



Mr. S. Tanweer Ashraf

MS, MRCS (Ed), FRCS (Eng), FRCS (Tr&Orth)
MSc Ortho Engineering (Cardiff),

Consultant Knee Surgeon

NHS: The Royal Orthopaedic Hospital &
Queen Elizabeth Hospital, Birmingham

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

Practice location:

Little Aston Hospital	0121 353 2444
Priory Hospital	0121 440 2323
West Midlands Hospital	0138 456 0123
Royal Orthopaedic Hospital	0121 685 4000

All correspondence to:

The Edgbaston Hospital
22 Somerset Road, Edgbaston,
Birmingham B15 2QQ, UK
0121 456 2000

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

MRI ASSESSMENT of patellar height

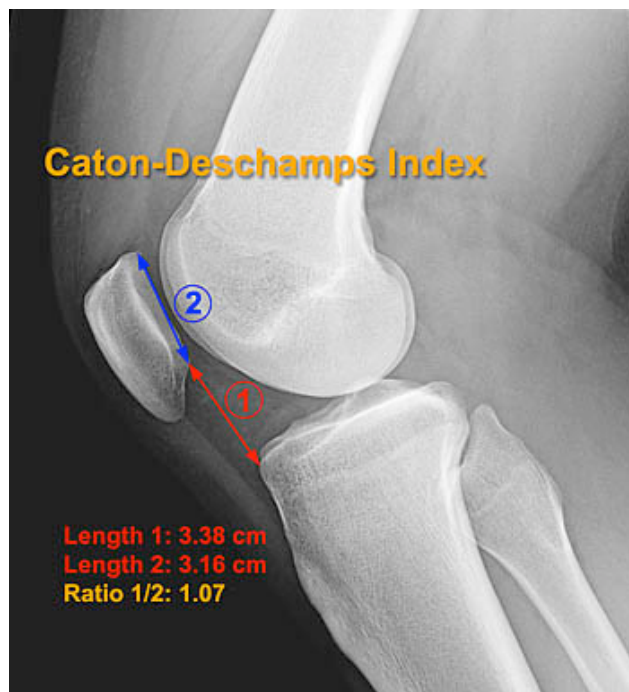
1. Caton Deschamps Index

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

N – 1

Alta >1.3

Baja <0.6





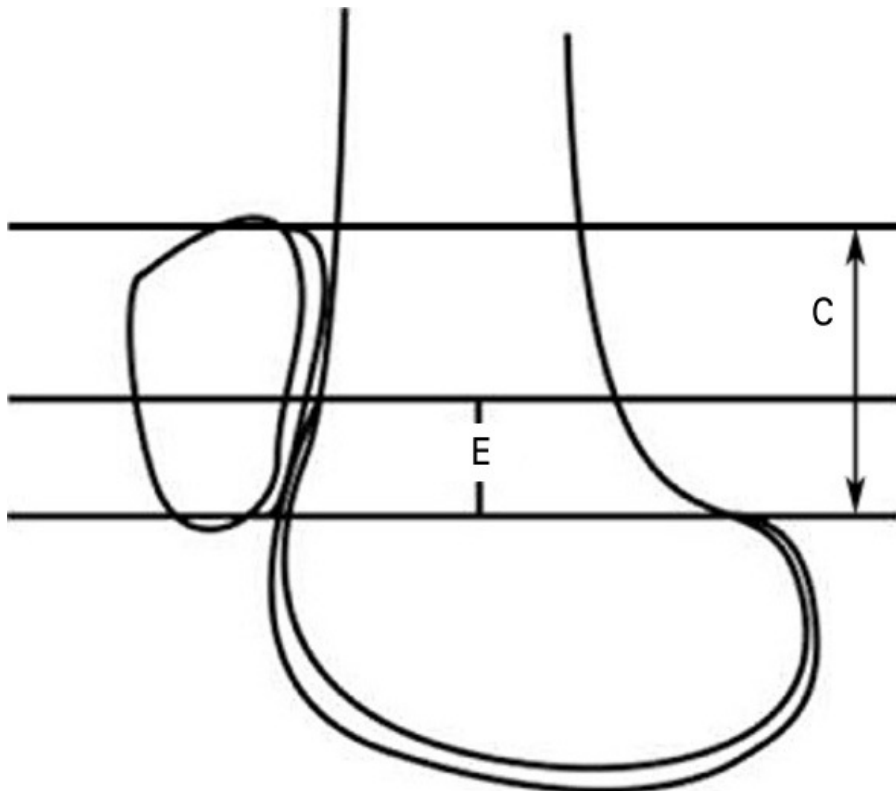
Caton Deschamps index in subluxed patella –

use sagittal section which shows the best mid sagittal view of the patella, and the anterior margin of visible tibial plateau.

