



# The Knee

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The knee is the largest joint in our body and is a high stress area because it is responsible for connecting 2 long bones. The knee allows us to bend and extend our leg so that we can run, jump, kick and climb. It is not covered up with fat and muscle like many of our other joints, the bone and ligaments are fairly exposed which makes it a common point of injury.

## **Bones:**

The knee is made up of 3 bones.

1. Tibia
2. Femur
3. Patella: acts as a lever for the quadriceps muscle to maximize its function. The patella also helps protect the knee and absorb shock and friction as muscles rub back and forth for activities like walking and running.

## **Muscles:**

1. Quadriceps: 4 strong muscles that run together, Rectus femoris, Vastus Lateralis, Vastus Medialis, Vastus Intermedius. These muscles assist with many actions of the leg but mainly work to extend the knee.
2. Hamstrings: made up of the Semitendinosus, Semimembranosus, and Biceps femoris. They flex the knee and also help extend the hip.

## **Ligaments:**

Lateral Collateral Ligament-Connects bone to bone, runs along the outside of knee

Medial Collateral Ligament-Connects bone to bone, runs along the inside of the knee

2 ligaments are found inside the knee joint, forming almost an "X" to help stabilize the knee from sliding back and forth, the Anterior Cruciate Ligament-ACL and Posterior Cruciate Ligament-PCL.



## ***Common Pediatric Knee Conditions:***

**Osgood Schlatters Disease:** Repetitive stress or a significant bump to the growth plate just below the knee causing irritation, swelling and pain. Typically seen in growing adolescents that are involved in repetitive powerful movements just as jumping/running/sports.

**Patella Femoral Syndrome:** This typically happens with repetitive flexion of the knee as with running or sports, and an imbalance of the quadricep muscles which causes the patella to be moved/pulled out of its typically alignment causing stress, swelling and pain along the patella.

**Osteochondritis Dissecans (OCD):** A break or pulling away of bone and/or cartilage typically at the end of a bone (often the femur) due to poor blood supply, possibly from repetitive stresses/traumas at the area. Causes pain, swelling, difficulty moving the joint.

**Ligament Sprains:** Sprains (a tear to the ligament) to the knee can often happen in the sports world. A hit from the outside of the knee can result in a sprain to the LCL, a hit or fall on the inside of the knee can damage MCL.

- **ACL:** A planted foot with sudden stopping or hit from the front is the when a torn ACL most often happens making soccer and football players prime candidates for this injury.
- **PCL:** The same set up but with a hit from the back of the leg can cause a tear to the PCL.

# **How to Keep Your Knees Strong**

## **Strengthen**

- **Lunges:** These are a great way to strengthen all the muscles surrounding your knee. Be careful not to let your leading knee to move forward over your toe as this puts too much stress on your knee. Try staying in place to do forward, backward or even side lunges, do walking lunges down a hall or field.
- **Squats:** There are many variations of the squat and all are great, just remember to always keep those knees behind you toes! Try 3

sets of 10 with or without a weight to feel the burn! Or lean against a wall slide down to squat position and see how long you can hold it, have a competition!

## **Stretch**

an important aspect for young and old alike is to keep the muscles flexible so they can move and slide along the joints without limiting or changing the alignment. Many of the above stated injuries can often caused by tight muscles or the adolescent body that is growing fast and the muscles cannot keep up with the rate that the bones are growing.

- **Quad Stretch:** Make sure you keep your leg straight and not bending or twisting at your knee. Hold these stretches for 30-60 seconds 3-4x before you run or go to play a sport.
- **Hamstring Stretch:** Make sure not to bounce or move around too much when stretching, sudden movements when your muscle is on stretch can actually cause injury if you are not careful. Use a belt, leash, something solid to maintain this stretch.