypermobility Early degeneration • Previous injury • Previous meniscectomy Inflammatory arthropathies	Bursitis Tendinitis Sports injuries to tendons Baker's cyst	Referred pain from hip conditions (pain front of thigh and knee)
Older adulthood >50 years	OA Inflammatory arthropathies Hypermobility	Bursitis Tendinitis Sports injuries to tendons Baker's cyst	Referred pain from OA hip

Patellar misalignment

Patellar misalignment can cause anterior knee pain, especially in girls, and may lead to recurrent dislocation or subluxation of the patella. It is associated with a variety of developmental disorders, including joint laxity, patella alta and hypoplasia of the lateral femoral condyle. A line drawn from the anterior superior iliac spine to the centre of the patella and a line drawn from the centre of the patella to the tibial tubercle form the Q angle. In a normal knee this angle is approximately 15°. The larger the Q angle, the larger the force vector pulling the patella laterally, and an angle of 20° is considered abnormal. Genu valgum, external tibial torsion and femoral anteversion increase the Q angle. The reliability of Q angle measurement is good;^{2,3} however the validity for the detection of anterior knee pain is not.³ In practical terms this means that people with abnormal Q angles do not always have or develop anterior knee pain, nor do all patients with anterior knee pain have an abnormal Q angle.

When dislocation occurs, the patient describes the patella as dislocating laterally. It may reduce spontaneously, or s/he may learn to push it back. The episodes may occur during sporting activities, but in recurrent cases may happen during normal day-to-day activities. The same factors cause subluxation, but because the symptoms are less dramatic the diagnosis is more difficult to make. The patient may complain of a feeling of 'giving way' as the patella rides up over the lateral femoral condyle. In the majority of cases there is weakness of the vastus medialis muscle and referral to physiotherapy for treatment directed at strengthening this muscle should be undertaken.

Chondromalacia patellae

This term is often used when discussing anterior knee pain. In this condition there is softening of the articular cartilage of the patella. This pathological diagnosis (made at arthroscopy) should *not* be used to describe a clinical diagnosis of anterior knee pain. It may be associated with patellar misalignment, and is due to the sheering of the articular cartilage as it is compressed against the lateral femoral condyle. Research studies have shown poor correlation between anterior knee pain and cartilage damage. Cases with changes consistent with chondromalacia patellae on arthroscopy and no symptoms have been described, as well as cases of pain and no changes.^{4,5} Physiotherapy and exercises to strengthen the quadriceps may be more appropriate than shaving the patella, which is often undertaken when the diagnosis is made at arthroscopy.

Hypermobility

It is worth checking for hypermobility in all patients presenting with joint or muscle problems.⁶ Hypermobility is the commonest condition that causes joints to overflex and overextend. Muscles are the major shock-absorbers and protectors for the joints. Typically, girls present within 3 years of the menarche and boys at around 15 years of age. Presentation is usually at times of rapid growth.

Adults

Overuse syndromes are common in adults.

Patellar tendinitis (jumper's knee)

This most commonly affects young sporty adults after the age of skeletal maturity, with pain and tenderness at the

lower pole of the patella. (The juvenile form is Sinding-Larsen-Johansson syndrome). The pain is brought on not only by jumping but also by running and by climbing stairs as the pain is felt on weight-bearing flexion and is an over-use condition. Most cases respond to restriction of activity, physiotherapy, and non-steroidal anti-inflammatory drugs (NSAIDs). Local injections of corticosteroids should be avoided because of the risk of rupturing the tendon.⁷

Bursitis

The various bursae around the knee often become inflamed as a result of overuse or repeated minor trauma. The GP must make an accurate anatomical differentiation to enable treatment to target the correct site.