2. Patellar engagement (Patellotrochlear index)

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

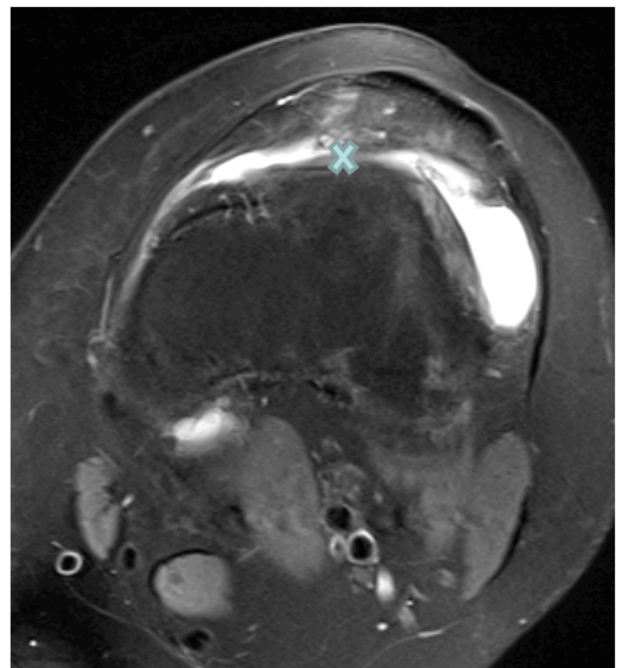
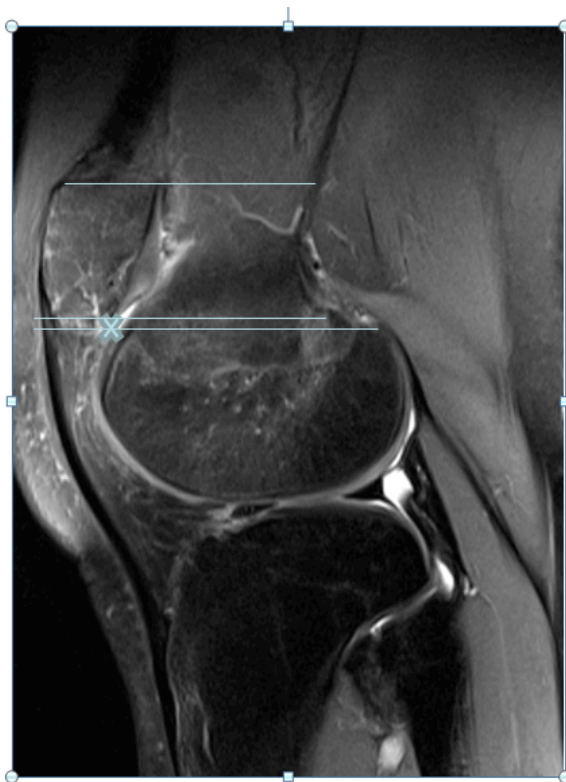
The highest point of the articular surface of the sulcus is identified using the highest axial slice on which cartilage can be identified. Using the multi-planar localisation tool available in the viewing software, this point is identified on the sagittal view, allowing the corresponding point on the 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.



