







Clinical Examination of the Knee

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- Propaedeutics rather than semiology → importance of the anamnesis!
- Clinical exam without anamnesis isn't enough: know the **type of knee use and patient expectations**
- Targeted and adequate questioning of the patient

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Patient Questioning

- If chronic pain:
 - Rhythm, night?
 - Location
 - Contributing factors: walking, running, stairs (descent: tibiofemoral, uphill: patellar)
- Spontaneous onset (sudden/insidious) or trauma related
- Daily life/effort
 - Effort: from the beginning, in progress, after?

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Patient Questioning



- Sports: which ones? (meniscus: bike ok, run painful)
- Effusion? Permanent/fluctuating
- Locked knee?
 - extension: patella
 - flexion: meniscus
- Feeling of letting go (patella), instability



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Patient Questioning Traumatic Injury

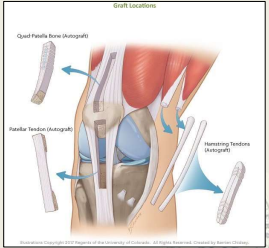
- Injury mechanism
 - Valgus: MCL
 - Torsion of an extended knee with foot fixed: meniscus
 - Torsion of a flexed knee with foot fixed: ACL
 - High energy trauma, knee flexed at 90: PCL
- Audible crack?
- Immediate/delayed effusion
- Sport trauma, private, work accident

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Patient Questioning

- Already carried out treatments and effects (infiltrations)
- Targeting: lifestyle, profession, sports, expectations
- Co-morbidities
- Background on the affected knee




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Clinical Examination

COMPARE! (hyperlaxity in women and teenagers, internal laxity on genu varum in football players)


- Morphotype, rotation disorders, mobility, oedema
- Amyotrophy: check the dynamics: post-traumatic 4ceps dysfunction
- Effusion: analgesic puncture. Allows 4ceps recovery.
- ! Sometimes no effusion in the anterior compartment but presence of a popliteal cyst



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Knee Arthrosis

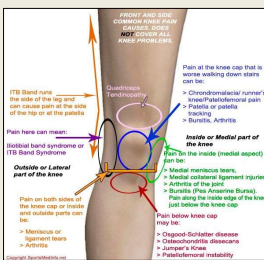
- Anamnesis about functional impotence: walking perimeter, uneven ground, use of a cane, stairs (ramp, step by step, backwards descent)
- Difficulty in getting up from a chair: 4ceps weakness, patella
- Rythm of pain



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Knee Arthrosis Clinical Examination



- Medial, lateral compartment pain (« finger sign) in unicompartmental osteoarthritis)
- Axial deviation (comparative), reductible?



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Knee Arthrosis Clinical Examination

- ROM (flessum):
 - Comparative (recurvatum, pre-existing stiffness)
 - Flexion: active and passive
- Swelling, popliteal cyst
- Robot sign, crackles

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Knee Arthrosis Clinical Examination


- Walk analysis:
 - Limp
 - Decoaptation: compartmental wear or ligament laxity
 - Steppage



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Anterior Knee Pain: Patellar Pathology



- Dislocation history (spontaneous reduction, trauma)
- Pain syndrome:
 - Cracking
 - Pseudo-blocking
 - Dropping of the knee



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Anterior Knee Pain: Patellar Pathology

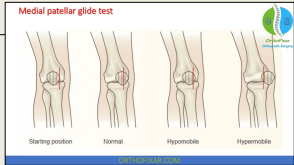
- Clinical exam:
 - Rabot (chondropathy)
 - Smilie (Zohlen: insignificant) = Moving Patellar Apprehension Test:
 - Extension - flexion with lateral force applied on the patella (thumb)
 - Extension - flexion with medial force applied on the patella
 - Positive test: apprehension or 4ceps recruitment on the 1rst part of the test.
 - Lateral ROM of the patella

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Anterior Knee Pain: Patellar Pathology


- Clinical exam:
 - Extensor apparatus alignment
 - Tilt Test: lateral retinaculum
 - Glide test: lat and med retinac
 - Morphotype (valgus, recurvatum, external rotation)
 - Muscular retractions
 - Podoscope



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Meniscus Tears Anamnesis

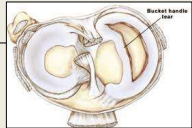
- Injury mechanism: twisting of the knee with fixed foot, raising from a squat position
- Pain during rotation, squatting or rising, prolonged sitting (car)
- Nocturnal pain in lateral decubitus, resting on the injured compartment: dislocated tear under the meniscus



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Meniscus Tears Clinical Examination

- Irreducible flessum = **bucket handle**
→ know how to detect a slight flessum: full extension but recurvatum on the other sign = extension deficit!
- Hydarthrosis only days following trauma - delayed onset
- 4ceps amyotrophy if old lesion




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Meniscus Tears Clinical Examination






Pain during joint line palpation is often the only sign!



