



## The Meniscus - Is it Necessary or Rudimentary?

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The word "meniscus" is derived from the Greek word, "meniskos" which means "crescent." The meniscus is a semicircular or half-moon shaped piece of fibro-cartilage that acts as a shock absorber in our knees. It also aids in stability. Each knee has two menisci, one of the inner side (medial) and one of the outer side (lateral). The other type of cartilage in our knees covers the joint surfaces of the femur, tibia, and patella, and is referred to as hyaline cartilage.

Both types of cartilage are poorly vascularized and are nourished by synovial or joint fluid that also acts as lubrication. When there is no blood supply available, damaged cartilage cannot mend itself.

Some meniscal tears may be caused by injury while others are associated with degenerative changes either in a previously injured knee or one that has become arthritic or unstable. It used to be thought that meniscal tears occurred primarily in males, but since Title IX and female sports participation, injuries are now seen in a significant number of women. Meniscal tears in pre-pubertal children rarely occur unless there is a congenital abnormality (discoid meniscus).

The menisci are attached to the periphery of the proximal tibia by a rather lax, thin, frail, meniscal-tibial ligament. This allows the meniscus to be anchored in the knee, but also provides for some mobility to help absorb the shock that we place on our knees in normal walking and in particular athletic endeavors. It is only when the stresses or strains placed on the knee are exceeded that the meniscus fails and is torn.

The ability of a torn meniscus to heal depends

on the location of the tear. There is some, albeit minor, blood supply to the periphery of the meniscus adjacent to the meniscal-tibial ligament. Tears that are located in the "red zone of vascularity" are able to heal, some on their own, if they are minor or following surgical repair. The more central tears that involve the inner edge of the meniscus will not heal and if symptomatic, may need to be partially removed. The surgeon will only remove that portion of the cartilage that is causing pain or interfering with normal joint function.

The arthroscope has been an enormous technological advance for the orthopaedic surgeon. Not only is the surgery much less invasive, but the visualization of the joint is so much better as the optics became state of the art and intra-operative TV monitors were made available. Also, the psycho-motor skills of the surgeon improved with repetitive use. Prior to the use of the arthroscope, the meniscus may not have been visualized completely with an open arthrotomy incision, and yet, the entire meniscus was removed since this was the preoperative diagnosis. Thirty and forty years later, we now recognize that knees that were subjected to total meniscectomy now have advanced degenerative arthritis. The "protective" meniscus was taken away and the joint began its downhill spiral.

Acute meniscal injuries usually require three elements. First, the individual must be either in a standing or squatting position. Second, they must be weight bearing with the foot contracting the ground or floor (stance phase of gait) and third, there must be a torsional or twisting moment that catches the semi-mobile meniscus in a vise between the femur and the tibia causing it to tear. The medial meniscus represents about 80% of all acute tears and the

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lateral meniscus is involved in about 20%. Rarely are both menisci torn in the same injury unless there is a severe force that also causes ligament disruption.

It is, therefore, highly unlikely that a meniscus is torn in mid-air (swing phase of gait) or damaged while we are in a seated position such as riding in an automobile. At the time of the acute meniscal injury, there may be a sensation of tearing or burning and even total collapse of the weight bearing ability of the extremity. If the meniscus is displaced into the inner portion of the joint rather than the normal peripheral location, the knee may "lock" and the patient is unable to gain full extension. This mechanical impediment is sometimes referred to an "internal derangement" or

if the meniscus is displaced into the joint, a "bucket handle tear."

A common phenomenon in the degenerative knee is the "horizontal cleavage tear of the medial meniscus" that is unrelated to a specific traumatic event. These are frequently seen on MRI scans and do not cause mechanical derangement in the joint and may not even be symptomatic. Arthroscopic removal of these menisci may result in a poor surgical outcome and may even hasten the arthritic process.

So, now the menisci, once thought to be vestigial and unnecessary, have risen up the food chain of clinical importance and finally get the respect they so rightfully deserve. ❖