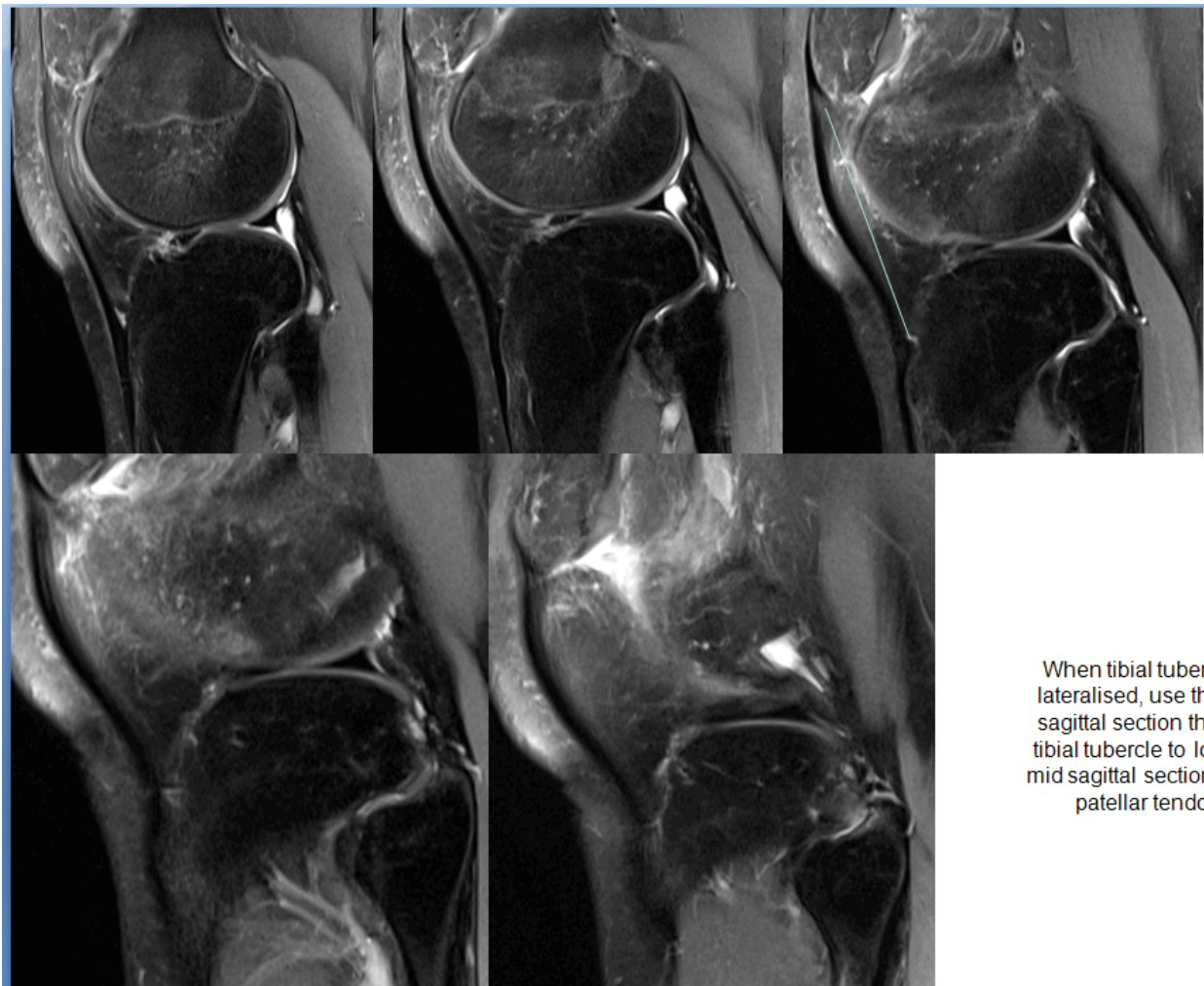
PTI in dysplasia with subluxed patella – use the multiplanar localizer tool on the viewing software or cross reference tool to localise the upper margin of trochlear cartilage from the axial sections.

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.



When tibial tubercle is lateralised, use the mid sagittal section through tibial tubercle to localise mid sagittal section of the patellar tendon.

