

# The Knee Joint



# 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

- **Uniarticulate**
  - A muscle that crosses one joint
- **Biarticulate**
  - 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



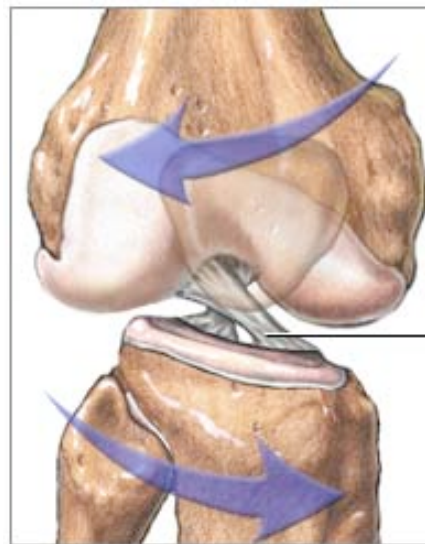
Note: Knee Flexion exercises emphasis the hamstring muscles while Hip Extension exercises emphasis the gluteus maximus

# Acute Knee Injuries



# ACL Injuries

- Cutting with rotation
- Hyperextension



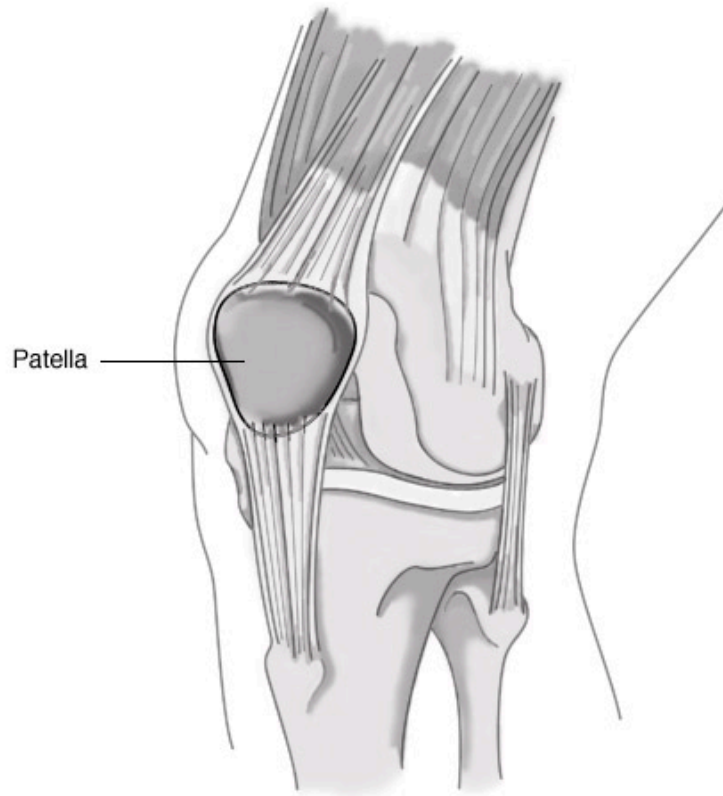
ACL

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



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# 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

