

Patella – Related Injuries

Contributors

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Overview

Patella related injuries are extremely common amongst sporting and non-sporting populations, covering a large spectrum of issues and conditions. Due to its anatomical position and complex attachments, the patella is highly susceptible to both trauma (direct and indirect) and overuse injuries.¹ The overuse pathologies, in particular patella-femoral pain syndrome and patellar tendinopathy are frequently encountered in clinical practice and represent a significant proportion of knee pain.² Pathologies secondary to traumatic events, such as patellar fracture and patellar dislocation, are albeit less common, however it is essential they are diagnosed and managed efficiently and effectively.

Anatomy and Function

The patella, commonly known as the 'kneecap' is a triangular bone which lies in the trochlear groove anterior to the knee joint of the distal femur. It is the largest sesamoid bone in the body lying within the quadriceps femoris muscle tendon, which attaches superiorly.³ The patellar ligament (patellar tendon) arises from the inferior third of the patella, attaching to the tibial tuberosity below. The patella femoral joint is somewhat complex due to several contact points and tissue attachments.¹ The main function of the patella is to improve the extension capacity of the quadriceps muscle; also protecting the quadriceps from frictional issues.

Case Studies

Patella dislocation/ instability (PD)

Ms Anna Jones is a 15-year-old gymnast. She was practising on the vault, when she landed awkwardly; her left knee was immediately swollen, painful and she was unable to weight bear. She was taken to ED (Emergency Department), on examination she had a gross effusion of her left knee, with lateral displacement of her patella. Her patella was reduced with analgesia and leg extension. Radiographs were undertaken to exclude any loose body or fracture. Her leg was immobilised in a patella stabilising brace and she was discharged with physiotherapy follow up.

Patella fracture (PF)

Calum Dickens is a 25-year-old labourer, in good health. He was clearing some roof gutters in wet weather when he slipped from his ladder and fell to the ground landing on his right knee. There was immediate pain and swelling and he was unable to straighten. Calum was taken to ED, on examination he was in pain, with significant swelling and tenderness in his knee and unable to actively extend his knee. Radiographs revealed a comminuted fracture of his right patella. He was referred to orthopaedics for further management and operative intervention.

Patella-ligament tendinopathy (PT)

Mr Bob Sloan is a 35-year-old engineer. He has always enjoyed fitness and had recently started playing football again for his local 5 a side team. He initially noticed a niggling pain in his right knee after matches and he attended his GP. On examination there was no obvious swelling. Bob was acutely tender at the inferior surface of his patella and resisted straight leg raising was painful. He complained of pain when squatting. The GP suggested initial rest and activity modification, analgesia and referral to physio for a rehabilitation programme.

Patella-femoral pain syndrome (PFPS)

Mrs Connie Herbert is a 20-year-old teacher. She has recently taken up running with her local running group the Troon tortoises and has participated in several park runs. She attended her general practice physiotherapist complaining of pain at the front of her right knee which was getting slowly worse over time; there was no history of trauma. General examination revealed bilateral foot overpronation and slight genu valgum, right more than left. There was no tenderness over her knee, but she was uncomfortable sitting. The physio suggested initial rest and activity modification, analgesia as required, foot orthosis and patellar taping. There was no imaging required.

Aetiology

PD: Generalised patella instability forms up to 3% of all clinical presentations of knee injuries, female > male, peak age 10-20 years, majority of primary dislocations occur in sporting activities. Patella usually displaces to lateral side.⁴ Recurrence is an issue > adolescent females, can be bilateral. Risk factors include ligamentous laxity, family history.⁵

PF: 1% of all fractures, male > female.⁶ Direct trauma often from a fall or direct blow e.g. directly falling onto the knee vs indirect trauma e.g. sudden quadriceps contraction. Often associated with high energy trauma. Diverse group of injuries, significant variability in fracture type.⁷

PT: “Jumper’s knee”, male > female, commonest in adolescents and young adults, increased frequency in ‘jumping athletes’ e.g. volleyball/ basketball, changing direction frequently, also occurs in non- athletic population.⁸ Repetitive overload causing gradual tendinous degeneration.⁹ Can be extremely debilitating and lead to extended absence from sporting activities.

PFPS: 25% of sports related knee injuries, an umbrella term, encompassing all peri/retro patellar pain in the absence of other pathologies.¹⁰ Also known as anterior knee pain and previously chondromalacia patellae. Female > male distribution, commonest in adolescents and young adults.¹¹ Multifactorial; anatomical, hormonal, biomechanical issues causing increased load on the patellofemoral junction.¹²

Clinical Features

	History	Examination
PD	- History of twisting/jumping - Knee gives way - Painful - Something “popping out” - Immediate swelling - Spontaneous reduction can occur with extension	- Gross swelling - Tender medial patellar border - Positive lateral apprehension test - Reduced straight leg raising (SLR)
PF	- Direct blow to knee - Indirect – sudden forceful contraction of quadriceps - Severe pain - Immediate swelling	- Gross swelling - Diffuse tenderness - Unable to weight bear - Reduced SLR
PT	- Insidious onset - Pain at inferior border of patella - Initially pain after activity - Progresses to pain during activity with knee flexion and pain after rest	- May be tender inferior pole of patella - Can have intratendinous swelling
PFPS	- Insidious onset - Vague location - Aggravated by sitting\descending stairs	- May be normal - Pain with provocation

Investigations

PD	- Radiograph to exclude fracture/ loose body. - AP/ Lateral and Skyline views.¹³ - Consider long leg alignment films
PF	- Xray AP/ Lat/ Skyline. - CT may aid
PT	Often non-required.
PFPS	- Usually none required. - Consider long leg alignment films

PD	- Conservative reduction of dislocation, management of pain/ inflammation, early immobilisation and early rehabilitation.¹⁴ - Surgical less common, only with specific circumstances e.g. loose body, debridement and reconstruction of MPFL, recurrent dislocations.
PF	- Depends on fracture classification:⁷ - Conservative for non or minimally displaced fractures with intact extensor mechanism. - Extension splint/ brace with gradual increase ROM. - Operative for open fractures, displacement > 3mm, unable to SLR, patella sleeve in children. - Effort should be made to preserve the patella. - ORIF with tension band wiring, total patellectomy if severe/ comminution.
PT	- Initial rest and analgesia as required. - Activity modification and identification of precipitants. - Exercise rehabilitation – eccentric programme.⁹ - Adjuncts can be used with varying success outcomes e.g. ECSW (extra corporeal shock wave), PRP (Platelet rich plasma) GTN¹⁷ - Arthroscopic/ surgical repair only in refractory cases.
PFPS	- Combination of conservative treatment modalities.¹⁵ - Initial rest and analgesia as required. - Activity modification and identification of precipitants. - Patellar taping can be useful for continuation of sport. - Tailored physiotherapy– core stabilisation, abductor strengthening etc. - Correct of biomechanical contributors e.g. orthosis for overpronation of feet.¹⁶ Surgery for recalcitrant cases, only if pathology demonstrated on MRI which may account for symptoms.

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