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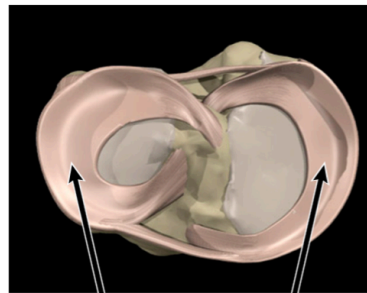
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Rehabilitation After Arthroscopic Meniscus Repair

There are two types of cartilage in the knee, articular cartilage and meniscus cartilage. Articular cartilage is made up of collagen, proteoglycans and water and lines the end of the bones that meet to form a joint. The primary function of the articular cartilage is to provide a smooth gliding surface for joint motion. Rubbing articular cartilage on articular cartilage is approximately 5 times more smooth, or with less friction, than rubbing ice on ice.¹

The meniscus cartilage in the knee includes a medial (inside) meniscus and a lateral (outside) meniscus. Together they are referred to as menisci. The menisci are wedge shaped, being thinner toward the center of the knee and thicker toward the outside of the knee joint (Figures 1–3). This shape is very important to its function. The primary function of the menisci is to improve load transmission. A relatively round femur sitting on a relatively flat tibia forms the knee joint. Without the menisci the area of contact force between these two bones would be relatively small, increasing the contact stress by 235-335% (Figure 4). The menisci also provide some shock absorption, lubrication and joint stability.

There are two categories of meniscal tears: acute traumatic tears and degenerative tears. Degenerative tears most commonly occur in middle-aged people. They typically occur through



Lateral meniscus Medial meniscus

Figure 1 Meniscus cartilage (shown here from above the knee, without the femur)

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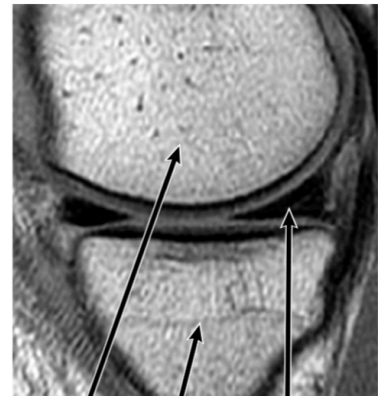
Tibia Medial meniscus Femur

Figure 2 Medial (inside) view of the knee

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repetitive stresses to the menisci over time, which severely weakens the tissue. This process of tissue degeneration makes it very unlikely that a surgical repair will heal or that the surrounding meniscus will be strong enough to hold the sutures used to repair it. One report showed that less than 10% of meniscal tears occurring in patients greater than forty years of age were repairable. Symptoms of a degenerative meniscus tear include swelling, pain along the joint line, catching and locking. Most often degenerative tears are surgically removed. Occasionally a patient may be able to regain function through rehabilitation without surgery.

Acute traumatic tears occur most frequently in the athletic population as a result of a twisting injury to the knee



Femur Tibia Medial meniscus

Figure 3 Normal MRI (sagittal view) of the knee, lateral (outside) view

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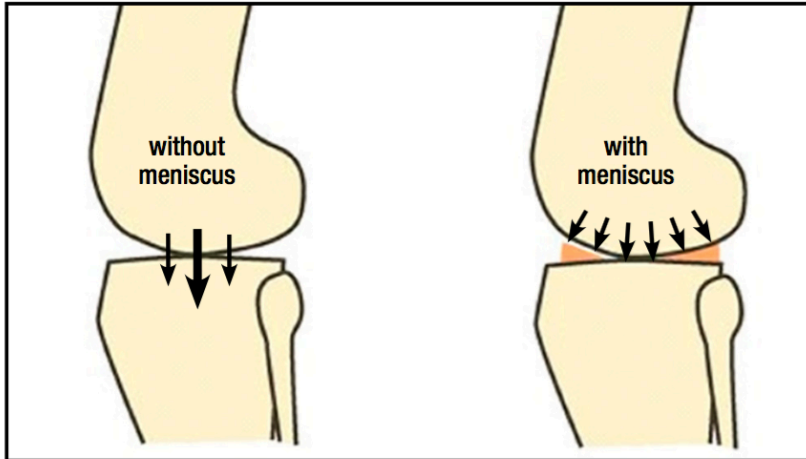


Figure 4 Schematic representation of the meniscal effect on contact pressure in the knee. Contact area is increased by 50% with addition of menisci. This reduces contact pressures.

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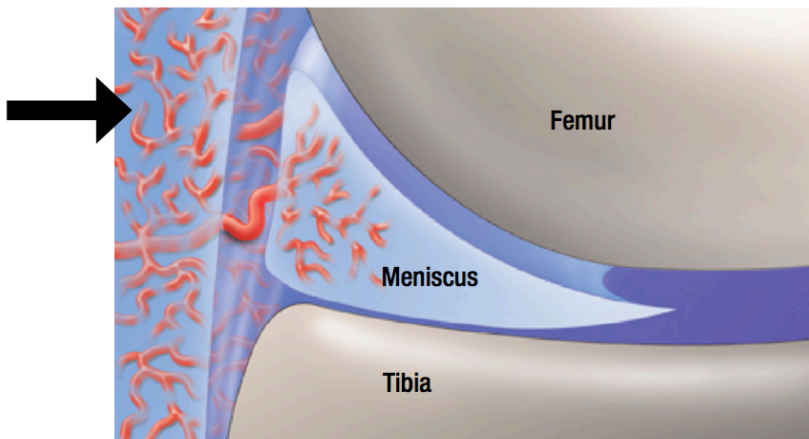


Figure 6 Perimeniscal capillary plexus (thick arrow) providing blood supply to the outer third of the meniscus.

