PatelloFemoral Joint (PFJ) Instability

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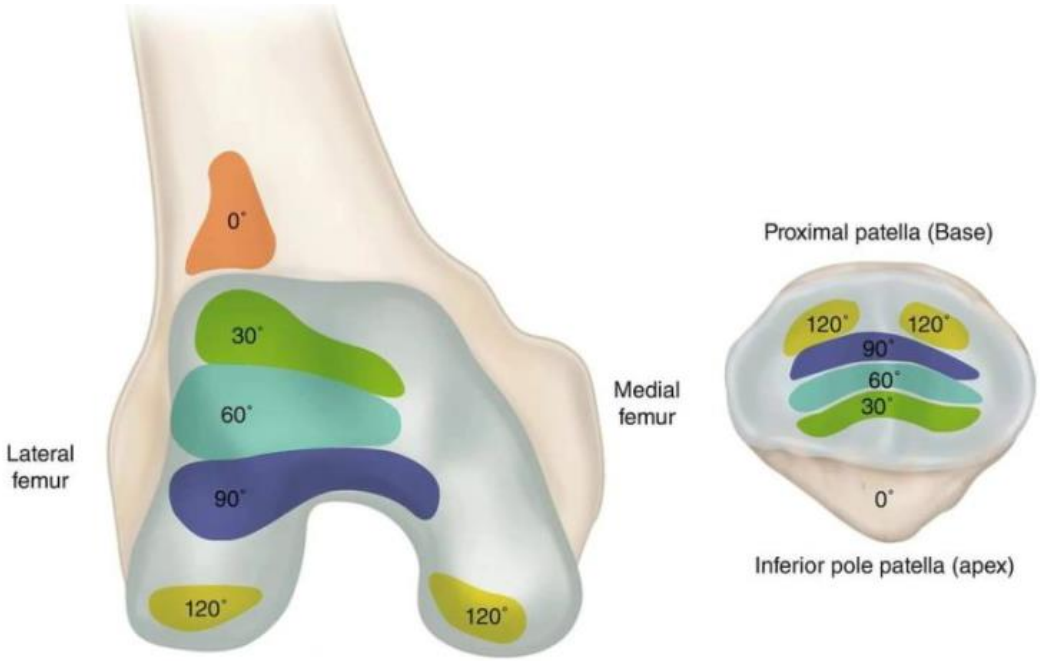
Who am I?

- FCP BSOL
- APP (Peripheral) ROH
- Specialist PFJ Multi-Diciplinary Clinic – 4 consultants and me!

Contents

Anatomy



PFJ – articulation between patella and trochlea

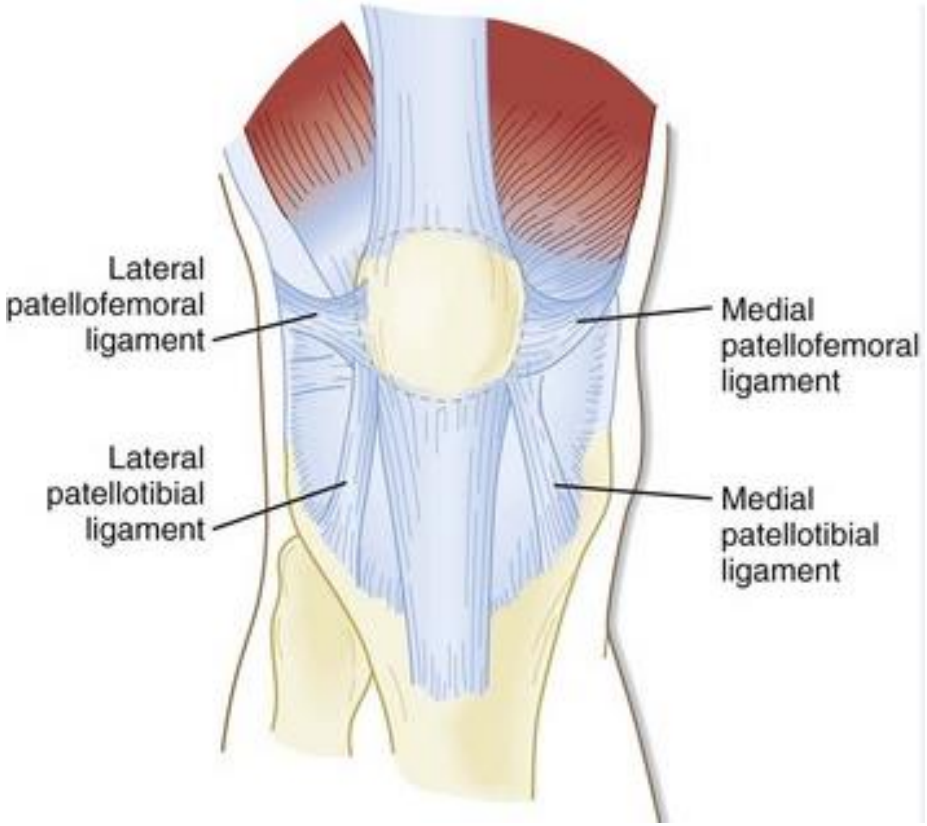
Patella is the largest sesamoid bone between the quadriceps tendon and patella tendon

Patella is an inverted triangle to fit within the groove of the trochlear

Variation in anatomy common particularly in trochlear

Due to incongruent nature of PFJ, dynamic stability is dependent on the soft tissues

