

The Knee

Orthopedics and Neurology
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The Knee

Internal derangement of the knee (IDK)

- This a common provisional diagnosis for any patient with mechanical symptoms of the knee. (Evans)
- IDK might also stand for “I don’t know”
- An appropriate diagnose enhances the patient’s opportunity to heal with less disability and improved function

The Knee

- Consists of two joints
 1. Patellofemoral
 2. Tibiofemoral

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Anatomy of the anteromedial aspect

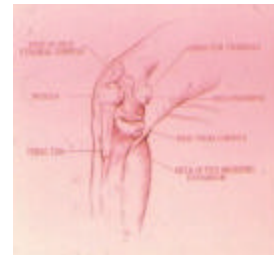


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- Knee pain may rise from:
 1. Joint
 2. Periarticular tissues
 3. Hip
 4. Femur

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Anatomy of the anterolateral aspect



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- Pain is the most common presenting symptom of knee pathology and the causes tend to be related to age, according to Evans.

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Knee stability depends on the following four ligaments

1. Tibial collateral
2. Fibular collateral
3. Anterior cruciates
4. Posterior cruciates

The Knee

- Lacks stability
- Not a hinge joint
- Minor derangements in knee cause “traumatic arthritis” better known as degenerative joint disease or DJD
- Menisci provide very little stability

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Stability is provided by soft tissues

- Ligaments
- Capsule
- Muscles

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Parts of knee that might be injured

- Ligaments
- Muscle tendons
- Capsule
- Meniscus
- Cartilage
- Bone
- Bursae
- Any combination of these

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Articulations

- Femur
- Patella
- Tibia
- Not the fibula

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Motions

- Flexion (130-150 degrees)
- Extension (0 degrees)
- Rotation (Internal/External) with flexion but not extension (10 degrees)

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Thigh muscles that attach to medial side of tibia near the pes anserine

- Gracilis (obturator n)
- Sartorius (femoral n)
- Semitendinosus (tibial n)

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Thigh muscles that attach to medial side of tibia near the pes anserine



The Knee

Thigh muscles that attach to medial side of tibia near the pes anserine



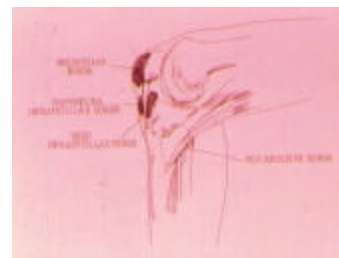
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Palpation of tibial tubercle and pes anserine insertion and bursa



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Clinically significant bursae



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Sciatic nerve innervates

- Hip joint
- Biceps femoris
- Semitendinosus
- Semimembranosus
- Ischial head of the adductor magnus

Normal Knee Joint

Femoral nerve neuropathy

- Quadriceps weakness and atrophy
- Loss of patellar reflex
- Sensory changes over anterior thigh and medial aspect of lower leg
- Neurological examination should include mensuration of quadriceps (4 inches or 10cm superior to the knee Evans and 3 inches Hoppenfeld)

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Mensuration of quadriceps for atrophy



Knee Joint Disease

- May present weakness and atrophy of the quadriceps

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Clinically significant bursae

- Prepatellar
- Superficial infrapatellar
- Deep infrapatellar
- Pes anserine or anseurine

http://orthoinfo.aaos.org/fact/thr_report.cfm?thread_id=205&topcategory=Knee

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Osgood-Schlatter's Syndrome

- Knee pain with young athletes
- Tenderness at insertion of infrapatellar tendon into the tibial tubercle
- Avulsion of tibial tubercle
- Infrapatellar tendon loses rigidity and a palpable defect is palpable

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Osgood-Schlatter's Syndrome



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Abduction Stress Test

Also known as Valgus Stress Test

- Assessment for medial collateral ligament injury
- Medial meniscus may also be injured with MCL injury
- Valgus stress to the extended knee
- Positive test with pain above, below, or at medial joint line

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Adduction Stress Test



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Adduction Stress Test

Also known as the Varus Stress Test

- Assessment for lateral collateral ligament
- Mechanism of injury = varus force with flexed knee
- Usually ruptures at fibular insertion or it may avulse at fibular styloid
- Possible peroneal palsy

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Adduction Stress Test

- Usually torn in conjunction with posterolateral ligament complex
 1. Lateral capsule
 2. Arcuate ligament
 3. Popliteus tendon

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Adduction Stress Test



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Apley's Compression Test
Also known as Apley's Distraction Test and Apley's Grinding Test

- Assessment for collateral ligament injury and meniscus tears
- Medial meniscus is injured more often than the lateral
- Apley's and McMurray tests are most commonly used to diagnose meniscal tears

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Apley's Compression Test



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Apley's Distraction Test



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Childress Duck Waddle Test

- Assessment for medial and lateral meniscus tears
- Most common type of meniscal tear is the "bucket-handle" along the longitudinal axis
- The second most common is a tear along its transverse axis.