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Meniscus Tears Clinical Examination



McMurray Test: one hand holding the heel and the other compressing the medial then lateral compartment, the examiner performs internal and external rotation movements in hyper flexion (posterior segments of the menisci) and in extension (anterior segments) ; external rotation creates medial meniscal pain and internal rotation creates lateral meniscal pain.

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Meniscus Tears Clinical Examination

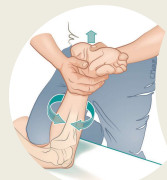

Apley grinding test: prone position, knee flexed at 90°, one hand exerts a compression force on the heel and the other imparts an internal and external rotational movement; external rotation compression causes medial meniscal pain and internal rotation compression causes lateral meniscal pain.

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Meniscus Tears Clinical Examination



The same maneuver **in traction** is painless in case of meniscal tear but painful in case of ligament lesion => differential diagnosis.

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Meniscus Tears Clinical Examination

Cabot maneuver: pain on palpation
→ can be enhanced by internal rotation of the foot in case of a lateral meniscus tear





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Meniscus Tears Clinical Examination

Lateral meniscus jump:

- Audible and visible in case of a discoid meniscus
- Extension - flexion mvt
- Posterior menisco-capsular disinsertion: jump in **flexion**
- Ant and post disinsertion: **double jump**

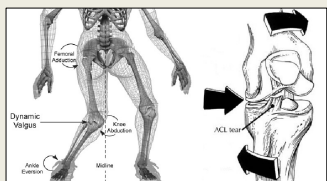



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Ligament Injuries

Again and again: Mechanism of injury

- Torsion of the knee, foot fixed: ACL
- Bad landing after a jump: ACL
- Contact in valgus: MCL
- Etc...

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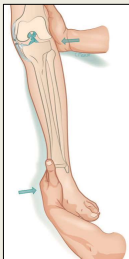
Ligament Injuries Frontal Laxity

Medial side: hand on the medial side of the heel, counter-support of the lateral side of the knee: valgus at 0° and 30° flexion

→ **Fetto & Marshall classification:**

- GRADE 1: no valgus laxity
- GRADE 2: valgus laxity at 30° : isolated sMCL
- GRADE 3: valgus laxity at 0° and 30°: sMCL, dMCL, capsule, POL + frequently ACL

Valgus stress + 30° flexion + foot externally rotated: if anteromedial rotatory instability: **PMC injury.**



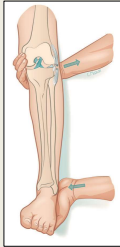
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Ligament Injuries Frontal Laxity

Lateral side: knee in extension, hand on the lateral side of the heel, counter-support of the medial side of the knee (hand under the knee)

- Laxity = LCL lesion
- LCL rupture is always associated with an ACL tear

Laxity in flexion and internal rotation: LCL + **posterolateral corner**





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Central Pivot Anterior Cruciate Ligament

Lachman Test: most pathognomonic


- Supine, **knee flexed to 20-30°** and **slightly externally rotated** to relax the iliotibial band.
- One hand stabilizes the distal femur, the other hand grasps the proximal tibia.
- And anterior force is applied on the tibia in an attempt to **sublux the tibia forward**.

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Central Pivot Anterior Cruciate Ligament

- **Delayed hard stop** = healed ACL tear on PCL, distended ACL graft, PCL
- **Sometimes absent** if associated medial meniscus bucket handle
- If thick body: cushion under the knee and counter-support on the anterior distal femur



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Central Pivot Anterior Cruciate Ligament

Anterior drawer test:

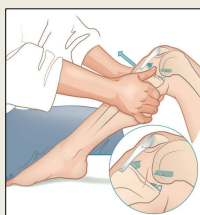

- 90° flexion
- Examiner seated on the foot
- Check if hamstrings are relaxed with both index

→ **ABSENT** in recent tear

= old tear with consequent relaxation of the posteromedial corner

= ACL + post horn of medial meniscus

= ACL + PM corner

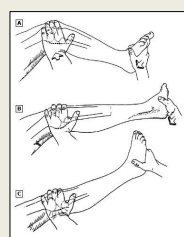
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Central Pivot Anterior Cruciate Ligament

