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THE KNEE

Cartilage, Meniscus, Tendons and Ligaments

The purpose of this handout is to provide you with a simple explanation of the working components of the knee and help you to understand the problems you may currently have with your knee.

The knee is a complex joint that resembles a hinge. It is made of the end of the thigh bone (**femur**), the top of the larger leg bone (**tibia**) and the kneecap (**patella**). These bones are covered with an extremely smooth substance called **articular cartilage**. This cartilage allows us to walk, run etc., without destroying the ends of the bones. When this cartilage wears out, you have Degenerative Arthritis or Osteoarthritis. (It's like old paint peeling from the wall)

MENISCUS

The meniscus {2 in each knee; lateral (outer) and medial (inner)} are thick, wedge shaped structures made of a different type of cartilage. The menisci (plural) lie between the tibia and the femur to improve the mechanics of the knee joint. They have many functions including: aid in the nutrition of the articular cartilage, help to stabilize the knee, help distribute your weight more evenly across the knee joint and many others.

The meniscus is easily torn, even with every day activity. You can tear the meniscus even bending down to pick an object up off the floor. Because most of the meniscus does not have nerve endings, tearing it usually does not hurt. The tear flips around in the joint and causes inflammation of the synovium (this is the tissue that lines the inside of the joint and makes normal lubricating fluid). The synovitis is what causes the discomfort and swelling.

Diagnosis of a meniscus tear is generally made by your history and physical exam. There has been a great deal of interest in MRI to evaluate the meniscus. However, recent research studies have shown that a thorough examination of BOTH knees by a fellowship trained knee/sports medicine surgeon can predict diagnose the presence of a tear MORE EFFECTIVELY than a MRI. MRI tests are good in some instances, but can miss tears when they exist and can indicate there may be tear when there really is not. They are helpful in identifying other associated injuries. Therefore, I do not use MRI in all cases. They do help identify other issues that may influence your care, even though they may not be causing symptoms. If you have

arthritis, MRI is helpful since a tear may be insignificant relative to other associated findings.

If a tear is small enough, it may only cause minor irritation, without much pain and even without swelling. If it is larger, the knee usually hurts directly over the tear and produces catching, popping, swelling and occasionally even locking (when the knee gets stuck and can not bend). The symptoms from the smaller tears may go away over 6 to 8 weeks with anti-inflammatory medicine and exercise to strengthen the thigh muscles (but the tear usually **does not heal**). The larger tears usually will not get better and are more debilitating. If a smaller tear has failed nonsurgical treatment after 6-8 weeks or if there is a larger tear, then surgical treatment is the most efficient way to treat the problem. Some tears can be repaired with sutures but typically this is only in those younger than 40 years old with tears that can heal..

Regardless of the type or size of the tear, you and I will formulate a treatment plan that suits your needs and lead to the quickest recovery possible. This will depend on your age, activity level, job requirements, etc. If surgery is needed, we will discuss the details of arthroscopy at that time.

LIGAMENTS

There are 4 major ligaments that support the knee joint. They are the ACL (anterior cruciate ligament), PCL (posterior cruciate ligament), MCL (medial collateral ligament) and the LCL (lateral collateral ligament complex). The most commonly injured are the ACL and MCL. The ACL and PCL cross each other inside the center of the knee joint. The collateral ligaments are on the sides of the knee.

Ligaments are thick rope-like structures. They are usually torn in major twisting, bending or hyperextension injuries to the knee. When they tear, they bleed and cause significant swelling. If the ACL is torn it usually does not heal and may need to be reconstructed to create a new ligament. This is especially true of active individuals who are "ACL dependent". This means that the other supporting ligaments do not effectively help the ACL maintain stability and the knee relies more on the AC. The PCL will often heal without surgery if treated early, it but sometimes needs to be reconstructed if it remains loose. Recent studies have shown that PCL surgery rarely improves the condition better than "mother nature" and that the natural history of a PCL injured knee is actually favorable. The MCL will usually heal, although occasionally you may have to wear a brace for 3 or 4 weeks. Rarely, the MCL needs to be surgically repaired (when there is another ligament torn, such as the PCL or ACL). The LCL is rarely injured alone and is a more complex injury, requiring surgical repair.

Another ligament that may need repaired or reconstruction is the medial patellofemoral ligament (MPFL). This is the primary stabilizing ligament of the patella (kneecap) and is often torn when the patella dislocates, especially in those under 30 years old.

CARTILAGE

The joint surface is composed of joint cartilage, or hyaline cartilage. This is different than the meniscus cartilage that was mentioned above. This specialized tissue is responsible for the smooth surface of the joint and is 1000 times more slippery than ice on ice. When it cracks, peels, flakes or wears away, from trauma, age etc this leads to arthritis.

Injuries to the cartilage are very difficult to treat and are a subject of intense research. When the surface is “frayed” it can be smoothed over arthroscopically with a significant decrease in grinding and pain. This is called a chondroplasty is done for chondromalacia (soft cartilage). More advanced injury may need resurfacing. One method is to clean the injured area and then drill or pick holes into the bone to allow special stem cells to fill the defect. These convert to fibrocartilage or scar cartilage. This works well for smaller defects but fibrocartilage is not as durable as real hyaline cartilage. You may have heard the term “microfracture”: this procedure requires non-weight bearing for up to 8 weeks and the use of a CPM (motion) machine for up to 2 months.

Other techniques are “cutting edge” and not often covered by insurance plans. They include using cartilage plugs from your own knee (other “expendable” areas) or a cadaver or cartilage bio-engineering (Cartilage cell transplant) The latter is when cartilage cells are biopsied and grown in a lab and then reinserted during another complex procedure. Stem cell injections may also be considered.

TENDONS

Tendons around the knee (patella or quadriceps) can degenerate over time and tear. The tear can be partial or complete. Complete tears require prompt surgical repair. Partial tears and degenerative tendons respond to conservative treatment in most cases using rehab or growth factor/stem cell injections. When they do not respond, surgery can be considered. Steroids should never be used for this problem.

Specific recommendation is based on your individual needs and criteria for the procedure. I am involved in ongoing research with several companies regarding these techniques and have access to the most advanced technology available.

This information is based on the most up-to-date science and research but is by no means inclusive of all treatment methods. It is meant to give you a very brief idea of what may be required to treat your joint injury.