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Palpation of the medial meniscus anterior portion and the coronary ligaments



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Internal rotation enhances palpation of medial meniscus



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Palpation of the lateral meniscus and its coronary ligaments



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Childress Duck Waddle Test

- Test with patient standing with feet apart.
- Internally & externally rotate and squat.
- Positive test = pain, inability to fully flex the knee, or a clicking sound on either posterior side of the joint
- Internal test = medial meniscus tear
- External test = lateral meniscus tear

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Drawer Test

- Assessment for injury to some degree of:
 1. Anterior cruciate ligament
 2. Posterolateral capsule
 3. Posteromedial capsule
 4. Medial collateral ligament
 5. Iliotibial band
 6. Arcuate-Popliteus complex
 7. Posterior cruciate ligament

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Position for eliciting the anterior drawer sign



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A positive anterior drawer test = tear of anterior cruciate ligament



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A positive posterior drawer test = tear of posterior cruciate ligament



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Lateral Pivot Shift Maneuver
Also known as Test of McIntosh

- Assessment for injury to some degree of:
 1. Anterior Cruciate Ligament
 2. Posterior capsule
 3. Arcuate-popliteus complex
 4. Lateral collateral ligament
 5. Iliotibial band

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Lateral Pivot Shift Maneuver
Also known as Test of McIntosh

- Test includes:
 1. The pivot shift test begins with knee in extension
 2. The jerk test begins with knee in flexion
 3. The Losee test begins with the knee in flexion(See page 789)

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McMurray Sign

- Assessment for medial or lateral meniscus injury
- Injuries to menisci are most common with males younger than 45
- Caused by a twisting force with knee flexed or semi-flexed

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McMurray Sign

- Sign is present if at some point in the arc, a painful click or snap is heard
- The arc includes both external and internal rotation with flexion and then extension of the hip and knee
- Internal rotation = lateral meniscus
- External rotation = medial meniscus

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McMurray Test



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McMurray Test



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McMurray Test



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McMurray Test



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Noble Compression Test

- Assessment for iliotibial band friction syndrome
- Test with patient supine
- Flex hip and knee to 90 degrees
- Thumb pressure to lateral femoral condyle
- If extension of knee with pressure over condyle produces pain near 30 degrees it is a positive test

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Clarke's Sign

- Assessment for chondromalacia patellae
1. Post traumatic fracture
 2. Tracking disorders with patellofemoral arthralgia
 3. Primary malacia is usually bilateral with unknown etiology

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Clarke's Sign

- Knee fully extended
- Compress quadriceps at superior pole of patella
- Patient gently contracts quadriceps
- Sign is present when patient experiences pain and is unable to continue
- Severity may be differentiated by amount of pain and presence or absence of crepitation

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Fouchet's Sign

- Assessment for patellar tracking disorder, peripatellar syndrome, or patellofemoral dysfunction.
- Procedure involves compression of patella against femur
- Sign is present with point tenderness and pain at the patellar margin
- Transverse rub = audible or palpable grating and pain confirm presence of sign

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Patellar femoral grinding test



The Foot

Helbing's Sign

- Assessment for Pes Planus or flat foot
- Sign is present when there is medial curving of Achilles tendon, as viewed from the posterior aspect.
- Helbing's sign indicates foot pronation

Pes Planus

Talar head displaces medially and plantarward



Pes Planus

1. Medial prominence of head of talus
2. Callosity of over head of talus



Helbing's Sign Present

Os Calcis in valgus and in pes planus



The Foot

Strunsky's Sign

- Assessment for metatarsalgia
- Sign is present when passive flexion of toes produces pain with patient supine and lower extremity extended.
- Pain is located in the anterior arch of the foot.

Palpation of the Metatarsals



Palpation of Metatarsals

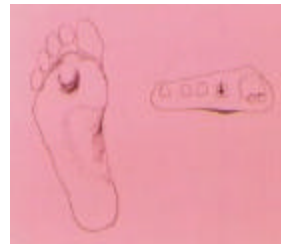


Transverse Arch of Foot

Located immediately behind the metatarsal heads



1. Metatarsal Head Callosities
2. Dropped second metatarsal head with associated plantar callus formation



Claw Toes

Frequently accompany metatarsalgia

