THE UNSTABLE KNEE

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WHAT IS INSTABILITY?

- True giving way from loss of a constraining structure (ligament)
- Giving way from pain or mechanical reason
LIGAMENTS

- Anterior cruciate ligament
- Posterior cruciate ligament
- Lateral collateral ligament
- Medial collateral ligament
- Lateral meniscus
- Medial meniscus
DIAGNOSIS

- History
- Examination
- Tests-XRay, MRI
- Surgery
TESTS

- Anterior drawer test
- Lachman’s test
- Pivot shift
- Posterior drawer
- Posterior sag
- External recurvatum
- Reverse pivot shift
GRADES OF INJURY

Grade 1-<0.5mm    Grade 2-0.5-1mm    Grade 3->1cm

FIGURE 29.4 Sprains have been characterized on the basis of ligament injury. (A) First-degree, (B) second-degree, and (C) third-degree sprains. (From Scott WN: Ligament and Extensor Mechanism Injuries of the Knee: Diagnosis and Treatment. St. Louis, Mosby-Year Book, 1991.)
ACL INJURIES

- 1/3000
- 70% sports related
- Twisting injury
- Immediate swelling
- Can’t keep playing
- Feel and hear pop
- Know something is wrong
TESTS

- Xray to exclude bony injury
- MRI - don’t take as gospel
- Also useful to exclude associated pathology
- Almost always come with one
LACHMANS
PIVOT SHIFT
TO OPERATE OR NOT

- Age
- Degree of instability
- Activity level - sport, work
- Related injuries - meniscus, other ligaments
TIMING OF SURGERY-when to refer

- Early/late
- No harm in allowing the knee to settle down a bit
- If in doubt have them gently test it out
DOES RECONSTRUCTION DECREASE RISK OF ARTHRITIS?

- Not conclusive
- Increase chondral and meniscal damage in ACL deficient knees
- Common sense tends to assume making more stable decreases chance of further damage
GRAFT CHOICES

- Autograft - hamstrings more popular in Australia
- Allograft - more popular in US
- Synthetic - more popular in France
FAILURE

- Poorly defined
- Reported rates 5-50%
- Loss of stability reported 5-10%
- Loss of stability > 5mm displacement or clinical giving way
FAILURE OF RECONSTRUCTION

INSTABILITY

- Failure of graft
- Incorrect tension
- Aggressive rehabilitation
- Other structures injured
- Associated ligamentous laxity
FAILURE OF RECONSTRUCTION

STIFFNESS

- Early surgery
- Surgical technique-tunnel placement, graft impingement, overtensioning
- Meniscal tear
- Fibrosis-synovitis, infection
FAILURE OF RECONSTRUCTION

PAIN

- Meniscal tears, cartilage lesions
- Donor site pathology
- Nerve lesions
- Arthritis
- Synovitis
- Infection
QUESTIONS FOR REVISION
Surgery

- Why did the original surgery fail
- What can be done differently
- Obstacles in the way of surgery
- What is needed to do the surgery—fixation, bone grafts, graft tissue
ACL WITH MENISCAL INJURIES

- Healing combined with ACL reconstruction: 90% vs 70%
- Stable lateral meniscal tears leave alone
- Better to operate earlier
ACL WITH VARUS KNEE

- Varus knee due to medial compartment OA or lateral ligament instability
- Can do combined HTO and ACL
POSTERIOR CRUCIATE

- Prevents posterior displacement of tibia
- Twice as strong as ACL
- History of a posterior blow to the tibia
- Not often symptomatically unstable
- Long term increase wear of medial and anterior compartments
MRI

- Not very accurate approx 70%
EXAMINATION

- Posterior drawer
- Sag- look from side and compare to other knee
- Check posterolateral corner
INDICATIONS FOR SURGERY

- >10mm movement
- Competitive sports
- Articular surface damage particularly patellofemoral and medial compartment
- Medial meniscus loss
- Heavy people who are more likely to stretch secondary restraints
- Varus alignment
- Younger
MEDIAL COLLATERAL LIGAMENT

