

GUIDELINES FOR THE MANAGEMENT OF ACUTE KNEE INJURIES

A. FRACTURES

Ottawa knee rules

Plain XRs should be performed if *any* of the following are present:

- Age 55+
- Tender head fibula
- Isolated tenderness patella
- Inability to flex > 90°
- Inability to bear weight (4 steps) at time of injury and in the examination

A tense effusion is also an indication for plain X-rays

Knee X-rays

Standard views are:

- AP view: standard view (if unable to weight-bear) or Rosenberg view (if the patient is able to weight-bear)
- Lateral view
- Skyline patella view: if a patellar injury suspected

A lipohaemarthrosis (a fat-fluid level on a horizontal beam lateral XR) suggests an intra-articular fracture

FRACTURE	HISTORY	EXAMINATION	INVESTIGATIONS	MANAGEMENT
Distal femur	Young: high-energy trauma Elderly: fall on flexed knee, note previous THR or TKR	Risk of neurovascular injury	Plain XRs of knee & femur	Long-leg cast Emergency referral
Tibial plateau	Young: high-energy trauma (e.g. 'bumper' injury) Elderly: varus or valgus injury	Risk of neurovascular injury Varus or valgus laxity	Standard XRs + plateau or oblique views Consider CT scan	Stable (<10° varus / valgus laxity) + minimally displaced (joint surface depression <2mm): long-leg or cast brace Displaced: emergency referral
Intercondylar eminence (cruciate ligament avulsion)	History of twisting injury Adolescent	Positive Lachman test	Standard XRs +/- tunnel view	Emergency referral
Patella	Direct blow to front of knee Fall → avulsion fracture	Assess ability to actively SLR	Standard XRs + skyline view	Minimally displaced (<2mm articular step + <3mm fracture separation + able to SLR): extension brace Displaced: emergency referral
Tibial tuberosity avulsion	Jumping injury Adolescent	Assess ability to actively SLR	Standard XRs	Undisplaced + able to SLR: extension cast or brace Displaced: emergency referral

B. SOFT TISSUE INJURIES

DIAGNOSIS	HISTORY	EXAMINATION	INVESTIGATIONS	MANAGEMENT
Extensor mechanism disruption (quadriceps rupture or patellar tendon rupture)	<p>Quadriceps tendon rupture: forced contraction, older patient (>40 years)</p> <p>Patellar tendon rupture: younger patient (<40 years)</p>	<p>Inability to actively SLR</p> <p>Palpable gap (most noticeable during SLR)</p>	<p>Lateral XR: change in height of patella</p>	<p>Emergency referral</p>
Patellar dislocation	<p>Often spontaneously relocated</p>	<p>Tender medial border of patella</p> <p>Patellar apprehension</p>	<p>Patellar tilt or subluxation may be seen on skyline XR</p>	<p>Bracing only required for first dislocations</p> <p>Fracture clinic referral</p> <p>Referral to specialist clinic if recurrent</p>
<p>Locked knee</p> <ul style="list-style-type: none"> • Meniscal tear • Loose body • ACL tear 	<p>Sudden inability to extend knee fully</p>	<p>Mechanical block to full extension</p> <p>Distinguish from pseudo-locking (inability to extend fully due to pain)</p>		<p>Urgent referral to specialist clinic</p>
Meniscal tear	<p>Twisting injury</p> <p>Trivial injury in older patient (e.g. rising from squatting)</p>	<p>Joint line tenderness</p> <p>Effusion</p> <p>Check for locked knee</p>		<p>Referral to specialist clinic (younger patient - meniscal repair may be possible)</p>
Medial collateral ligament (MCL) injury	<p>Valgus injury</p> <p>Medial pain</p>	<p>Pain or laxity on valgus stress</p> <p>MCL tenderness</p> <p>Exclude associated ACL injury</p>	<p>Occasional avulsion flake seen adjacent to medial femoral condyle (Pellegrini-Stieda lesion)</p>	<p>Hinged knee brace</p> <p>Refer for physiotherapy</p> <p>Referral to specialist clinic</p>
Anterior cruciate ligament (ACL) injury	<p>History of twisting or hyperextension injury</p> <p>Feeling of a 'pop'</p> <p>Rapid swelling</p>	<p>Positive Lachman test</p>	<p>Avulsion fractures may be visible on plain XR:</p> <ul style="list-style-type: none"> • Intercondylar eminence fracture • Second lesion (flake adjacent to lateral tibial plateau) 	<p>Refer for physiotherapy</p> <p>Referral to specialist clinic</p>
Posterior cruciate ligament (PCL) injury	<p>Direct blow to anterior tibia</p>	<p>Pre-tibial abrasion</p> <p>Posterior sag</p> <p>Positive posterior draw</p> <p>False positive Lachman test</p>	<p>Intercondylar eminence fracture may be visible on plain XR</p>	<p>Refer for physiotherapy</p> <p>Referral to specialist clinic</p>