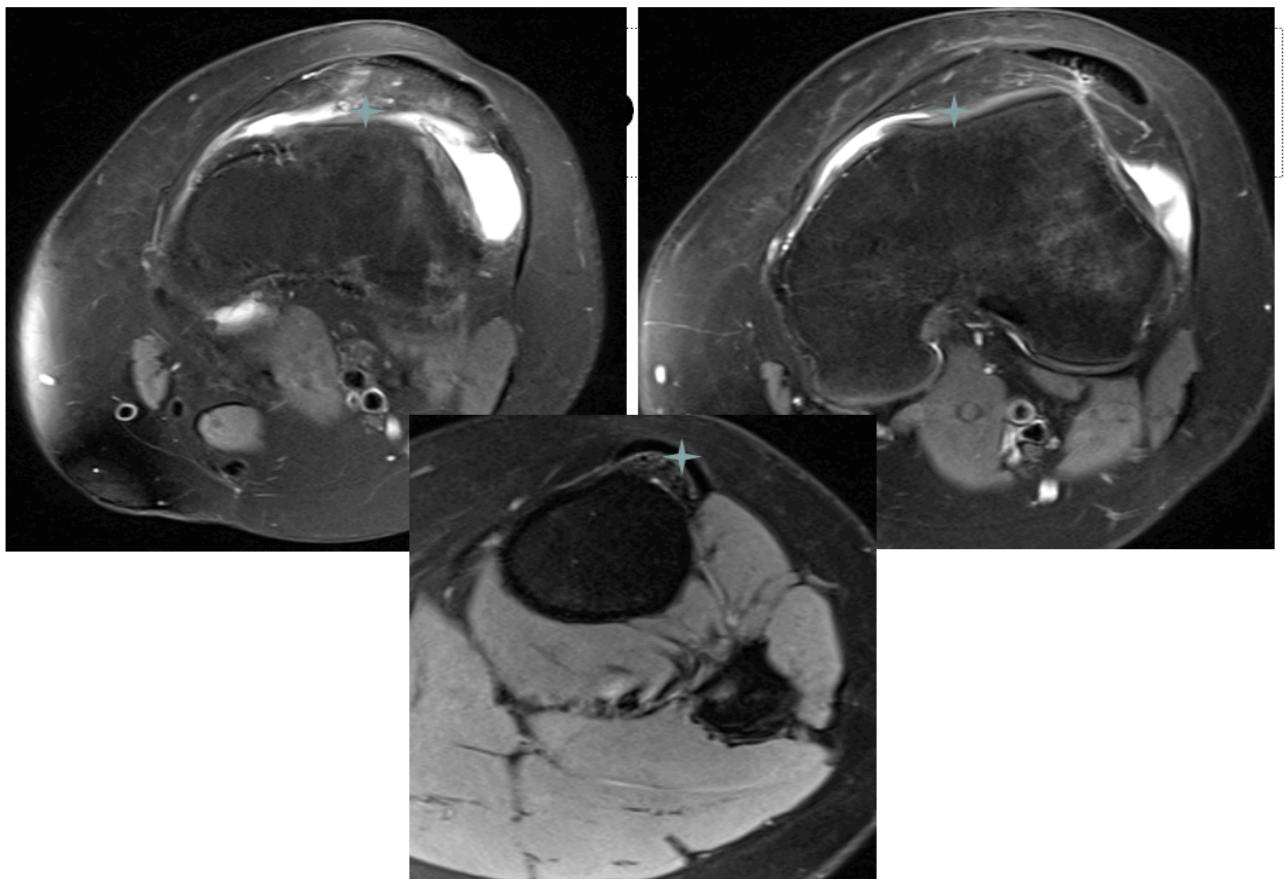
4. Tibial tuberosity lateralisation (TTTG distance)

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.



