Anterior Knee Pain

Anterior knee pain is common with a variety of causes.\textsuperscript{[1]} It is important to make a careful assessment of the underlying cause in order to ensure appropriate management and advice.

Common causes\textsuperscript{[2]}

**Patellofemoral pain syndrome (PFPS)**

PFPS is defined as pain behind or around the patella, caused by stress in the patellofemoral joint. PFPS is common. Symptoms are usually provoked by climbing stairs, squatting, and sitting with flexed knees for long periods of time.\textsuperscript{[3]}

PFPS seems to be multifactorial, resulting from a complex interaction between intrinsic anatomy and external training factors.\textsuperscript{[4]} Pain and dysfunction often result from either abnormal forces or prolonged repetitive compressive or shearing forces between the patella and the femur.

Patellofemoral pain syndrome (PFPS) is a common cause of knee pain in adolescents and young adults, especially among those who are physically active and regularly participate in sports. Although PFPS most often presents in adolescents and young adults, it can occur at any age. Over half of all cases are bilateral (but one side is often more affected than the other).

The potential causes of PFPS remain controversial but include overuse, overloading and misuse of the patellofemoral joint. Underlying causes of PFPS include:

- Overuse of the knee - eg, in sporting activities.
- Minor problems in the alignment of the knee.
- Foot problems - eg, flat feet.
- Repeated minor injuries to the knee.
- Joint hypermobility affecting the knee.
- Reduced muscle strength in the leg.

Physiotherapy and foot orthoses are often used in the management of PFPS.\textsuperscript{[5]}

**Other common causes of anterior knee pain in adolescents**

These include:

**Osgood-Schlatter disease**

- See the separate article on Osgood-Schlatter Disease.
- Sinding-Larsen-Johannsson disease - another common cause of anterior knee pain in children and adolescents. It is similar to Osgood-Schlatter disease but occurs at the inferior pole of the patella.
- Osgood-Schlatter and Sinding-Larsen-Johannsson diseases are common causes of anterior knee pain which are aggravated by jumping and kneeling.\textsuperscript{[6]}

**Chondromalacia patella\textsuperscript{[7]}**

- Softening of the articular cartilage of the patella. This is therefore a pathological diagnosis and confirmation of chondromalacia patella requires MRI or arthroscopy.\textsuperscript{[8]}
- There is a poor correlation between the degree of anterior knee pain and cartilage damage.
- It may be associated with patellar misalignment.
Bipartite patella

- This is common in adolescence and may cause pain and tenderness.
- It is usually asymptomatic but variable in severity and may require surgical treatment. [9]

Patellar misalignment

- Often accompanied by damage to the chondral surface of the patellofemoral joint. [10]
- It is more common in girls and may cause recurrent dislocation or subluxation of the patella.

Hypermobility

- Causes hyperextension and hyperflexion of the knee.
- This most often presents around the time of the pubertal growth spurt.

Other common causes of anterior knee pain in adults

These include:

Patellar tendinopathy (jumper’s knee)

- Patellar tendinopathy is a common and painful overuse disorder. [11]

Bursitis

- Prepatellar bursitis (housemaid’s knee).
- Deep infrapatellar bursitis (parson’s knee): inflammation is below the patella. [2]
- Anserine bursitis: often presents with spontaneous medial knee pain with tenderness in the inferomedial aspect of the joint. [12]

Isolated patellofemoral arthritis [13]

- Patellofemoral osteoarthritis is a common form of knee osteoarthritis in middle and older age. [14]

Presentation [2]

See also the separate article on Knee Assessment.

- Knee pain is often bilateral but more severe in one knee than the other.
- Pain may be difficult to localise but is usually anterior or anteromedial.
- Pain may be aggravated by active and passive movement.
- Pain may be aggravated by particular activities such as walking, running (especially downhill), stairs (especially going down stairs), squatting and when getting up after prolonged sitting.
- Associated features may include crepitus, clicking and swelling.

Investigations

- X-rays (skyline views should be included with anteroposterior and lateral knee X-rays).
- MRI scanning may be useful and give much more detail of soft tissues. [15]
- Other investigations may be required (eg, joint aspiration, serology, arthroscopy) depending on likely diagnosis.
Differential diagnosis

Other causes of knee pain, including:

- Children and adolescents: referred pain from the hip - eg, slipped capital femoral epiphysis and Perthes' disease, osteochondritis dissecans.
- Adults: trauma - ligamentous sprains (anterior cruciate, medial collateral, lateral collateral); meniscal tear; inflammatory arthropathy (rheumatoid arthritis, reactive arthritis); referred pain from the hip (eg, fracture of the neck of the femur) or sciatica.
- Older adults: osteoarthritis, gout, pseudogout.
- Any age: septic arthritis

Management

The management will depend on the underlying cause. However, conservative treatment is usually effective and most patients will not require surgical intervention.\(^{[16]}\)

- Management includes modification of training, patellar taping/strapping techniques, quadriceps strengthening, non-steroidal anti-inflammatory drugs (NSAIDs) and rest.\(^{[17]}\) Referral to a physiotherapist is therefore often appropriate.
- Modify exercise to eliminate activities which aggravate symptoms.
- Exercise therapy has been shown to be effective in reducing pain but evidence regarding improvement of function has been conflicting.\(^{[18]}\)
- Patellar taping may be beneficial to reduce pain and improve function.\(^{[19]}\) Soft knee braces may also be of benefit.
- The quadriceps must be strengthened once the pain has subsided. Muscular imbalance may be the cause of the patellar malalignment and building of the appropriate muscles can assist realignment of the patella and reduce or eliminate symptoms with time.
- Proper footwear is important. Foot orthoses are often effective in decreasing rotational forces in the tibia that affect tracking of the patella during locomotion.

Drugs

- NSAIDs and simple analgesics help to relieve discomfort. However there is only limited evidence for the effectiveness of NSAIDs for short-term pain reduction in PFPS.\(^{[20]}\)

Surgical

Most people achieve results that are acceptable or better with conservative treatment. If conservative measures fail, there are a number of possible surgical procedures depending on the underlying diagnosis:

- Simply removing damaged cartilage is not enough. The biomechanical problem needs addressing and there are various procedures to aid re-alignment. Surgical intervention usually involves arthroscopic evaluation followed by release of the lateral attachments of the patella.
- Shaving: with early degenerative changes an option is to shave the damaged cartilage down to the normal cartilage underneath and so smooth the gliding surface. The success of the treatment depends on the severity of the cartilage damage.
- Tightening of the medial capsule: If the medial capsule is lax, it can be tightened to pull the patella back into correct alignment.
- Medial shift of the tibial tubercle: moving the insertion of the quadriceps tendon medially at the tibial tubercle allows the quadriceps to pull the patella more directly and decreases the amount of wear on the underside of the patella.
- Other surgical techniques include partial or complete removal of the patella, or replacement of damaged cartilage by a polyethylene cap prosthesis.

Prognosis

- In younger patients, if appropriate action is taken at an early stage, exercise adjusted accordingly and the quadriceps muscles built up, then the outlook for full functional recovery is very good.
- In older affected patients, there is often progression to osteoarthritis.
Further reading & references

- Knee pain - assessment; NICE CKS, March 2011

2. Anterior Knee Pain; Arthritis Research Campaign, October 2004
7. Chondromalacia of the Patella; Wheeless’ Textbook of Orthopaedics

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