PIVOT SHIFT TEST

MacIntosh:

- supine
- one hand on the antero-lateral face of the knee
- the other hand exerts internal rotation and anterior translation of the tibia + valgus
- flexion - extension: jump btw 20° and 40°




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Central Pivot Anterior Cruciate Ligament

PIVOT SHIFT TEST

Henri Dejour:

- supine
- foot btw elbow and torso
- one hand under the tibia, exerts an anterior translation
- the other hand on the anterolateral femur exerts an antero-post translation
- lower limb is brought in slight abduction by the elbow
- belly acts as a lever to obtain a valgus
- extension - flexion: jump btw 20° and 40°




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Central Pivot Anterior Cruciate Ligament

PIVOT SHIFT TEST

- The shift isn't systematically present!
- Indicates significant instability and damage to the antero-lateral ligament
- Lachman = laxity; Jump = instability
- **Negative in case of posterolateral corner tear**

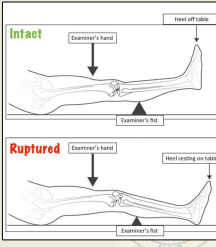


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Central Pivot Anterior Cruciate Ligament

LELLI'S TEST




- Can be performed after **acute injury** without much discomfort
- Patient supine, legs fully extended:
 - One fist under the prox 1/3 of the calf
 - With the other hand, apply a downward force over distal 4ceps
- Positive: anterior tibial translation > damaged ACL: the heel don't rise




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Central Pivot Posterior Cruciate Ligament

Isolated PCL: swallowed ATT, direct posterior drawer in flexion, Lachman with delayed hard stop without shift, reverse pivot shift.
→ swallowed ATT: both knees 90° flexed, asymmetrical profile









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Central Pivot Posterior Cruciate Ligament

Direct posterior drawer:
→ 70-90° flexion
→ sit on the foot
→ posterior translation with both thumbs on the ATT (! reduce the spontaneous posterior drawer at the beginning of the exam)






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Central Pivot Posterior Cruciate Ligament

Reverse Pivot Shift Test:

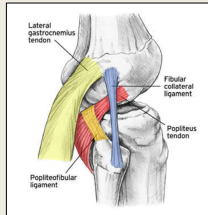
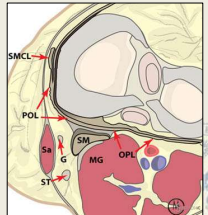
- 70-90° flexion
- one hand at the ankle inducing external rotation of the foot
- the other hand on the lateral side of the knee inducing a posterior drawer and valgus
- flexion - extension: jump btw 40 and 20°
- not easy...





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Corner Injuries

Corner injuries are often **unrecognized** lesions, their lack of care is a **major cause of failure in ACL surgery**, particularly on the lateral side.







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Corner Injuries Posteromedial Corner

- Anterior drawer test in **external rotation** is increased compared to the direct drawer test
→ AD in internal rotation isn't interesting: sometimes signifies an ilio-tibial band distension...
- Posterior drawer in internal rotation identical to the direct posterior drawer (less important in case of isolated lesion of the PCL)






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Corner Injuries Posterolateral Corner

The posterior drawer test in external rotation is increased in comparison to direct posterior drawer

Hughston Test:

- supine
- grasp both hallux and lift
- if PCL + PLC: recurvatum and external rotation of the limb







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Corner Injuries Posterolateral Corner

Dial Test:

- prone
- measure external rotation at 30° and 90° of flexion
- test positive: > 10° difference

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Corner Injuries Posterolateral Corner

Dial Test:

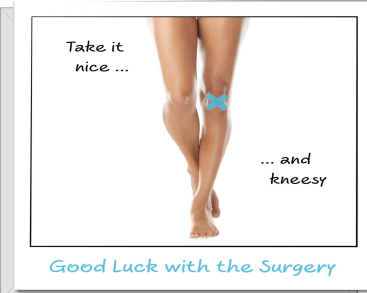
- Isolated PLC injury: 10° difference at 30° flexion only
- PCL instability: > 10° difference only at 90°
- PCL + PLC: > 10° at both 30° and 90°

Not easy to measure...**Magee's method:**

- Tibia rotates more at 30° than at 90°: isolated PLC
- Tibia rotates more at 90°: PCL + PLC



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