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when the foot is planted. Symptoms of an acute meniscus tear include swelling, pain along the joint line, catching, locking and a specific injury. Often times these tears can be diagnosed by taking a thorough history and completing a physical examination. An MRI may be used to assist in making the diagnosis. If an athlete suffers a meniscal tear, the three options for treatment include: non-operative rehabilitation, surgery to

trim out the area of torn meniscus, or surgery to repair (stitch together) the torn meniscus. The treatment chosen will depend on the location of the tear, the athlete's sport, ligamentous stability of the knee and any associated injury.² The location of tear is important because the outer portion of the meniscus has a good blood supply whereas the inner portion has a very poor blood supply. Figure 6 shows the blood vessels (perimeniscal

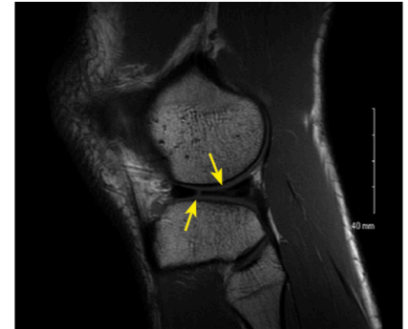


Figure 5 MRI (sagittal view) of a lateral meniscus tear (yellow arrows)

capillary plexus) entering the outer portion of the meniscus.³ This blood supply is necessary for a tear or a repair to heal. Without an adequate blood supply, the area of torn meniscus will have to be removed.

After meniscal surgery, rehabilitation with a physical therapist or athletic trainer is needed to restore range of motion, strength, movement control and guide the athlete's return to sport. When the meniscus is repaired there may be a period of restricted knee flexion, especially during weight bearing, to protect the repair sutures and the meniscus. The rehabilitation guidelines are presented in a criterion based progression. Specific time frames, restrictions and precautions are given to protect healing tissues and the surgical repair/reconstruction. General time frames are also given for reference to the average individual, but individual patients will progress at different rates depending on their age, associated injuries, pre-injury health status, rehabilitation compliance and injury severity. The size and location of the meniscal tear may also affect the rate of post-operative progression.

Rehabilitation After Arthroscopic Meniscus Repair

Phase I (Surgery to 6 weeks after surgery)

Precautions	<ul style="list-style-type: none"> ○ Weight-bearing <ul style="list-style-type: none"> ○ Partial weight bearing (25%) as tolerated with brace locked in extension (Weeks 0-4) ○ Partial weight bearing (50%) as tolerated with brace unlocked (Weeks 5-6) ○ Hinged Knee Brace: worn for 6 weeks post-op <ul style="list-style-type: none"> ○ Locked in full extension for ambulation and sleeping – remove for hygiene and PT
Range of Motion Exercises	<ul style="list-style-type: none"> ○ AAROM → AROM as tolerated <ul style="list-style-type: none"> ○ Weeks 0-4: No flexion greater than 90° ○ Weeks 4-6: Full ROM as tolerated – progress to flexion angles greater than 90°
Therapeutic Exercises	<ul style="list-style-type: none"> ○ Quad/Hamstring sets, heel slides, straight leg raises, co-contractions ○ Isometric abduction and adduction exercises ○ Patellar Mobilizations ○ At 6 weeks: can begin partial wall-sits – keep knee flexion angle less than 90°

Phase II (6 weeks to 12 weeks following surgery)

Precautions	<ul style="list-style-type: none"> ○ Weight-bearing <ul style="list-style-type: none"> ○ As tolerated ○ Discontinue crutch use ○ Discontinue use of hinged knee brace when you have achieved full extension with no extension lag
Range of Motion Exercises	<ul style="list-style-type: none"> ○ Full active ROM
Therapeutic Exercises	<ul style="list-style-type: none"> ○ Closed chain extension exercises ○ Hamstring strengthening ○ Leg press – 0-90° ○ Proprioception exercises ○ Begin use of the stationary bicycle

Rehabilitation After Arthroscopic Meniscus Repair

Phase III (12 weeks to 16 weeks following surgery)

Precautions	<ul style="list-style-type: none">○ Weight-bearing<ul style="list-style-type: none">○ Full weight-bearing with normal gait pattern
Range of Motion Exercises	<ul style="list-style-type: none">○ Full/painless ROM○ No deep knee bends for 4 months
Therapeutic Exercises	<ul style="list-style-type: none">○ Continue with quad and hamstring strengthening○ Focus on single-leg strength○ Begin jogging/running○ Plyometrics and sport-specific drills

Phase IV (4 months to 6 months following surgery)

Therapeutic Exercises	<ul style="list-style-type: none">○ Gradual return to athletic activity as tolerated○ Maintenance program for strength and endurance
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References

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2. Fowler PJ and Pompan D. Rehabilitation after mensical repair. *Tech in Ortho*, 8(2): 137-139, 1993.
3. Arnoczky SP and Warren RF. Microvasculature of the human meniscus. *Am J Sport Med*, 1982.