Prepatellar bursitis (housemaid's knee) is the commonest form of bursitis. It usually affects people who kneel a lot, such as carpet fitters and building workers who often have to spend time kneeling on hard surfaces. The patient presents with a hot, red, fluctuant swelling over the front of the patella, sometimes with thickened skin over the area. Aspiration may be necessary to exclude infection and is often very therapeutic, with the patient requiring no other treatment. In resistant cases – providing infection has been excluded – a corticosteroid injection is often helpful. However, most cases will respond to rest, avoidance of kneeling, and NSAIDs. Gout needs to be borne in mind, as it may present in this way. If necessary, the aspirate should be examined for crystals and if these are found the condition can again be treated either by oral NSAIDs or by an injection of corticosteroid.

Deep infrapatellar bursitis (parson's knee) also presents in much the same way as prepatellar bursitis, although the area of inflammation is below the patella. The diagnosis and treatment of this condition are the same as for prepatellar bursitis.

Anserine bursitis is a more vague term given to pain in the region of the anserine bursa over the medial aspect of the upper tibia, especially in obese patients. It is often impossible to ascertain whether the pain is arising from the

bursa, the pes anserinus insertion, or the medial ligament. Whatever the cause it often responds to rest and NSAIDs, although in persistent cases an injection of corticosteroid into the most painful and tender area is usually very effective – though this may need to be repeated unless the bio-mechanical problems can be corrected.

Clinical features of anterior knee pain (retropatellar/patellofemoral pain)

- Patients are typically young with a vague and insidious onset of the pain.
- Often affects both knees with the dominant one giving more pain.
- It may be difficult to localise the pain, though it is usually anterior or anteromedial.
- Associated features: crepitus, snapping or clicking, and there may be swelling.
- Aggravating activities: walking, running (especially downhill), stairs (especially going down), rising from prolonged sitting or squatting.
- Other features: effusion, pain on patellar compression (for a practical, less traumatic test see 'Anterior knee pain: patellar stabilisation compression test'). Often pain on active or passive movements.

Investigations

Unless trauma is suspected then any form of imaging or special investigations are rarely necessary for good management. If a serious condition is suspected then appropriate investigations are indicated; otherwise they rarely help in diagnosis or management. The trend to detect morphological lesions by imaging should be resisted as the correlation between these lesions and pain is not established. Magnetic resonance imaging (MRI) should not be used as a routine screening test but it should be used when alerting features are found during the assessment.

Primary care management

Many of the conditions causing anterior knee pain are commoner in active adolescents who often experience a great deal of frustration at being given advice to restrict their activities. They respond better to more active management under the care of a physiotherapist. While the natural history of this condition is improvement and resolution, it has been found that proprioceptive muscle stretching and strengthening aspects of physiotherapy have a beneficial effect. Patellar taping should be tried as a recent trial^{8,9} supports its use, though a previous trial did not.¹⁰ The use of shock-absorbing shoes (trainers) or insoles (e.g. Sorbothane) is recommended. If knee pain is severe then modifying an old pair of trainers may give symptomatic relief. Do this by cutting about 2 cm off the heels of the trainers and gluing on thin, rubber ones in their place; these can be bought in most supermarkets. This lowers the heel and prevents over-extension of the knee.

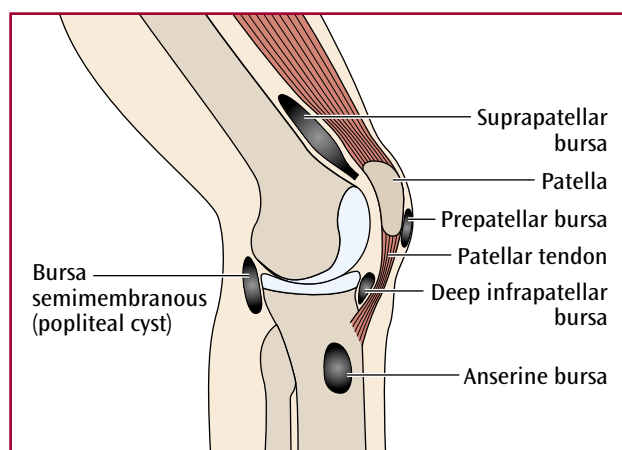


FIGURE 1. Bursae around the knee (reproduced with permission from Hosie GAC, Field M. *Shared care for rheumatology*. London: Martin Dunitz; 2002. p.183, Fig. 23.3.)

