Clinical Anatomy of the knee

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Overview

- Knee joint function
- Surface anatomy
- Bones
- Ligaments
- Tendons
- Examination
- Disease processes
The Knee Joint

• Poorly constructed in terms of stability - femur round, tibia flat.

• Comprised of four bones.
  • Femur
  • Tibia
  • Fibula
  • Patella
The knee joint

• Load bearing / Force transmission

• Locomotion

• Proprioception
Surface Anatomy

- Quadriceps
- Patella
- Petellar Tendon
- Lateral Joint Line
- Tibial Tuberosity
- Fibular Side (actual bony prominence not visible)
- Medial Joint Line
- Anterior Tibial Tuberosity
- Tibia
Bones

- Patella: femur = patellofemoral joint
- Femur: tibia = medial and lateral tibiofemoral joints
Knee Arthroscopy Surface Landmarks

[Diagram showing cannula and arthroscope]
Patella

- Medial facet
- Lateral facet
- Articular cartilage
Femur

- Medial femoral condyle
- Lateral femoral condyle (protrudes more)
- Trochlea
- Articular cartilage
Femoral ligament insertions

- PCL inner aspect medial femoral condyle
- ACL inner aspect lateral femoral condyle
Tibia

- Medial and lateral plateau
- Insertions of menisci and cruciate ligaments
- MCL/semimembranosus
Tibial plateau

- Insertions of menisci/
- Cruciate ligaments
Ligaments

- Extracapsular: MCL/LCL
- Intracapsular: ACL/PCL

Functions:
- Stabilise
- Proprioception
ACL

- Two bundles
- Prevents anterior drawer and pivot
ACL Injury

ACL injuries occur when bones of the leg twist in opposite directions under full body weight.
MRI

Normal ACL in RED

Torn ACL
Tests for ACL

Lachman’s

Anterior Draw
Arthroscopy

Intact ACL

Torn ACL
ACL Reconstruction
PCL

- Stronger than ACL
- Prevents posterior drawer
PCL injury

- Direct Blow onto Tibia on a flexed knee
Posterior Sag from PCL rupture
MCL

- Medial
- Prevents valgus stress
- Deep and superficial parts
- Heals well
LCL

- Lateral
- Prevents varus stress
- Cord like – weakest of the ligaments but rarely torn in isolation
Multiple Injuries
Extensor mechanism

- Quadriceps
- Patella
- Patellar tendon
Quadriceps

- VMO
- Rectus femoris
- Vastus intermedius
- Vastus lateralis
- Extend knee
VMO

- Medial most quad
- Helps prevent lateral dislocation of the patella
Extensor Mechanism injuries I
Extensor Tendon Injuries III
Hamstrings

- Biceps laterally
- Semitendinosus/semimembranosus medially
- Flex knee
Pes

- Sartorius
- Gracilis
- Semitendinosus
- G and T used for ACL reconstruction
Movements of the Knee

**The principal muscles acting on the knee:**

- **Extensors** - quadriceps femoris
- **Flexors** - hamstrings assisted by gracilis, gastrocnemius and sartorius.
- **Medial rotators** - popliteus.
Movements of the Knee

- The principal knee movements are *flexion* and *extension*, but rotation of the knee is possible when the joint is in flexed position.
Examination

- Look
- Feel
- Move
- Think about structures and what you’re doing to them
Diseases

- OA
- Meniscal tears
- Ligament injuries
- Patellofemoral tracking
- Tendon injuries
- Inflammatory arthritis
- Infection/tumours
Arthritic Knee X-ray
Knee Arthritis
Knee OA on arthroscopy
Total Knee Replacement
Patellofemoral Knee Replacement

PFA Implant
Unicondylar Knee Replacement
Meniscal Tears

condyle

menisous
tibial plateau

Torn flap
Treatment of Meniscal Tears

Suture/ Repair

Debridement

[Images showing a meniscus with sutures and a before and after debridement view.]
Other Pathologies

Patella Maltracking

Bone Tumour
Any Questions ?