DIAGNOSIS	HISTORY	EXAMINATION	INVESTIGATIONS	MANAGEMENT
Posterolateral corner (lateral collateral ligament) injury	High-energy trauma Forced hyperflexion or hyperextension	Laxity on varus stress Increased external rotation of tibia Risk of peroneal nerve injury	Avulsion fracture from head of fibula may be visible on plain XR	Emergency referral or referral to specialist clinic (if presentation delayed)
Knee dislocation or multiple ligament injury	High-energy trauma	Multi-directional laxity High risk of neurovascular injury	Consider angiography	Emergency referral (orthopaedic +/- vascular surgical)

C. OTHER CAUSES OF ACUTE KNEE PAIN

DIAGNOSIS	HISTORY	EXAMINATION	INVESTIGATIONS	MANAGEMENT
Tumour	General malaise Weight loss Persistent pain Previous malignancy	Bony tenderness Signs of 1° neoplasm	Abnormal plain XRs FBC, CRP, LFTs, bone chemistry Serum electrophoresis	Urgent referral
Infection	Fever Night sweats General malaise Persistent pain	Febrile Effusion Severe pain on passive movement	FBC, CRP, blood cultures Consider aspiration (send fluid to microbiology for culture + cytology for crystals)	Emergency referral
Osteoarthritis	Older patient (usually >40 years) Pre-existing pain	Varus or valgus standing deformity Crepitus Stiffness	Joint space narrowing on weight-bearing XR	Simple analgesia Weight loss Walking aids (e.g. stick) Strengthening + stretching exercises Low impact activity Intra-articular corticosteroid Referral to specialist clinic: failure of non-surgical management, disabling pain, progressive deformity

DIAGNOSIS	HISTORY	EXAMINATION	INVESTIGATIONS	MANAGEMENT
Inflammatory arthropathy (e.g. rheumatoid arthritis)	Polyarticular involvement Morning stiffness	Joint swelling Rheumatoid nodules	FBC, CRP RhF, ANA, HLA-B27 Consider aspiration (send fluid to microbiology for culture + cytology for crystals)	Rheumatological referral
Spontaneous haemarthrosis	Rapid swelling Known bleeding disorder or anti-coagulant therapy	Tense effusion	Clotting screen	Emergency referral
Patellofemoral pain	Any age Anterior knee pain Pain worse on stairs Sitting pain	Patellofemoral clicking Patellofemoral crepitus	Patellar tilt or subluxation may be seen on skyline XR	Simple analgesia Exercises: quadriceps strengthening + hamstring stretching Minimise activities involving weight-bearing in flexion Orthotic assessment Referral to specialist clinic: failure of non-surgical management
Bursitis	Anterior pain + swelling	Extra-articular swelling (pre-patellar or infra-patellar)	None usually required	Consider aspiration Simple analgesia Rest (e.g. extension splint) Activity modification Emergency referral if infected bursitis suspected

Also consider: referred pain from lumbar spine or hip

NOTES

Abbreviations

SLR = straight leg raise

RhF = rheumatoid factor

ANA = anti-nuclear antibody

Initial management of a soft tissue knee injury (48-72 hours)

- RICE: Rest + Ice + Compression + Elevation
- Avoid HARM: Heat + Alcohol + Running + Massage
- Paracetamol
- Consider aspiration of a painful, tense effusion (discuss with on-call orthopaedic team):
 1. Aseptic technique, inserting needle through normal skin
 2. Examine the aspirate:
 - a. Clear yellow fluid \Rightarrow synovial effusion (meniscal tear, arthritis)
 - b. Cloudy yellow fluid \Rightarrow inflammation (inflammatory arthritis, infection)
 - c. Bloody fluid \Rightarrow haemarthrosis (ACL or PCL tear, collateral ligament tear, patellar dislocation, peripheral meniscal detachment)
 - d. Blood + fat globules or blood-fat layer forming on standing \Rightarrow lipohaemarthrosis (intra-articular fracture)
 3. Send fluid to microbiology for culture + cytology for crystals
- Bracing is generally only required for MCL injuries

Indications for MRI

- Equivocal clinical diagnosis of a meniscal or ACL injury
- Multiple ligamentous injury
- Atypical pain

Plain XRs should be performed first

Examination by an experienced clinician may be as accurate as MRI