PAEDIATRIC ACUTE CARE GUIDELINE	
Fractures – Knee Region	
Scope (Staff):	All Emergency Department Clinicians
Scope (Area):	Emergency Department

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Fractures – Knee Region

This guideline is specific for the assessment and management of knee injuries

Background

- Fractures around the knee are uncommon in children
- Physeal and avulsion fractures are more common than ligamentous injuries

General

- Although fractures around the knee are uncommon, growth plate involvement can lead to growth arrest and leg length discrepancy. These fractures should all be followed up closely by the Orthopaedic Team.
- Common fractures around the knee include:
  - Distal femoral physis,
  - Tibial spine
  - Tibial tubercle
  - Proximal tibial physis
  - Patella
- Ligamentous injuries are uncommon until fusion of the growth plates because ligaments in children tend to be stronger than the bone

Assessment

- Look for clinical evidence of a knee effusion

- Assess injury to the popliteal artery, particularly with proximal tibial physeal fractures
- Assess the location of the patella

History

- Common mechanisms of injury are sports accidents, falls from bicycles, motor vehicle accidents or direct trauma to the knee
- Consider non-accidental injury. Complete an Injury Proforma form for all children < 2 years (A3 folded sheet located in the Doctor's offices)

Examination

- There is usually swelling and tenderness of the knee with decreased range of movement and unwillingness to weight bear
- A large effusion/haemarthrosis suggests an avulsion or ligamentous injury
- In the acute setting, it is often difficult to assess ligamentous laxity/knee instability due to the degree of pain and swelling
- A patella dislocation is often clinically evident with the knee held semi flexed, showing the abnormal position of the patella (lateral and superior)
- Assess for neurovascular compromise and open wounds

Investigations

Radiology:

- X-Rays: Anteroposterior (AP) and lateral views. See Radiology Requests - Limb X-Rays.
- Request patella (skyline) views if fractured patella suspected
- For a description of the typed of fractures see Fractures - Overview

Management

- Ligamentous and minor avulsion injuries should be managed with immobilisation in a Richard's Splint
- All physeal fractures around the knee should be referred to the Orthopaedic Team
- Patella dislocations are easily reduced in the Emergency Department

Initial management

- Analgesia
- Examine for neurovascular injury (if deficits evident manage immediately) - urgent Orthopaedic Team referral
- Ice and elevation of affected limb
- Immobilise suspected fracture before X-rays (e.g. splint, board)
- Antibiotics for compound/open fractures and tetanus if not up to date

Further management

Ligamentous Injuries and Avulsion Fractures

- Ligamentous injuries are uncommon before growth plate closure
- The medial collateral and anterior cruciate ligaments are most commonly injured
- Anterior cruciate injury is often associated with avulsion of the tibial spine
- Significant avulsion injuries should be discussed with the Orthopaedic Team
- Immobilise the knee in an appropriately sized Richard's Splint and follow up in the Orthopaedic Fracture clinic in 10-14 days. See Outpatient Clinics.

[caption id="attachment_3552" align="alignnone" width="300"] Avulsion of tibial spine (insertion of anterior cruciate ligament)[/caption]	[caption id="attachment_3566" align="alignnone" width="207"] Avulsion fracture of lateral tibial condyle (Segond Fracture). Associated with ACL and medial meniscus injuries.[/caption]

Tibial Tuberosity Fractures

- Avulsion fracture of the tibial tuberosity is seen in adolescents when the quadriceps contracts violently and suddenly e.g. high jump
- There is usually a history of Osgood Schlatter disease
- Refer these to the Orthopaedic Team for possible operative management

[caption id="attachment_3553" align="alignnone" width="205"] Avulsion of tibial tuberosity with superior displacement. Note high riding patella.[/caption]

Physeal Fractures Around the Knee

- Distal femoral and proximal tibial physeal fractures have a high incidence of growth sequelae and should be referred to the Orthopaedic Team urgently for reduction and immobilisation
- The popliteal structures are tethered around the point of the proximal tibial physis and careful neurovascular examination should be performed

[caption id="attachment_3556" align="alignnone" width="300"] Distal femoral physeal fracture - widened physis with mild anterior displacement. - Salter-Harris I fracture.[/caption]

Patella Fractures and Dislocations

- Transverse, avulsion or sleeve fractures are more common in adolescents than young children
- Non-displaced fractures are immobilised and followed up in the Orthopaedic Fracture clinic. See Outpatient Clinics.
- Displaced patella fractures should be referred to the Orthopaedic Team

[caption id="attachment_3738" align="alignnone" width="200"] Patella sleeve fracture. The patient clinically had difficulty extending knee.[/caption]

- The patella usually dislocates laterally and is obvious clinically
- Dislocations should be reduced in the Emergency Department with adequate analgesia +/- light sedation
- The knee is extended whilst placing medial pressure on the patella
- Post reduction X-Rays should be taken to exclude osteochondral fracture
- Immobilise in a Richard's Splint for 4 weeks with Orthopaedic Fracture clinic follow up

Knee Dislocations

- Femorotibial joint dislocations are rare in children but have a high incidence of neurovascular injury
- Refer all to the Orthopaedic Team urgently for a gentle reduction

Fractures of the Knee Requiring Urgent Orthopadic Referral

- Physeal and tibial tuberosity fractures
- Knee dislocations
- Neurovascular compromise
- Compound fractures
- Significant displacement or angulation
- Clinical deformity
- Compartment syndrome

Referrals and follow-up

- All fractures around the knee should be followed up in the Orthopaedic Fracture clinic. See Outpatient Clinics.
- Suspected ligamentous injuries of the knee should also be followed up in the Orthopaedic clinic after 10-14 days of immobilisation

Health information (for carers)

- Pain Management Health Fact Sheet
- Crutches

Nursing

- Ensure patient is comfortable and has adequate analgesia
- Neurovascular limb observations

Tags

artery, avulsion, bone, broken, collateral, cruciate, epiphyseal, femur, fracture, fractures, growth plates, knee, ligaments, limb, meniscus, orthopaedic, patella, popliteal, tibia

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