There is little evidence to recommend the use of steroid injections in anterior knee pain but as an adjunct to physiotherapy and maintenance of exercise regimes in the short term they are worthy of use in individual patients. Similarly, surgery may be required in some individuals but it is not a panacea for anterior knee pain: there are no randomised, controlled trials for surgical interventions.

Prognosis

Anterior knee pain is a benign condition and the majority of cases have a good long-term outcome, but most patients have persistence of some pain.

Conclusion

With careful history-taking and examination, most cases of anterior knee pain can be diagnosed by GPs and treated within a community setting. The available evidence would suggest the appropriate treatments for anterior knee pain are:

- education
- stretching
- quadriceps strengthening
- shoe insoles
- patellar taping.

Further reading

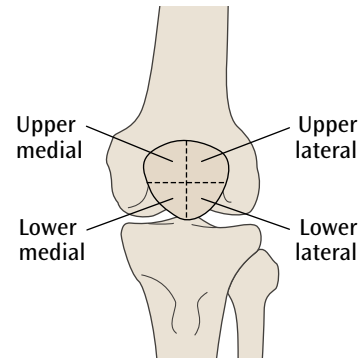
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ANTERIOR KNEE PAIN PATELLAR STABILISATION COMPRESSION TEST

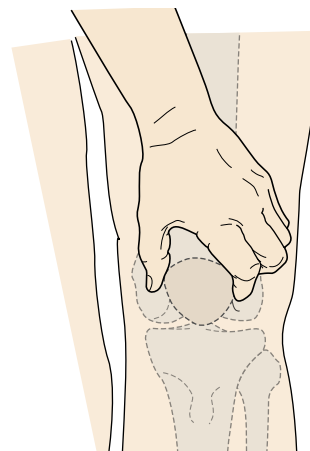
Some of the tests used to assess anterior knee pain (retropatellar/patellofemoral pain) can cause severe pain: the test described below causes minimal discomfort. It gives an indication of severity by dividing the patella into four quadrants: upper medial, lower medial, upper lateral and lower lateral.



Patellar quadrants

Description

- The patient lies on a couch with the knees fully extended and relaxed. With the non-dominant hand use the index finger and the thumb to stabilise the patella over the middle of the knee (i.e. over the femoral condyles), holding it firmly but gently by the medial and lateral edges.



Patellar stabilisation

- With the dominant hand place the tip of the index finger or thumb over the lower lateral quadrant of the patella. Perform rotational movements and downward pressure over this quadrant while keeping the patella stabilised with the non-dominant index finger and thumb.
- Repeat this rotational compression movement for all four quadrants.
- Ask the patient to give an indication of the amount of pain experienced. This can be descriptive or on a visual analogue scale (VAS) of 1 to 10. Pain will be elicited in some of the quadrants but rarely severely in all four.

COMMENT

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Osgood-Schlatter disease and Sinding-Larsen-Johansson syndrome are common causes of anterior knee pain in adolescent sportspeople. Depending on the severity of the condition, which will fluctuate over a 2-year period during fast growth and skeletal maturity, every effort to maximise the player's sporting development should be made. Complete cessation from sport (to let the condition 'calm down') should be a last resort. An assessment of the young player's activities, competitive games and training should be made with his/her parents present.

An agreement to reduce the programme should be reached. An active-rest programme should also be considered, i.e. reduce or eliminate sporting weight-bearing activities for a while whilst monitoring joint range and

muscle tone through light weights, mobilising exercises, swimming and hydrotherapy exercises. A logbook of daily work should be kept as a means of monitoring the development work against symptoms experienced.

Chondromalacia patellae should be managed in a similar manner with an emphasis on inner range non-weight-bearing quadriceps exercises aimed at the 'toning' of the vastus medialis.

Education of the young sportsperson and of his/her parents is of paramount importance. Frequent assessment of the conditions referred to above is necessary, together with strict compliance with the agreed development programme, which will be dependent on symptoms being experienced at the time.

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