



# Understanding Knee Pain Causes and Treatment

GETTING YOU BACK FROM INJURY FASTER

## Understanding Knee Pain

### Causes and Treatment

Did you know that knee pain can be associated with multiple musculoskeletal dysfunctions? No matter what the cause, knee pain should not be ignored because of the many different structures and muscles involved. Knee pain can stem from weakness in the hip, gluteal muscles, and quadriceps, foot and ankle instability, patellar hypomobility, tightness in the iliotibial band, or a direct injury.

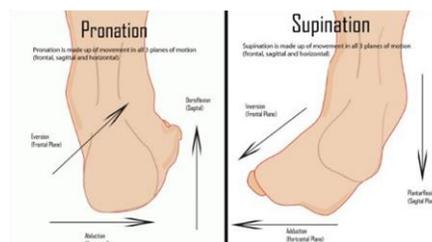
### Lower Extremity Weakness

- Quadriceps are the group of muscles in the front of the thigh that work to straighten your knee, and bend your hip. When weak, this muscle is unable to control the movement of the knee cap (patella), which can cause pain
- The gluteal muscles control motion at the hip and act as important stabilizers during all activity. If these are weak, they are unable to keep the thigh from rotating inward, placing increased stress on the medial compartment of the knee



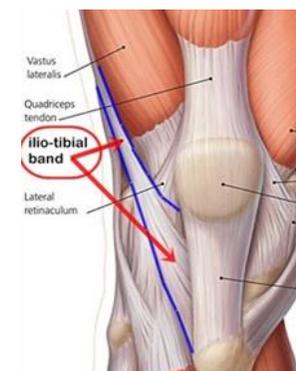
### Foot and Ankle Instability

The alignment and strength surrounding the foot and ankle determine where the knee will absorb forces at. As seen in the figure below, pronation and supination are important movements that are used during regular walking. If there is increased pronation due to lack of stability or muscle weakness, it increases stress on the inside of the knee. Interestingly, increased pronation is often seen with hip weakness because the inward rotation of the thigh has to be offset at the joints down the leg.



### Patellar Mobility

The patella connects the quadriceps to the shin via the patellar tendon. The main purpose of the patella is to assist with knee extension by increasing the leverage of the quadriceps. The patella should be able to move in all directions, and if one or more directions are restricted, it can change the biomechanics of the knee joint, and lead to increased stress and degeneration of the cartilage. One common contributing factor to decreased patellar mobility is tightness in the iliotibial band (ITB). As seen below, the ITB attaches to the lateral tissues of the knee, and can pull the patella to the side, preventing it from moving up and down with knee extension and flexion.



### Direct Injury

There are many different structures within the knee joint that may become injured with twisting, falling, or bending of the knee. There are various tests your physical therapist may perform to determine whether or not these structures are damaged, and can refer you to the appropriate resources for imaging or surgical intervention if needed.

## Physical Therapy

### What we do

A comprehensive rehabilitation program is a critical part in the treatment of knee pain. With the guidance of an experienced physical therapist or athletic trainer, stretching and strengthening of the hip, knee, and ankle will help quicken the recovery time and prevent re-injury.

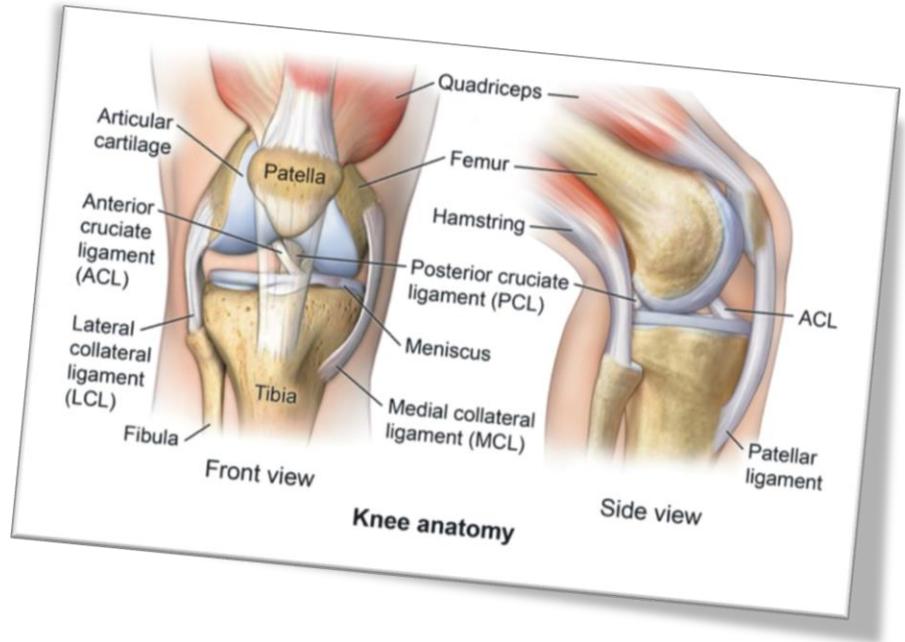
### Manual Therapy

In order to optimize the biomechanics of the knee joint, physical therapists may use a variety of techniques to help your knee joint move better. One common technique, pictured below, is mobilization for the patella. By manually applying pressure in various directions, the ligaments and structures around the knee are loosened, and pain often decreases.



### Exercise

With any lower extremity injury, it is important to participate in a well-rounded physical therapy program that includes strengthening, stretching, and proprioception. Strength programs will focus on strengthening the hip abductors, gluteals, and quadriceps. Exercises will be tailored to the



individual, and progressed as pain decreases. Ultimately, your physical therapist will help you understand how to independently progress your strengthening program to maintain proper alignment of the knee joint.

Balance is the next important component of any knee injury as it helps to strengthen and stabilize the knee and ankle to prevent future injury. This will be achieved through various single leg and dynamic exercises that progressively challenge the knee.

Finally, it is important to incorporate stretching and, foam rolling into your home program as this will help maintain muscle length and decrease tension in the muscles that causes pain. Foam rolling helps to increase mobility and decrease neuromuscular input into muscles, inducing relaxation. Stretching activities should be performed for 45 seconds, three times, and repeated 2-3 times throughout the day for optimal results.



### Trigger Point Dry Needling

Trigger points are taut bands of skeletal muscle that can be painful and refer pain

to other areas of the body, depending on where in the muscle the trigger point resides. If deemed appropriate for your condition, your physical therapist may utilize a technique called Trigger Point Dry Needling (TPDN). This is a therapeutic technique that uses a thin filament needle to release trigger points in order to decrease pain and improve range of motion. The process has been shown to normalize muscle firing dysfunction and help speed recovery when combined with manual therapy and exercise.

### Orthotics

If your knee pain stems from faulty foot and ankle mechanics or positioning, your physical therapist may recommend an insert for your shoe, to help normalize alignment. One of the most common problems is loss of arch height, which can cause all the joints above the ankle to adjust to the flat foot. These changes include inward twist at the foot and ankle, posterior rotation and drop of opposite hip, and increased curve in the low back. This causes inward rotation of the thigh and leg, placing excess strain on the joints and subsequently leading to increases in pain.