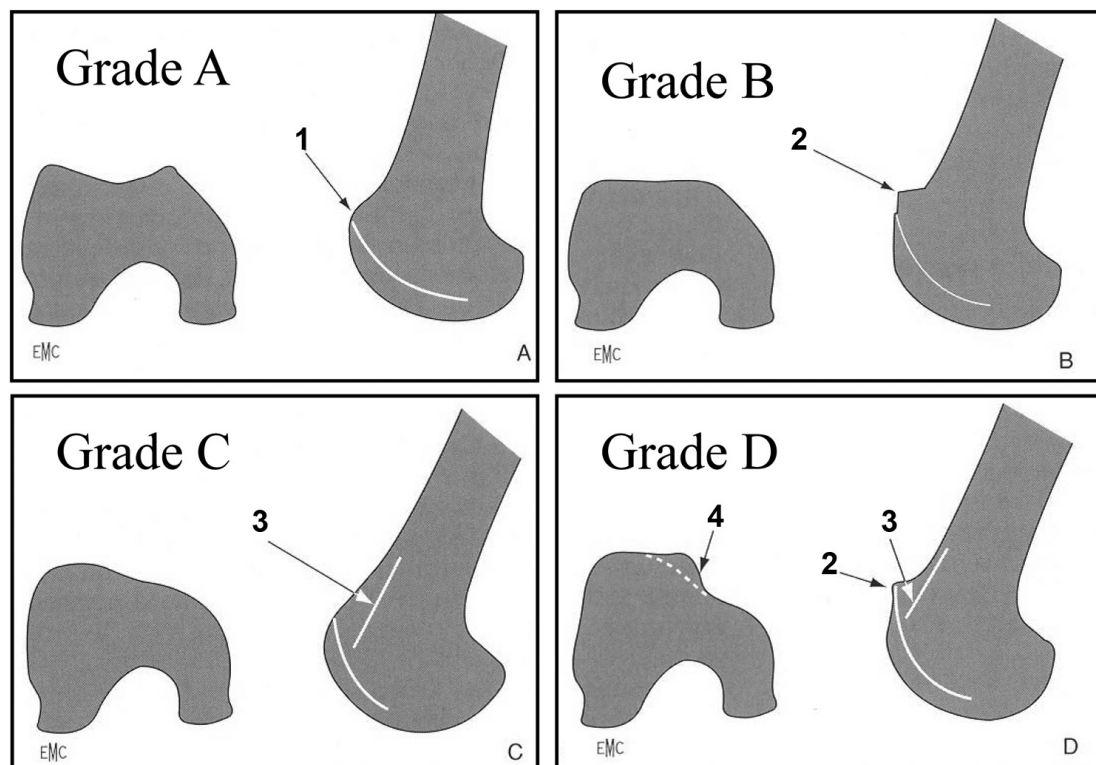
5. Trochlear dysplasia

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 joint

Assess for presence of supratrochlear spur

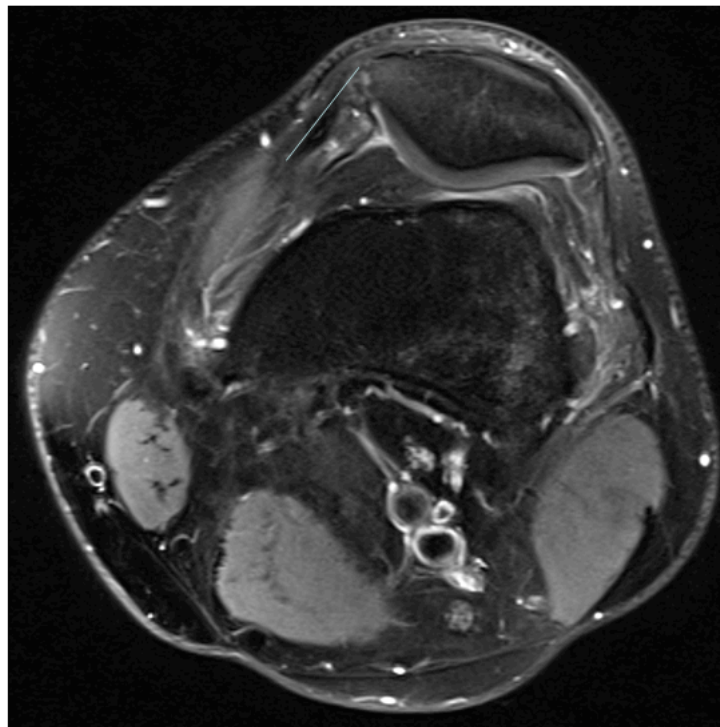


6. Integrity of medial patellofemoral ligament (MPFL)
VMO patellar distance (VMOP)

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.