Anatomy



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PFJ Issues

PFJ disorders manifest as either pain or instability

Same issues present in both populations

Commonly, it is a collection of problems with 1 being most prominent

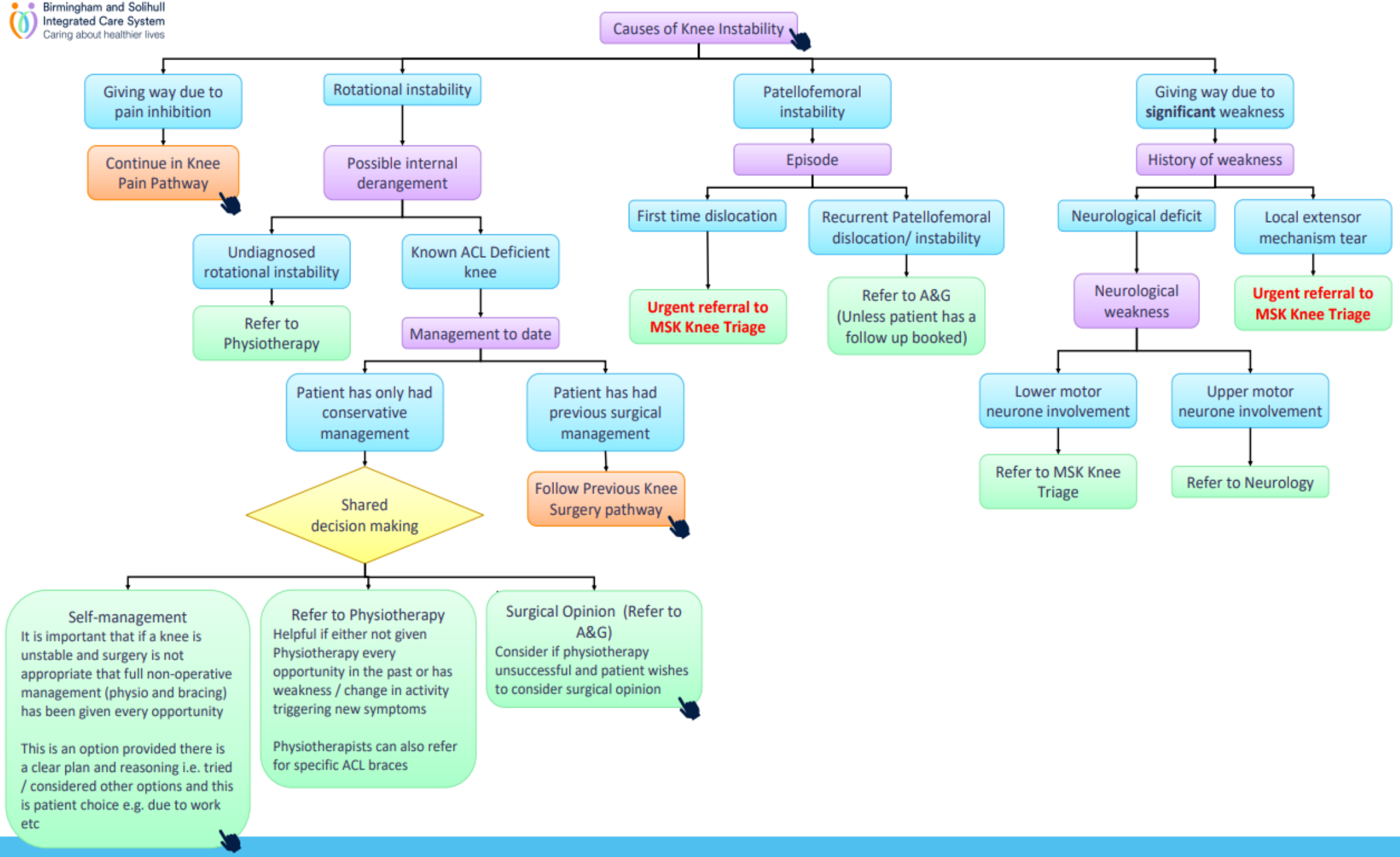
Many more people have anatomical issues than have problems

2 populations – young, and middle aged

Birmingham and Solihull Integrated Care System
Caring about healthier lives

Return to start

Return to Main Pathway



PFJ Instability

An acute PFJ dislocation is the most common acute knee injury in children

~40% will become recurrent

10% of these patients may develop contralateral knee PFJ instability

20% will develop OA within 20 years following their initial dislocation

Categorisation

Acute Dislocation:
Traumatic following mostly traumatic / sport injuries

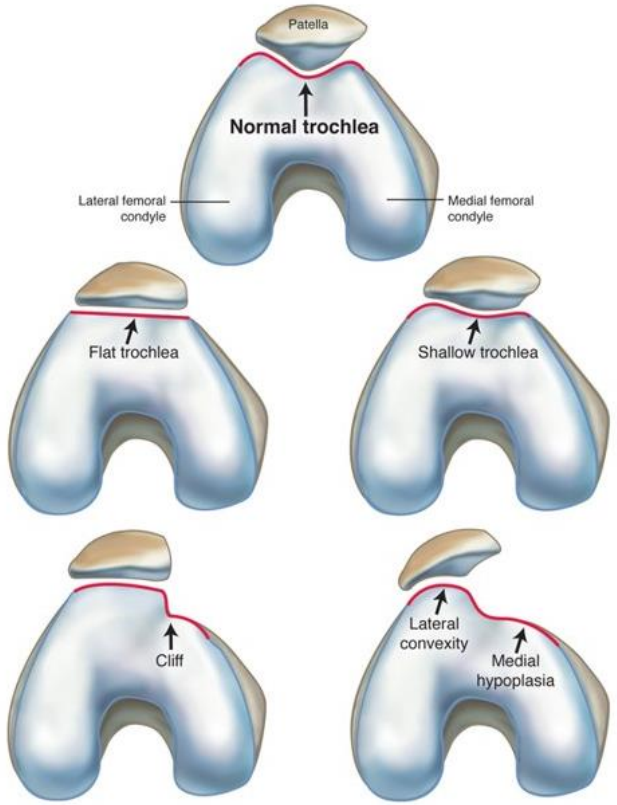
Chronic Dislocation:
May follow traumatic event or any associated misalignment

Recurrent Dislocation:
Patella dislocated with minimal stress during flexion; may relocate spontaneously

Habitual Dislocation:
Patellae dislocate with almost every movement of flexion and reduce spontaneously. Often congenital form of patellar instability

Contributing Factors

- Trochlear Dysplasia
- Patella Alta
- Lateralisation of Tibial Tubercle
- Age at Dislocation
- Hyper-Mobility
- Valgus Alignment
- Rotational Malalignment



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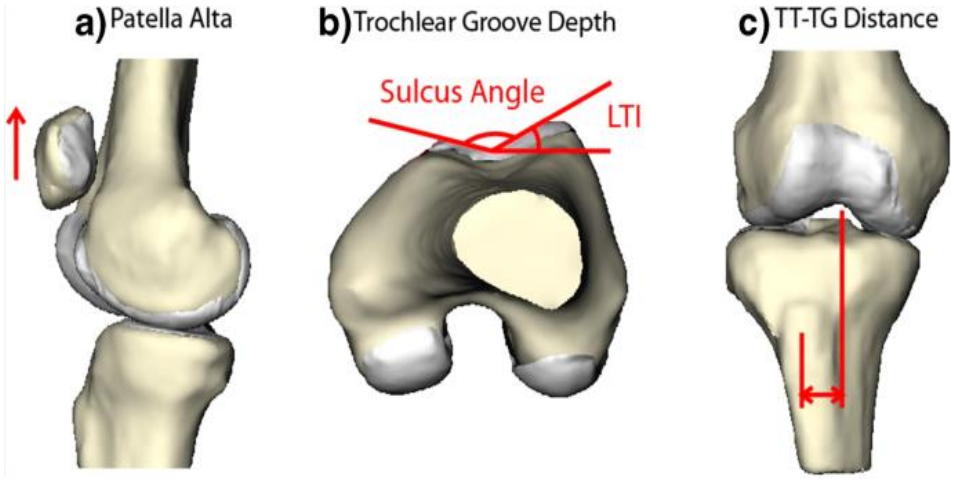

