Regional Protocol for Radiological evaluation of patients with Patello-femoral instability

**MRI Knee:**

Standard knee sequences

1. Patellar height
   - Caton Deschamps Index
   - Patellar engagement (Patellotrochlear Index)
   - Patellar tendon length

2. Tibial tuberosity lateralisation
   - TTTG distance (cartilage) – proximal trochlea; also distal trochlea if high grade dysplasia

3. Trochlear dysplasia – Dejour Type

4. Patellar and trochlear cartilage

5. Medial stabilizers
   - MPFL integrity
   - VMO-patellar distance

**CT Knee 3D (optional)**

Pre op planning

**CT lower limb rotational profile**

Long scanogram both lower limbs, from hip to ankle:

- Assess limb length
- Genu Varum/valgus

CT both hips/knees/ankles:

- Femoral anteversion
- Femorotibial rotation
- External tibial torsion

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**Practice location:**

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The following section describes how the above measurements are to be taken. – Dr. S. Chaudhary (Radiologist)

MRI ASSESSMENT of patellar height

1. Caton Deschamps Index

Inferior margin of articular surface of patella
Anterior margin of tibial plateau

N – 1
Alta >1.3
Baja <0.6
2. Patellar engagement (Patellotrochlear index)

Engagement of the patella into the trochlear sulcus in full extension is expressed as a percentage.

The highest point of the articular surface of the sulcus is identified using the highest axial slice on which cartilage can be identified. Using the multi-planar localisation tool available in the viewing software, this point is identified on the sagittal view, allowing the corresponding point on the articular surface of the patella to be identified. The height of this point from the inferior aspect of the articular surface of the patella is then measured. From this measurement, the percentage of the patella articular surface engaged in the sulcus is calculated (E/C).
PTI:
>50% - patella infera
<12.5% - patella alta.

PTI in dysplasia with subluxed patella – use the multiplanar localizer tool on the viewing software or cross reference tool to localise the upper margin of trochlear cartilage from the axial sections.
3. Patellar tendon length

Inside length of patellar tendon measured in midsubstance of the tendon on sagittal MRI, along its inner margin.

This may not necessarily be midsagittal section of the knee when the patella is subluxed or tibial tuberosity is lateralised.

Use the mid sagittal section through tibial tuberosity when the tuberosity is lateralised, to localise the mid tendon.
4. Tibial tuberosity lateralisation (TTTG distance)

Use the multiplanar localization tool on the viewing software, placing the cursor along the deepest point of cartilaginous trochlear sulcus at the first axial MRI section showing the trochlear cartilage (proximal trochlea), and another at the mid point of patellar tendon insertion on the tibial tuberosity.

If the proximal trochlear groove is flat, use the mid point; If it is convex, take the highest point of the cartilage convexity as the trochlear reference point.

In high grade trochlear dysplasia, it will be worth giving an additional TTTG distance using the deepest part of the inferior trochlear sulcus when it is well formed.
5. Trochlear dysplasia

Classify according to Dejour (A-D)

Use the first axial section of the knee showing a complete trochlear cartilage.

Assess for medial facet hypoplasia/absence or vertical join
Assess for presence of supratrochlear spur
6. Integrity of medial patellofemoral ligament (MPFL)  
VMO patellar distance (VMOP)

Axial MRI section through inferiormost fibres of vastus medialis obliquus.  
Shortest distance between the superomedial aspect of patella, to the edge of vastus medialis obliquus muscle.

- Shortest distance between the superomedial margin of patella and VMO muscle
CT rotational profile lower limb

Scanogram

- Mechanical axis (Miculkz line) – line joining the centre of femoral head to the centre of talar dome
- Mech axis >15mm medial to knee center – genu varum
- Mech axis > 1mm lateral to knee centre - genu valgum
Femoral anteversion

- Defining the femoral neck axis (Hernandez method) – line joining mid point of femoral head and isthmus of femoral neck
- Femoral condylar axis – Tangent to the distal femoral condyles.
Femorotibial rotation

- Rotation of proximal tibia with respect to distal femur in full extension.
- Femoral condylar axis – Tangent to distal femoral condyles
- Tangent to tibial plateau – section showing widest diameter of tibial plateau, between the femorotibial joint and head of fibula.

External tibial torsion

- Proximal – tangent to tibial plateau at its widest diameter
- Distal – Bimalleolar axis
- Defined as external torsion of distal tibia with respect to proximal tibia.