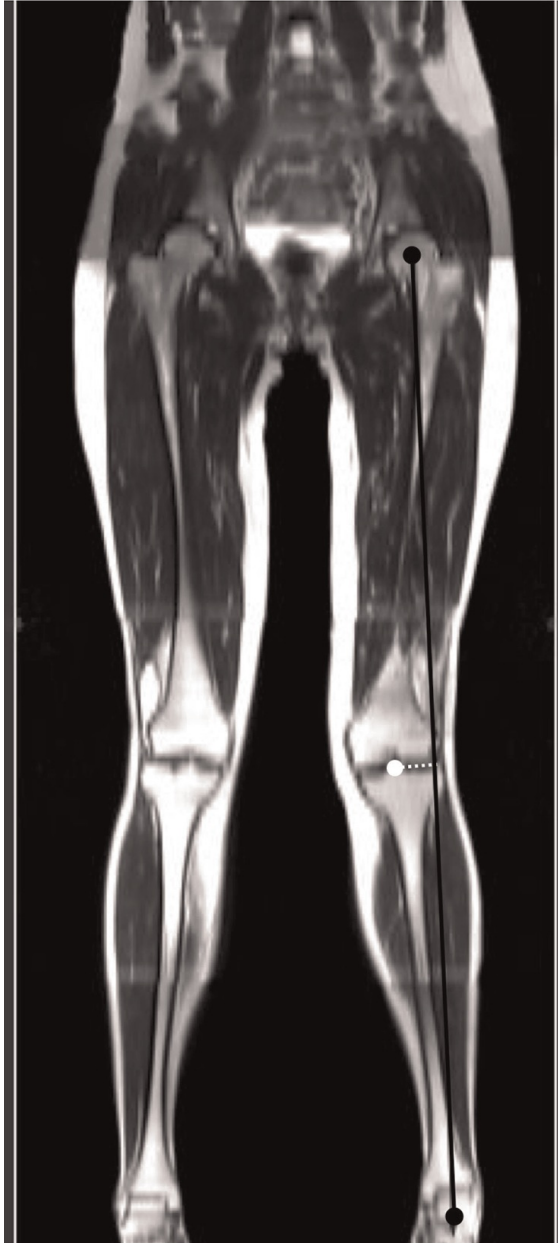
VMO patellar distance



- Shortest distance between the superomedial margin of patella and VMO muscle

CT rotational profile lower limb

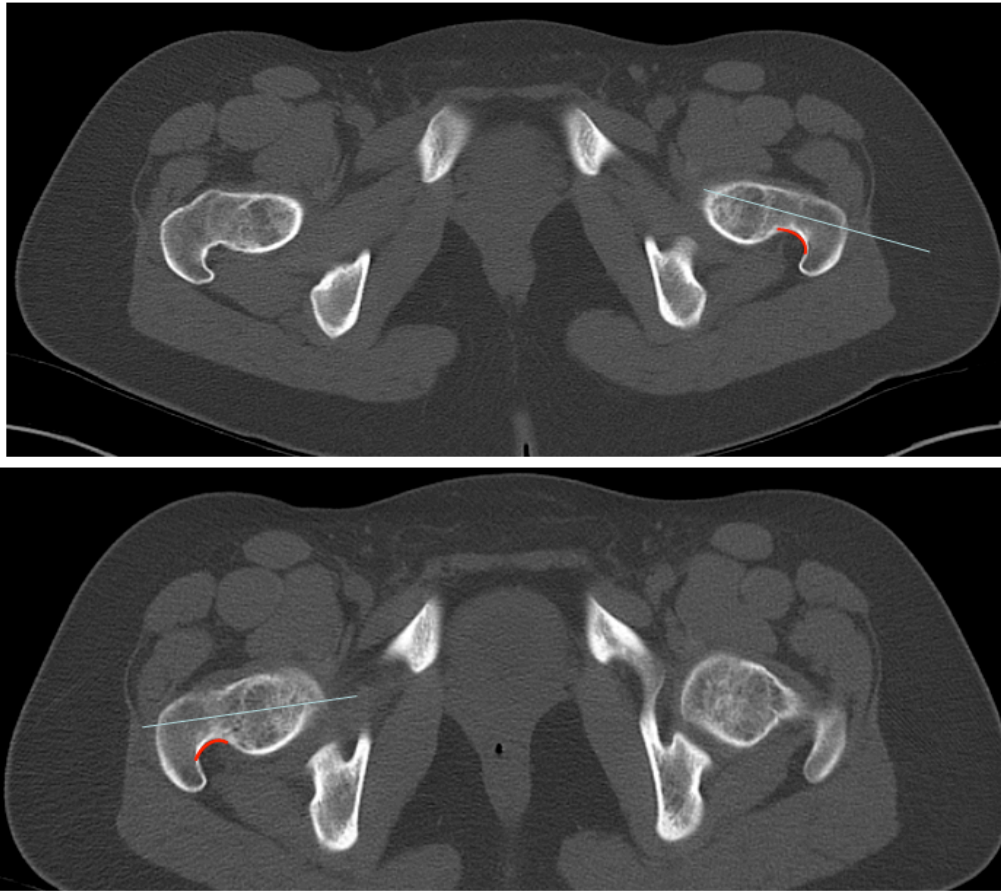
Scanogram



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- Mechanical axis (Mikulicz line) – line joining the centre of femoral head to the centre of talar dome
- Mech axis $> 15\text{mm}$ medial to knee center – genu varum
- Mech axis $> 1\text{mm}$ 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.