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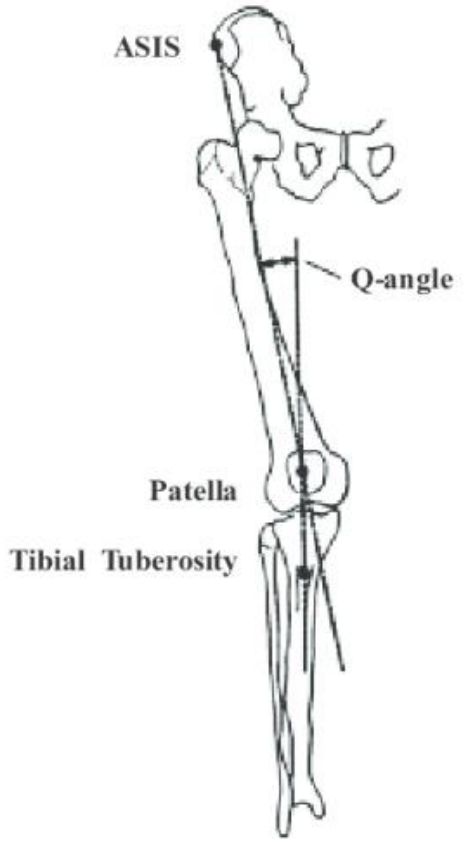

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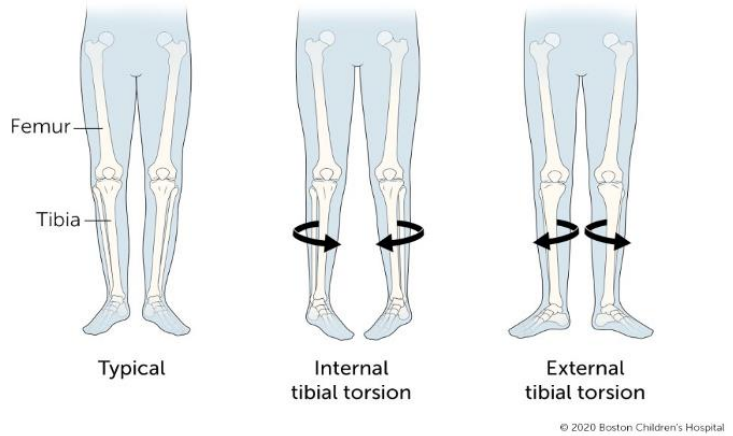

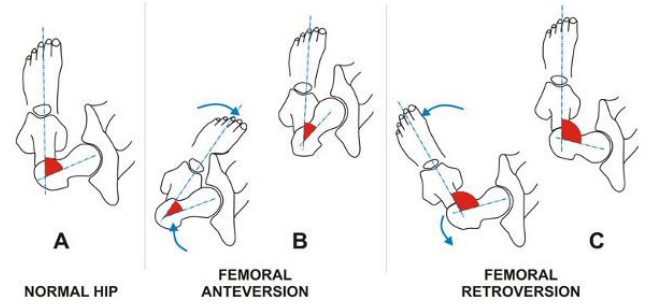

How to categorise contributing factors?

Structural

- Osseous Abnormalities
  - Patella Alta / Morphology
  - Trochlear Dysplasia
- Lower Limb Alignment
  - Versional / Rotational issues
  - TT-TG
- Soft Tissue
  - Hypermobility
  - Medial laxity (MPFL Insufficiency)

Functional

- Lower Limb Alignment
  - Q-Angle
  - Muscular tightness (Rec Fem, ITB)
  - Muscle weakness (VM)
- Gait
  - Valgus Thrust
  - Foot Pronation

British Orthopaedic Association

BSCOS British Society for Children's Orthopaedic Surgery

BOA STANDARD

ASSESSMENT AND MANAGEMENT OF FIRST TIME LATERAL PATELLAR DISLOCATION (FTLPD)

1. An acute lateral patellar dislocation should be reduced without delay.

2. Aspiration of an associated haemarthrosis should not be performed.

3. Following reduction, all patients should have an AP and lateral radiograph of the knee, including skyline patellar view.

4. **Cast immobilisation should not be used,** but **splints that permit full knee flexion may be used** for pain relief in the period immediately following injury.

5. **Unrestricted weight bearing should be encouraged immediately**, with the aid of crutches if required.

6. Patients should be evaluated within 2 weeks of injury in an age-appropriate clinic, by a clinician proficient in the assessment of knee injuries led by a named consultant or specialty doctor.

7. **Risk factors for recurrent patellar instability should be documented** and include; patient demographics, mechanism of injury, previous contralateral dislocation, history of joint hypermobility, and family history of patellar dislocation or joint hypermobility. This should be supported by an **appropriate examination, which should include an assessment of global joint laxity and lower limb alignment**.

8. **Assessment by a musculo-skeletal physiotherapist should occur within 3 weeks of injury**.

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BOA STANDARD

ASSESSMENT AND MANAGEMENT OF FIRST TIME LATERAL PATELLAR DISLOCATION (FTLPD)

9. **Unless contraindicated, magnetic resonance imaging** reported by a musculoskeletal radiologist should be undertaken if:
- An associated injury is suspected (e.g. osteochondral fracture, ACL rupture, haemarthrosis)
- Alternative injuries cannot be excluded (e.g. locked knee, non-functioning extensor mechanism)
- Patient assessment is difficult
- Any form of surgical intervention is planned
- A patient fails to recover following conservative treatment

10. Surgery to treat associated injuries (e.g. fixation of significant osteochondral fractures) may be considered.

11. **Surgery solely to stabilise the patella should not be offered routinely** following isolated FTLPD.

12. Isolated lateral retinacular release is never indicated.

13. Clinicians considering surgery following FTLPD should discuss their plan within an age-appropriate multi-disciplinary team meeting, or alternative forum for peer review, with written documentation of the outcome included in the medical records.