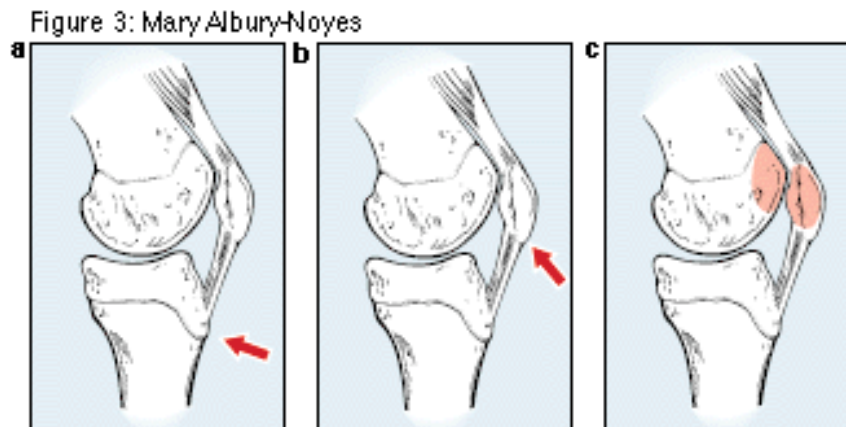
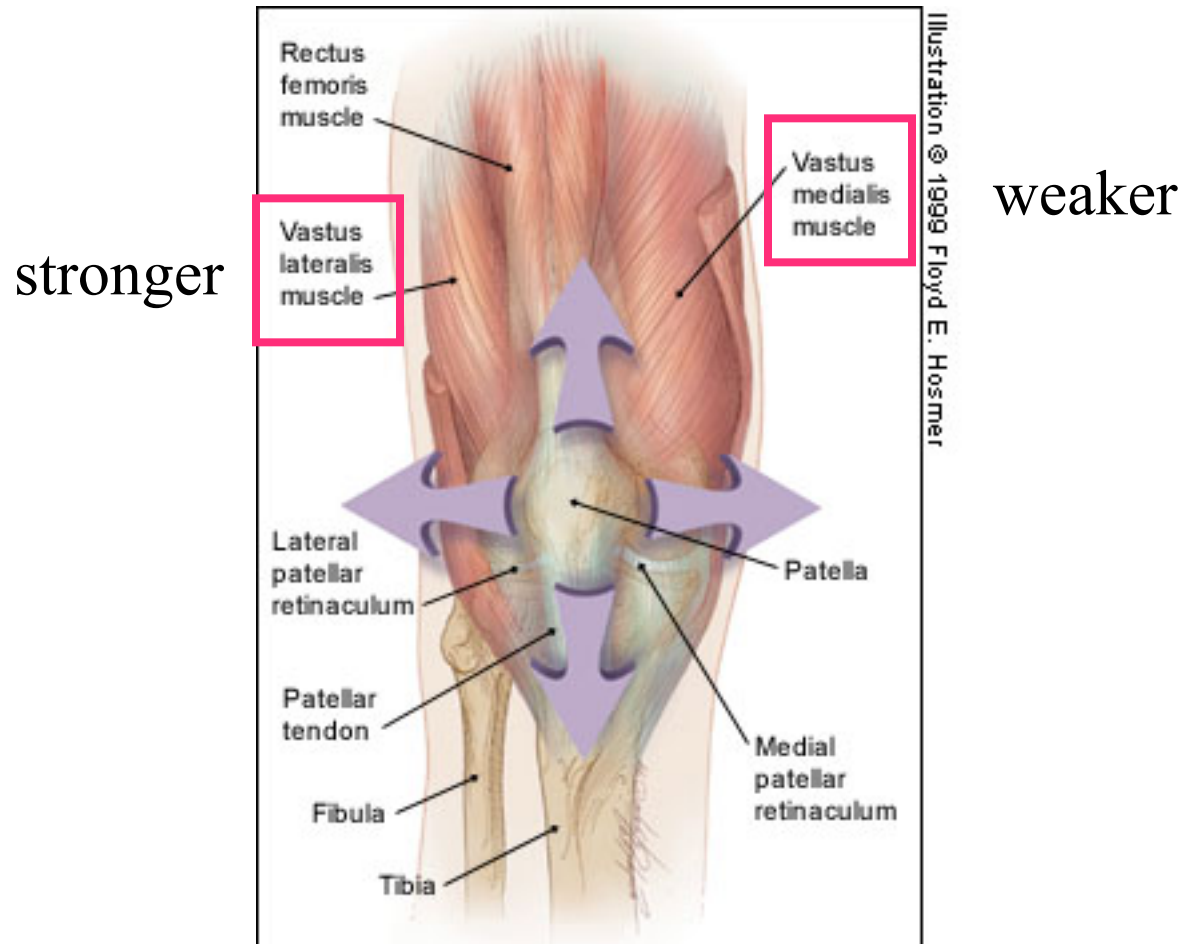


Figure 3. Chronic anterior knee pain in adolescents may be a result of OSD or other conditions. OSD is a disturbance at the junction of the patellar tendon and the tibial tubercle apophysis (a, arrow). Sinding-Larsen-Johansson disease involves pain, swelling, and tenderness of the inferior patellar pole at the origin of the patellar tendon (b, arrow). Patients who have patellofemoral syndrome (c, shaded areas) have poorly localized peripatellar pain.

