The Knee Joint

• **Hinge joint?**
• **Double-condyloid joint**
  – Flexion and Extension
  – Internal and External Rotation
• The locking of the knee into full extension is often referred to as the “screw home” movement
  – Tibia externally rotates 10 degrees
  – Biceps femoris
• **Initial flexion of the knee, the knee “unlocks”**
  – Tibia internally rotates
  – Popliteus, semitendinosus, semimembranosus
Two-Joint Muscles

- **Uniarticular**
  - A muscle that crosses one joint

- **Biarticular**
  - A muscle that crosses two joints
Two-Joint Muscles

- Two-joint muscles are most effective when either the origin or insertion is stabilized.
- Explain the benefit of leaning backwards while kicking a ball.
Quadriceps Exercises

Squats
Quadriceps Exercises

Leg Extension

Leg Press
Quadriceps Exercises

Plyometric or Jump Training

Uphill Running
Hamstring Exercises
Hamstring Exercises

Note: Knee Flexion exercises emphasis the hamstring muscles while Hip Extension exercises emphasis the gluteus maximus.
Acute Knee Injuries
ACL Injuries

- Cutting with rotation
- Hyperextension
Patellar Tendonitis

What is it?
Patellar Tendonitis

- Due to high deceleration or eccentric forces of the quadriceps at the knee during landing
- As you land the hamstrings cause your knee to flex to absorb the shock of impact
- In order to control or decelerate the flexion produced by the hamstrings, the quadriceps muscles contract eccentricly
- Eccentric contractions occur as the muscle is being lengthened or stretch
- Eccentric contractions produces high amounts of force, and therefore stress to the patellar tendon
Chondromalacia

Breakdown or softening of the articular cartilage of the patella
Chondromalacia

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stronger weaker
Osgood-Schlatter’s Disease

- Overuse, not a disease.
- Inflammation to the patellar tendon at the *tibial tuberoscity*
Osgood-Schlatter’s Disease

- Avulsion fracture
IT Band Syndrome

- Overuse
- Tight hip abductors and/or IT band
IT Band Syndrome

- Strengthening and stretching

**Iliotibial Band Stretch**
This exercise helps prevent IT band syndrome.
1. Position yourself as shown, with your right hand and forearm on the wall while keeping your arm straight.
2. Move your right leg back and so that it crosses behind the left leg.
3. Slowly lean into the wall and feel the stretch in your right iliotibial band and your calves. Hold for 30 seconds.
4. Switch to other side and repeat.

Strengthening