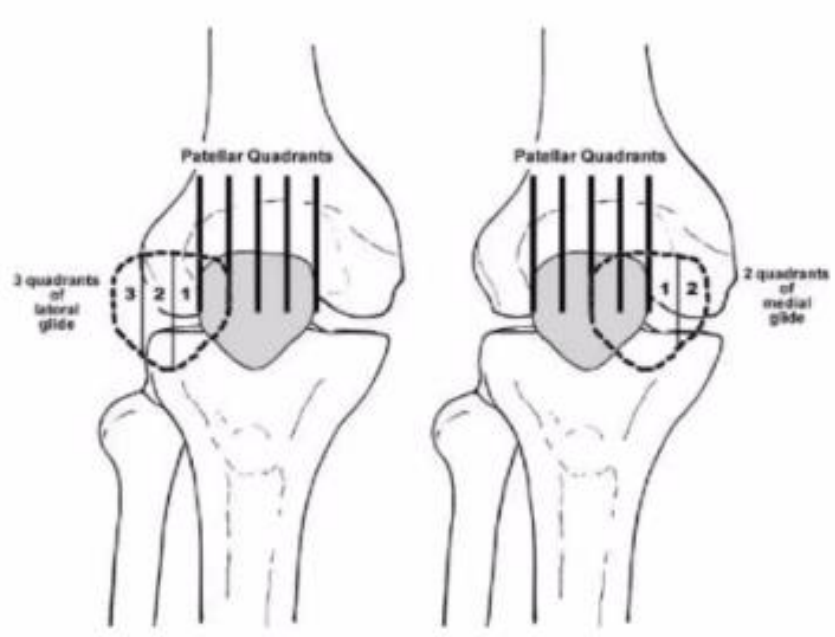
14. Patient initiated follow up is appropriate unless:
- Surgery is undertaken
- **A patient fails to recover** following conservative treatment
- There is a **high risk of recurrent dislocation**
- **Significant malalignment has been identified** in a skeletally immature patient

15. **Appropriate patient information including leaflets, videos or online / app-based content should be available**.

What about the recurrent dislocations?

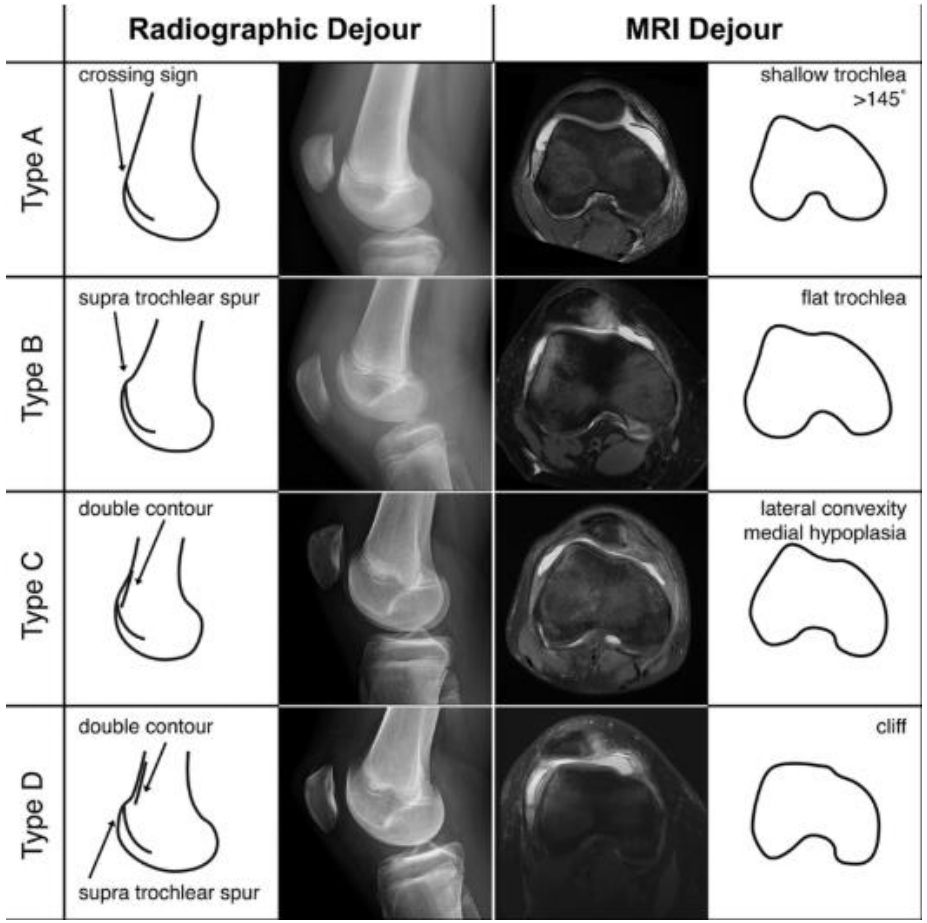
Patella Apprehension / Laxity

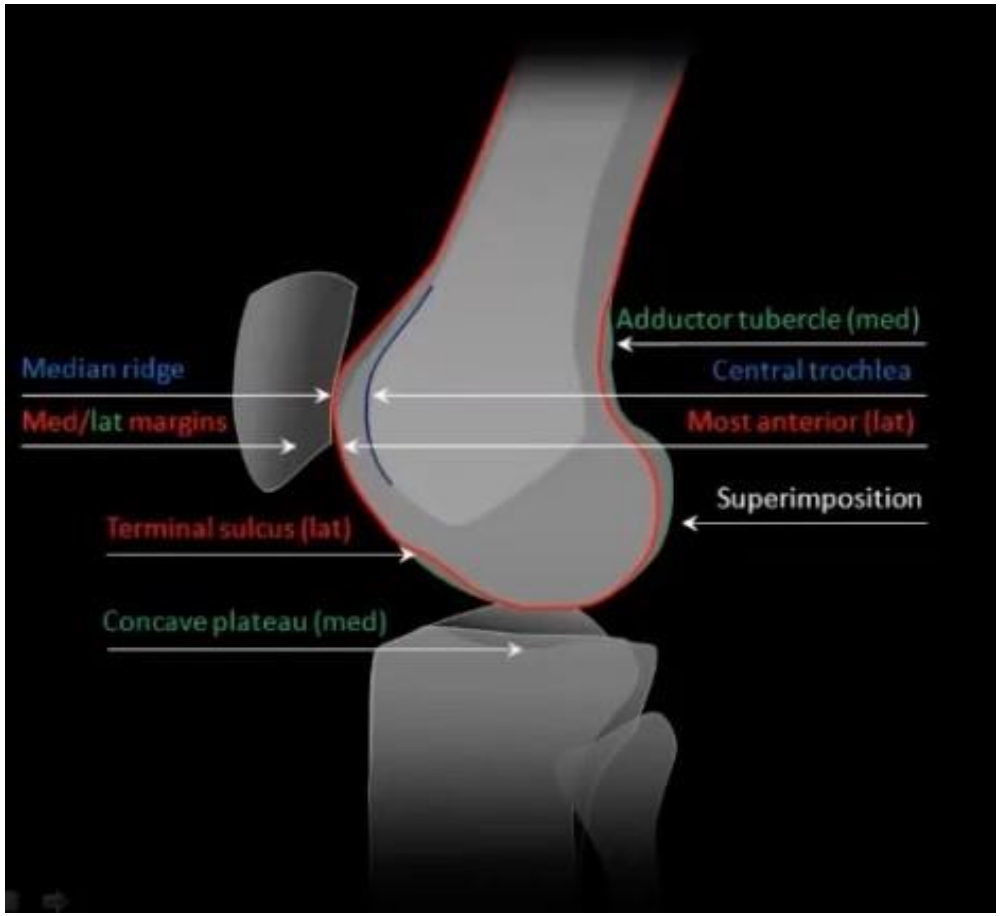
- Patella Glide Test
  - Normal accessory glide is 3 quadrants of lateral mobility and 2 quadrants of medial mobility
  - Completed in extension with quads inhibited
- Apprehension (Lateral Glide)
  - At 0°, 30 ° +/- 60 °
  - Assessing for apprehension and/or instability