- Deep component attached to medial meniscus
- Superficial component
- Prevents valgus
- Also prevents external rotation
MEDIAL LIGAMENT INJURIES

- Valgus force
- Always compare to other side
- Palpate point of pain
- > 5mm is abnormal
- Feel for endpoint
TREATMENT

- Isolated partial tears do well
- RICE
- Splint
- Progressive weight bearing
- Early exercises
- Sport 3-4 weeks
- Ongoing pain think meniscus
GRADE 3 MCL

- RICE
- Flexion brace lock straight or 30 degrees for 2 weeks
- 30-90 flexion up to 4 weeks and then unlimited up to 6 weeks
- Quads exercises
- WBAT
- Rare to have medial meniscus tear
MCL SX
LATERAL LIGAMENT COMPLEX OR POSTEROLATERAL CORNER

- Lateral ligament
- Popliteus
- Popliteofibular ligament
- Arcuate complex
- Oblique popliteal ligament
- Isolated lateral ligament injuries rare
- Isolated posterolateral injuries rare
- Often associated with ACL or PCL injury
- Important to recognise as can lead to failure of ACL reconstruction
DIAGNOSIS

- Excessive extension, varus, external tibial rotation
- Test at 30 and 90 degrees of flexion to determine if PCL involved
- External recurvatum test
- Reverse pivot shift test
REVERSE PIVOT SHIFT
TREATMENT

- Acute injuries should be repaired primarily + augmentations (refer early)
- Chronic - can sometimes tighten anatomical structures but usually require augmentation
- If have a varus mechanical alignment then need to do a valgus osteotomy or reconstruction will fail
ARTICULAR CARTILAGE AND MENISCUS

- Both can cause pseudo instability
- Pain or a mechanical catching
CARTILAGE INJURIES-
OUTERBRIDGE CLASSIFICATION

1- softening of cartilage
2- fibrillation superficial
3- fibrillation down to subchondral bone
4- exposed bone
HISTORY

- Usually twisting injury
- Older patients often no trauma
- Swelling several hours later or next day
- Pain
- Clicking
- Locking
- Giving way
MENISCUS

- Similar history to cartilage
- True locking usually meniscus
EXAMINATION

- Effusion in 50%
- Joint line tenderness
- Pain with flexion
MENISCAL REPAIR

- Lateral better than medial
- Early better than later
- With ACLR improves healing rate
- Younger patients do better
- Postop limit WB in flexion
PATELLA INSTABILITY

- Unstable non traumatic - female, young, always predisposing factors
- True dislocation-traumatic often predisposing factors
Patella constraints
INSTABILITY-Multifactorial

- Valgus malalignment
- Ligamentous laxity
- Deficient medial structures (MPFL rupture / medial retinaculum laxity / VMO atrophy)
- Tight lateral retinaculum
- Trochlea dysplasia
- Patella alta
- Abnormal rotational profile (femoral anteversion / external tibial torsion)
HISTORY

- Clicking
- Feels unstable
- Dislocation-2 clicks, knee dislocated, required reduction in hospital
EXAMINATION

- Alignment, tenderness, position, crepitus
- Q angle
- J-sign
  - lateral subluxation of patella as knee approaches full extension
Skyline View
  - Assess for
    - lateral tilt
    - subluxation
    - trochlea dysplasia

Lateralisation of tibial tuberosity

Tibial tubercle – trochlear groove distance
  - distance between anterior tibial tuberosity and the deepest point of the trochlear groove.
CT

- Compare both sides
- 0,15,30 degrees
- Quads relaxed, contracted
MRI

- Articular Cartilage Damage
- MPFL integrity
- Loose Bodies
- Bone bruising
RECURRENT INSTABILITY

- Surgical Options
  - Lateral release
  - Tibia tubercle osteotomy
  - MPFL reconstruction
  - Lateral Trochlea Elevation
THANKYOU