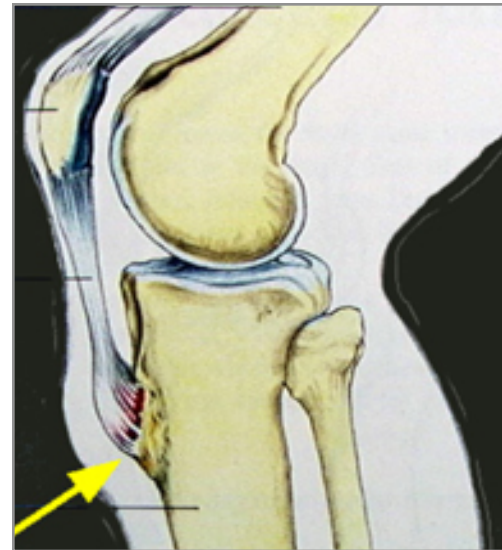
# Chondromalacia





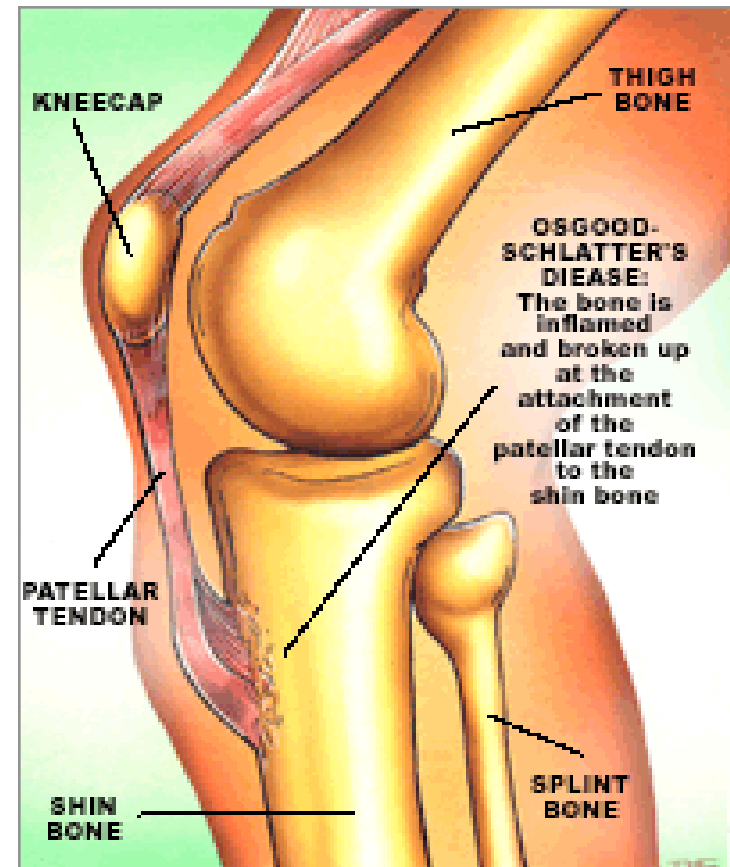
# Osgood-Schlatter's Disease

- Overuse, not a disease.
- Inflammation to the patellar tendon at the *tibial tuberosity*



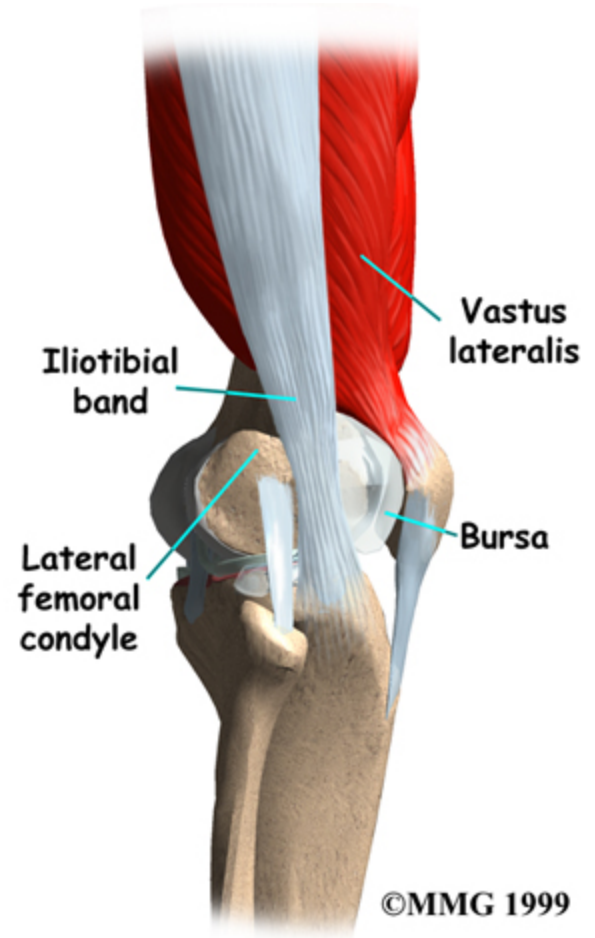
# Osgood-Schlatter's Disease

- Avulsion fracture



# IT Band Syndrome

- Overuse
- Tight hip abductors and/or IT band



# IT Band Syndrome

- Strengthening and stretching



Strengthening

## 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 foot 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.



## IT band stretches