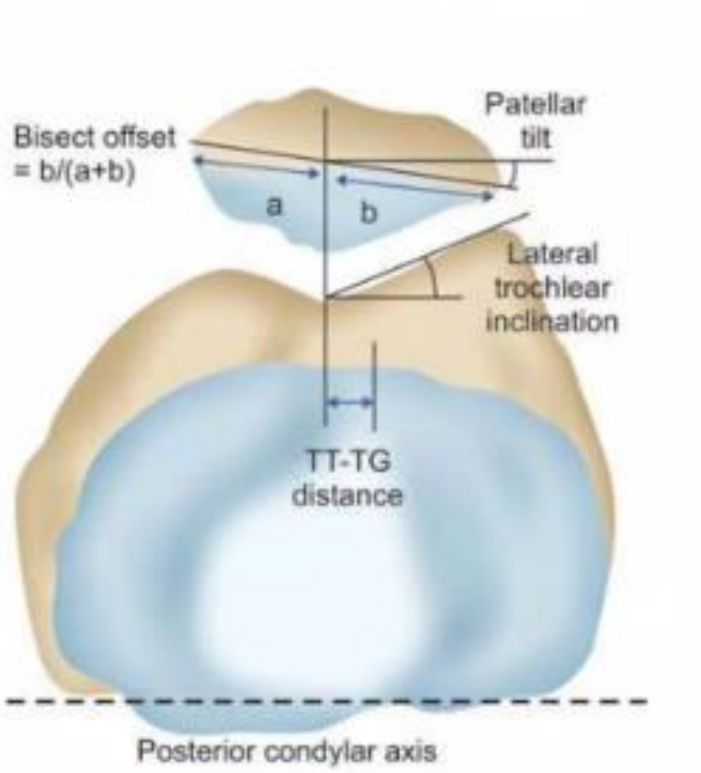
Patella Maltracking – J-Sign

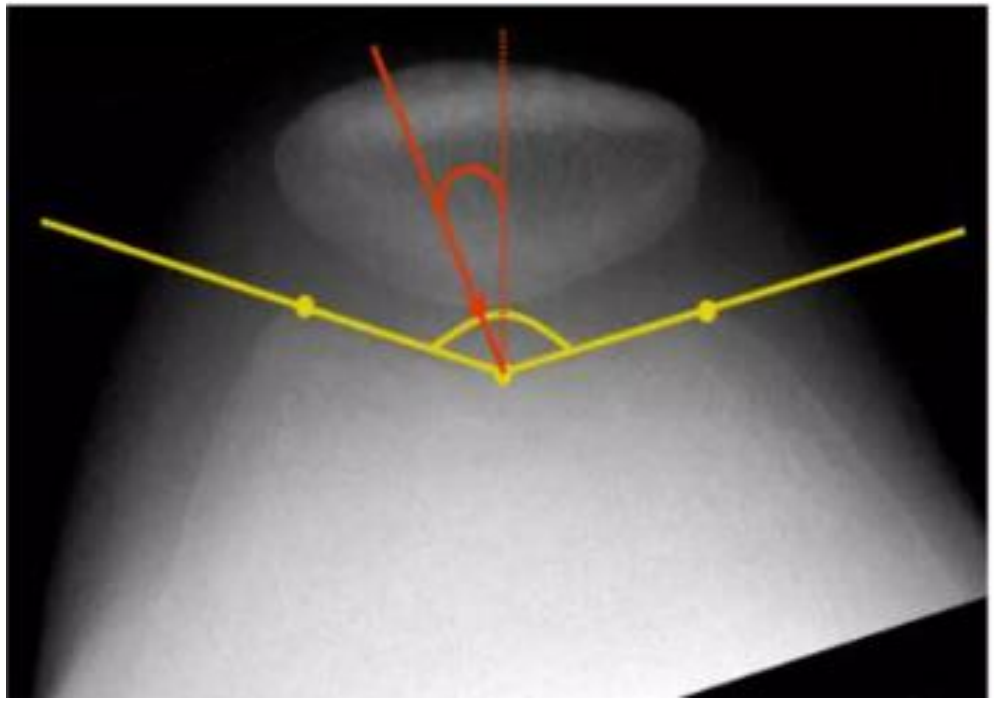
Trochlear Dysplasia



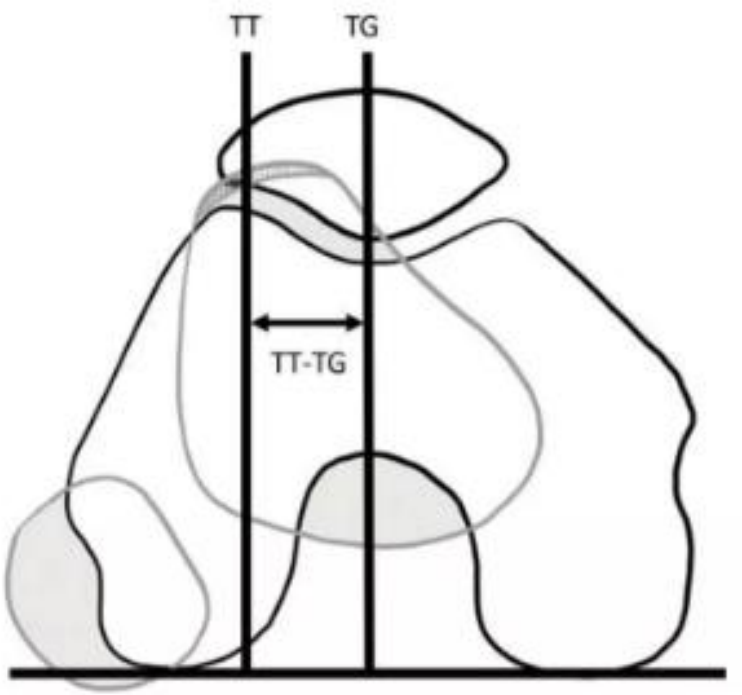


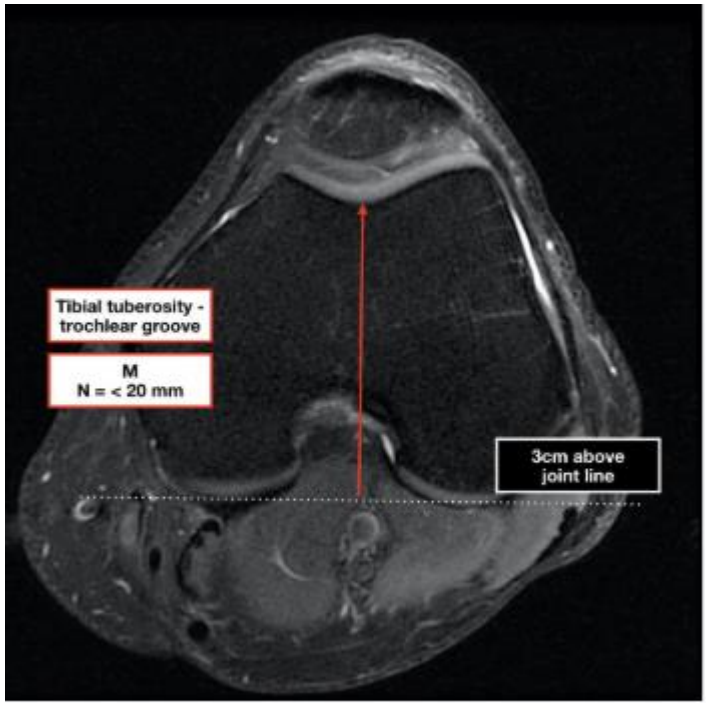
Axial / Skyline XR Images

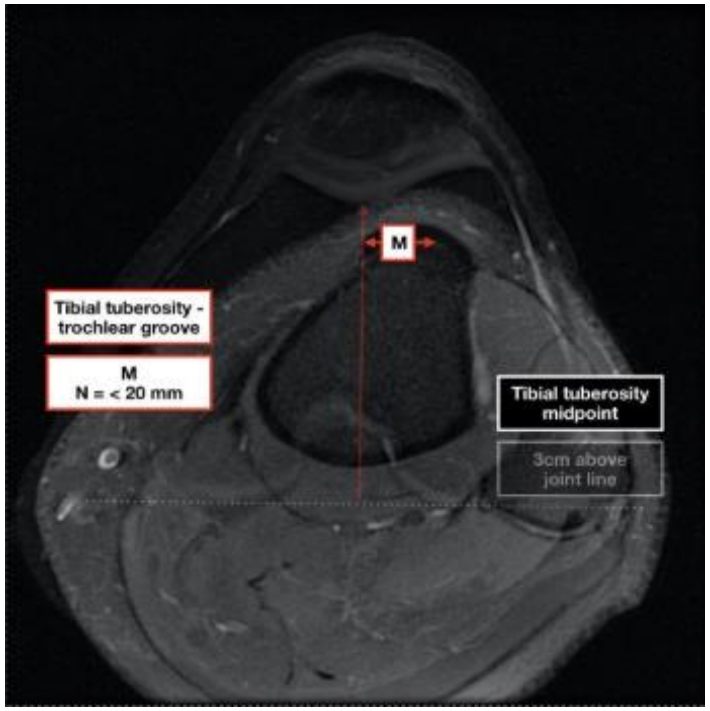




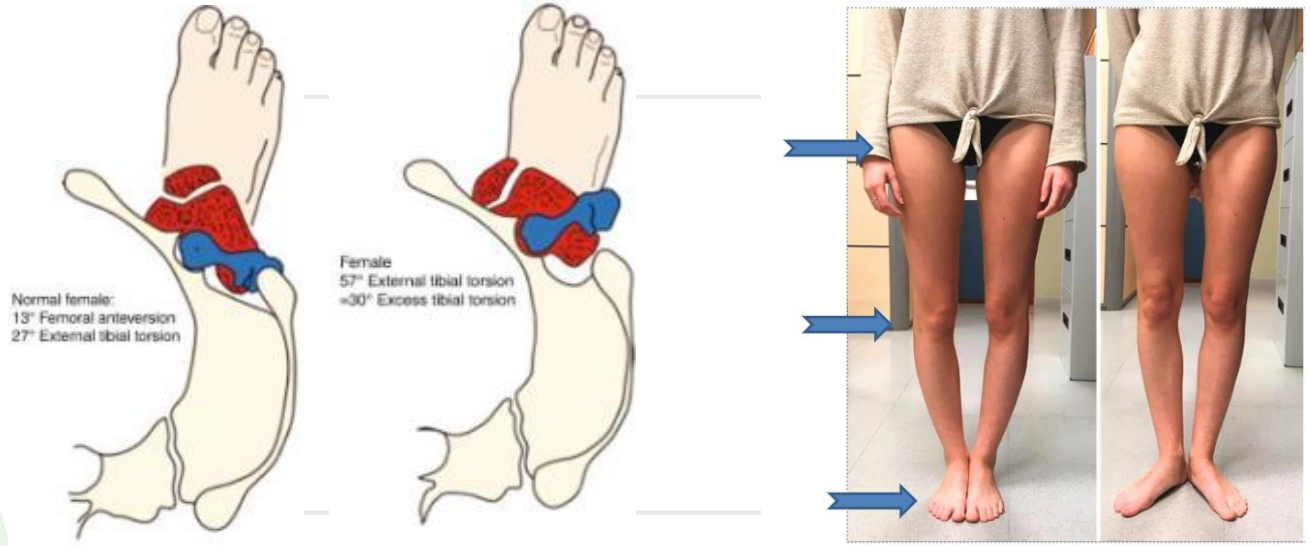
Lateralisation of Tibial Tuberosity

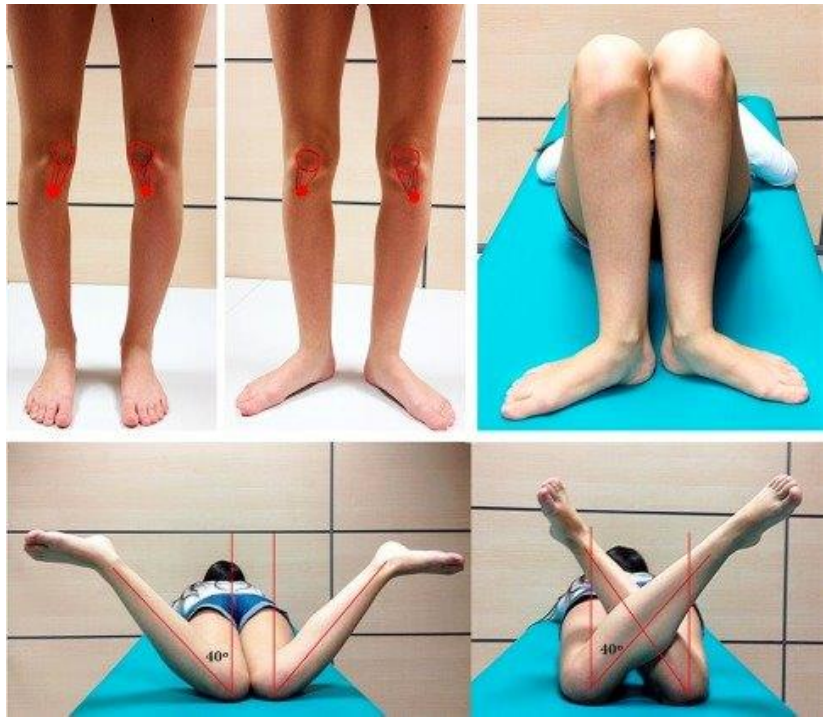






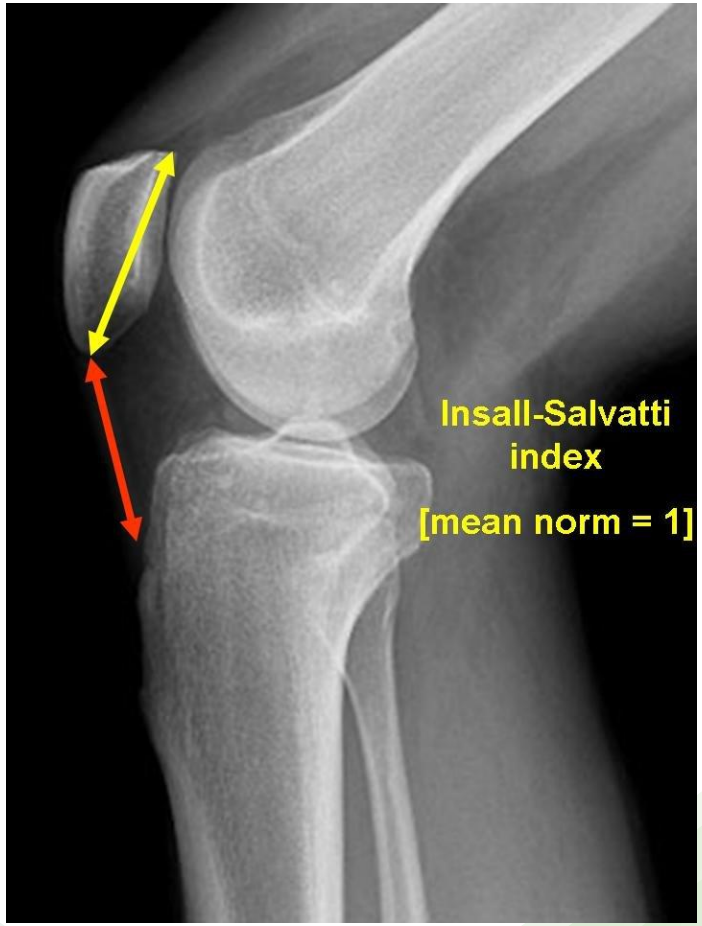
Lower Limb Alignment – Rotational Assessment





Patella Alta

- In FCP/physiotherapy clinics we may not always have access to diagnostic imaging, but we can assess how high the patella is sitting in neutral and compare to the contralateral side.



Imaging considerations

XR

- AP WB, Lateral, Skyline
- ?Leg Alignment View

