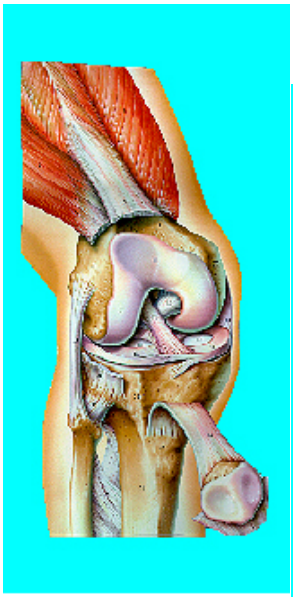
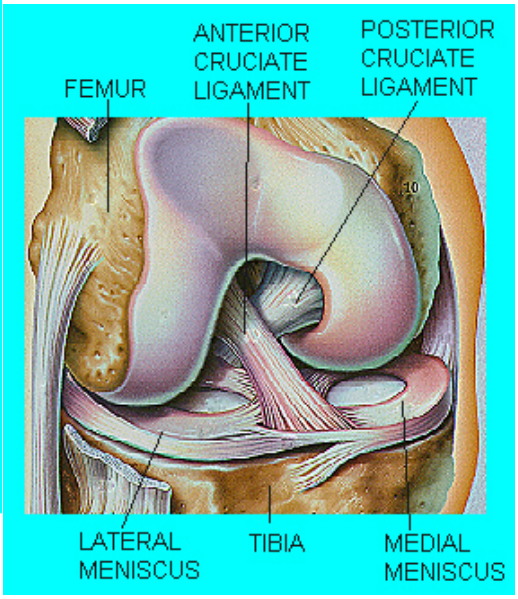
# THE KNEE






•Anterior Cruciate Ligament=ACL
•Posterior Cruciate Ligament=PCL
•ACL and PCL cross and are the primary stabilizers of the knee
•They maintain the rotary stability of the knee while also preventing the lower leg (tibia) from moving either too far forward or backward on the upper portion (femur) of the leg at the knee.
•The PCL is the larger of the two
•The ACL is torn more often

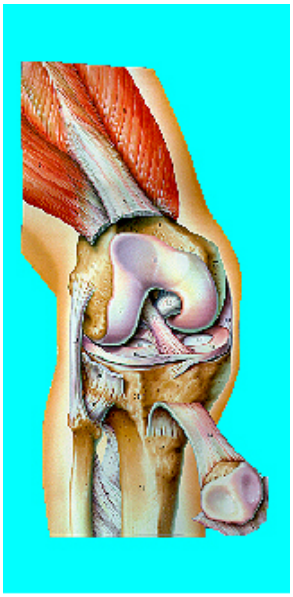
# ACL INJURIES

•An ACL tear is one of the most serious injuries in sport
•Women tend to suffer more knee injuries than men and the injuries are usually more serious*
•A non-contact ACL tear occurs without impact with another person or object and always involves a rapid deceleration of the knee joint (landing from a jump, leg plant in a cutting movement)
•The ACL is most vulnerable when the knee is pointing inwards, the foot is pointing outwards, and the torso is falling forwards
•ACL injuries are accompanied by a “pop”, significant swelling, and instability of the knee
•Ice the knee to reduce pain and swelling, exercises and physical therapy can help to regain range of motion, consider surgery for reconstruction
•PREVENTION, PREVENTION, PREVENTION (see back side!)

## *WHY??!?!

•Wider pelvis leads to greater internal rotation forces of the knee joint
•Less muscular development
•Greater knee flexibility, which decreases joint stability
•Increased foot pronation placing internal rotation on knee

References:
Knee Joint – Anatomy & Function - http://www.arthroscopy.com/sp05001.htm
Physical Therapy Corner: Knee Injuries and the Female Athlete - http://www.nismat.org/ptcor/female_knee/
http://www.jointhealing.com/pages/knee/acl1.html
Performance Coaching – http://www.pponline.co.uk/encyc/0150.htm
http://www.ultimatehandbook.com/Webpages/Health/injprev.html



# PREVENTING KNEE INJURIES

***Injury Prevention Tips***

•Avoid training when you are tired
•Increase your consumption of carbohydrate during periods of heavy training
•Increase in training should be matched with increase in strengthening and resting
•If you experience pain when training STOP your training session immediately
•Never train hard if you are stiff from the previous effort
•Introduce new activities very gradually
•Allow lots of time for warming up and cooling off

***Strengthening and Stabilizing the Knee***

•Avoid an imbalance of strength and power between hamstring and quadriceps
•The hip joint should take the majority of the stress of deceleration (use hamstrings and gluteals!*)

***EXERCISES**

1) **THE SQUAT: back straight, bend at the hips, knees stay above toes**
2) **LATERAL LUNGES: step to 1 side and squat down to floor, drop your hip down and back, let trailing leg relax and lag behind, back straight, knees behind toes, hold for 1 second**
3) **LATERAL BOUNDING: same as lateral lunge, but at real-time speed. Hop from one foot to the other quickly, make sure knees are above toes, bend at hips, back straight, land softly and quietly**

•Strengthen core muscles to increase stability and control knee internal rotation (quadriceps, hamstrings, hip abductors, gluteus medius, external hip rotators, lower abdominals and obliques)
•Strong ankle and calf muscles control knee joint decelerations and provide stability
•Use good technique in landing and cutting*
•Use proper footwear*

***LANDING: upright torso position, increased knee flexion on impact, continuing movement after landing helps decrease deceleration forces.**
**CUTTING: lowered center of gravity, increased knee flexion**
**FOOTWEAR: stable shoes that control excess pronation, suitable grip for the surface (no slipping)**

•Incorporate warm-up and stretching into your workout!*

***WARM-UP: 1) Jog in a straight line; 2) Shuttle run (side to side) to engage hip muscles – sidestep pushing off with back leg; 3) Backward running to engage hamstrings and hip muscles – land on your toes and keep knees slightly bent**
**STRETCHING: (Stretch after a short warm-up) 1) Calf – stand with one leg forward, bend forward at the waste keeping back leg straight; 2) Hamstring – sit on the ground with right leg extended in front of you, bend left knee and rest bottom of foot on your right inner thigh, with a straight back try to bring chest to knee; 3) Hip Flexor – Lunge forward leading with right leg, drop left knee down to ground, place hands on right thigh and lean forward with your hips**