- Clinical questions to confirm / support objective assessment
  - Alta, Dysplasia, Lateral Tilt / Subluxation

MRI

- MPFL rupture, Trochlear dysplasia, Patella Alta, TT-TG, Patella Tilt
- Rule out chondral defect or concomitant injury

- Standard vs Vertical gantry
- Option of torsional measurements

The Assessment of Patients with Recurrent Patellar Instability

August 2020

1. The diagnosis and clinical assessment of recurrent instability involves patient-specific assessment, based on:
    - A history of recurrent patellar dislocation, or clear history of recurrent subluxation.
    - A history of instability symptoms and their pattern.
    - Acute and chronic pain.
    - Parameters in the history which constitute risk factors for patellar instability (History of first event and age of onset, bilateral instability, family history).
    - Previous surgical interventions.
    - A detailed history of the exact nature of previous physiotherapy, compliance and barriers to physiotherapy progression should be elicited.
    - An assessment of generalised joint hypermobility
    - Clinical evaluation of the rotational profile of the limb and the presence of coronal deformity
    - The potential for non-operative interventions including physiotherapy to improve the patient's outcome.

2. Radiographs should include: antero-posterior (or PA); true lateral at 20-30 degrees flexion; and axial (skyline) views at 20-30 degrees knee flexion. These images aim to detect:
    - Patella alta (see point 5)
    - Degenerative change
    - Loose osteochondral fragment
    - Trochlear Dysplasia

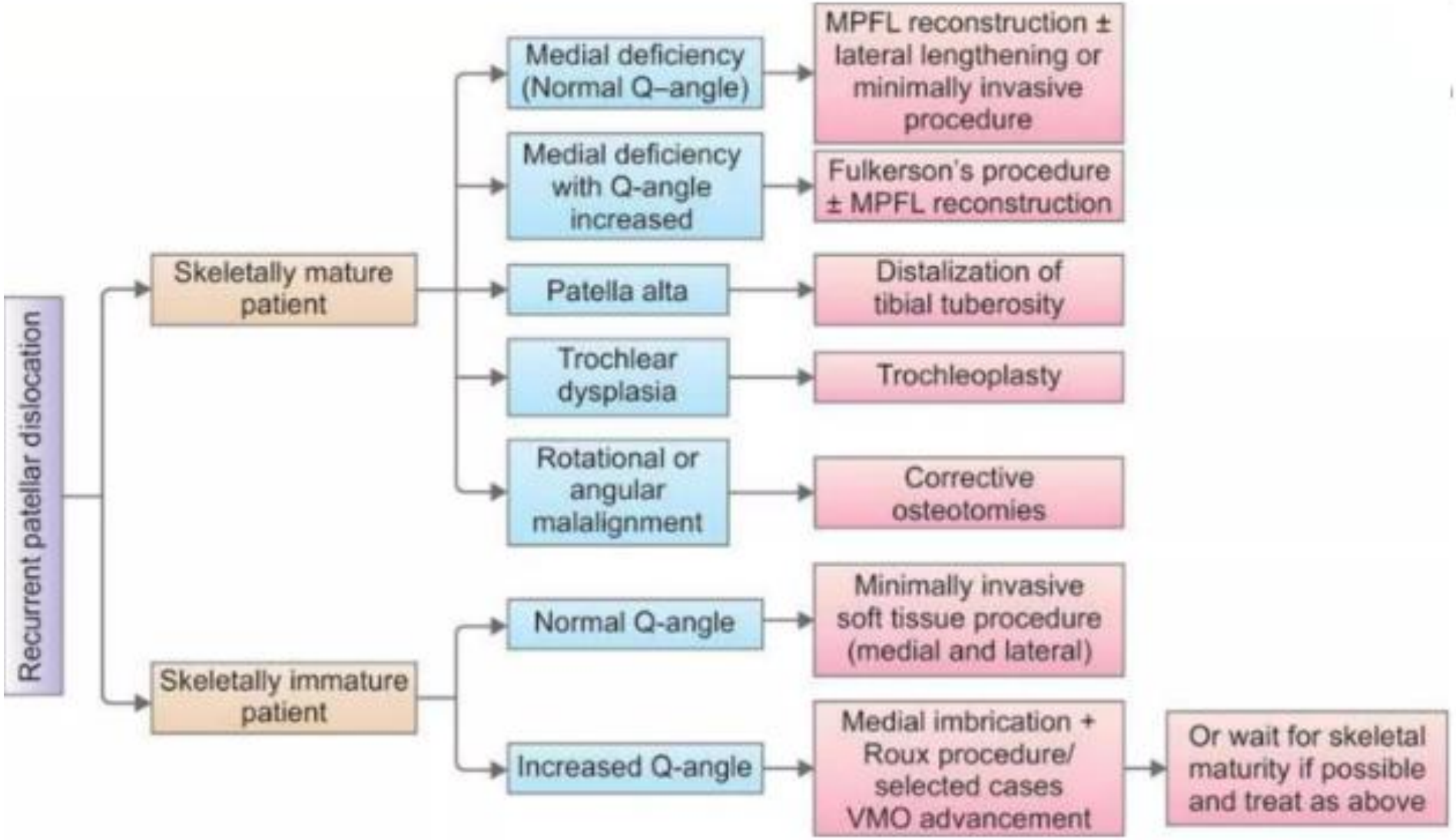
The Assessment of Patients with Recurrent Patellar Instability

August 2020

3. Further imaging investigations should include an MRI of the knee (unless MRI contra-indicated) which includes axial and sagittal images. The MRI aims to outline:
    - Patella alta (see point 5)
    - Degenerative change or cartilage loss
    - Loose osteochondral or chondral fragment
    - Meniscal and ligamentous pathology
    - Trochlear dysplasia
    - Tibial tuberosity offset

4. Consider further imaging investigation, in select cases only, based on individual clinical findings:
    - Long leg radiographs to assess coronal plane alignment
    - CT to assess rotational alignment of femur and tibia

5. Determination of patella alta involves assessment of the clinical picture and radiological imaging, and may include indices such as patellotrochlear overlap, Caton-Dechamps ratio or Blackburne-Peel ratio according to published normal ranges.


Recurrent patellar dislocation
Skeletally mature patient
Skeletally immature patient
Medial deficiency (Normal Q–angle)
Medial deficiency with Q-angle increased
Patella alta
Trochlear dysplasia
Rotational or angular malalignment
Normal Q-angle
Increased Q-angle
MPFL reconstruction ± lateral lengthening or minimally invasive procedure
Fulkerson's procedure ± MPFL reconstruction
Distalization of tibial tuberosity
Trochleoplasty
Corrective osteotomies
Minimally invasive soft tissue procedure (medial and lateral)
Medial imbrication + Roux procedure/ selected cases VMO advancement
Or wait for skeletal maturity if possible and treat as above

The Surgical Management of Recurrent Patellar Instability

1. **Surgery:**
    a. In the absence of severe trochlear dysplasia, patella alta and major abnormalities in alignment, the soft tissue surgical procedure of choice should be a medial patellofemoral ligament (MPFL) reconstruction.
    b. Isolated lateral retinacular release is never indicated for patellar instability.
    c. Isolated medialisation of the tibial tuberosity is not recommended in pure patellar instability, although reducing excessive lateralisation may occasionally be indicated.
    d. Significant patella alta, in the setting of recurrent dislocations, should be treated by tibial tuberosity distalisation, often combined with other procedures (MPFL reconstruction; medial soft- tissue procedure; and/or trochleoplasty).
    e. Consider correction of rotation or coronal malalignment when severe abnormality is present.
    f. Severe trochlear dysplasia in skeletally mature patients should be treated with trochleoplasty. Determination of severe trochlear dysplasia is typically based on a convex or laterally-facing lateral trochlear facet, or a Dejour classification of B or D.
    g. All surgical procedures for patellar instability must be carried out by surgeons with appropriate experience and training. Trochleoplasty and combined surgical procedures should be carried out by surgeons with demonstrable training in these procedures and experience in their use.
    h. Clinicians should be cautious recommending surgical treatment for instability patients who also have background chronic pain, as their pain symptoms may not improve or could even deteriorate after stabilisation surgery. Caution is also advised in patients with generalised joint hypermobility.

The Surgical Management of Recurrent Patellar Instability

2. **Post-operative Physiotherapy:**

    a. Physiotherapy following surgery for patellar instability, should be performed by physiotherapists with training and experience in this pathology, or under the supervision of an appropriately skilled and experienced physiotherapist.

    b. Recommended post-operative physiotherapy should include:

        i. Education and advice.

        ii. Observation and monitoring of individual case deviations (such as, after tibial tubercle osteotomy).

        iii. Restoration of range of motion.

        iv. Assessment of functional movement patterns and lower limb control, address deficits where they are present.

        v. An individually tailored exercise program which may include lower limb and trunk strengthening and/or proprioceptive exercises.

        vi. A functional-based program to meet the occupational, sporting and social goals of patients.

3. Clinicians dealing with complex cases should have access to a multi-disciplinary team and a forum for case review or advice from peers

- Skeletally immature patients should be initially treated with rehabilitation, before considering formal reconstructive procedures. If surgery is necessary, such patients would benefit from procedures which preserve growth plates and are best carried out by surgeons used to performing these procedures.

Summary

PFJ instability is complex and multifactorial

Assessment should take into consideration both functional and structural components

Differentiate between PFJ Pain & PFJ Instability

Diagnostic assessment and imaging (if able) as per BOAST Best Practice Guidelines

Refer on to secondary care for multiple dislocations or instability