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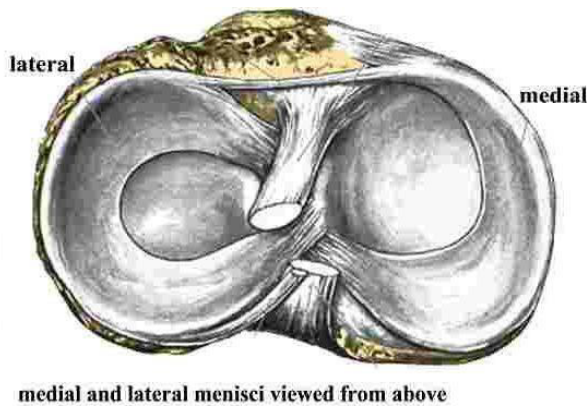
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**REHABILITATION PROTOCOL
MENISCAL REPAIR**

The meniscus is a crescent shaped cartilage that acts as a shock absorber between the femur (thigh bone) and tibia (shin bone). Each knee has two menisci: medial (inner) and lateral (outer). There is an additional type of cartilage in the knee joint called articular cartilage. This is a smooth, white glistening surface that covers the ends of the bones. The articular cartilage provides lubrication and as a result, there is very little friction when the joint moves. Either by virtue of regular wear and tear on your knee joint, or an acute injury these cartilages can become torn and cause pain. These tears are often accompanied by swelling, and can occasionally be accompanied by sensations of popping, grinding, buckling or having the knee lock in place.

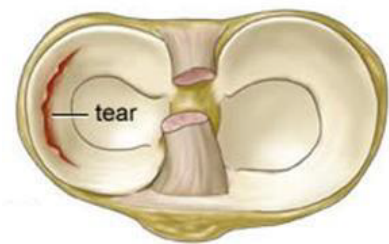


The mainstay of treatment for a meniscus tear is non-operative. A short course of activity modification (refraining from sports or activities that hurt the knee), ice, anti-inflammatory medication and elevation will usually relieve the acute symptoms. Physical therapy and exercises aimed at strengthening the muscles around the knee joint (the hamstrings and quadriceps) can often be helpful. The majority of patients with meniscal tears or cartilage injuries do not require surgery. However, there are a small percentage of patients who continue to have symptoms despite a course of conservative treatment.

Some portion of the pain may be from osteoarthritis, whereby the cartilage lining the knee joint has simply worn away. This may be due to an injury earlier in life, or there may be a genetic component as well. Pain from arthritis may be due to inflammation in the lining of the knee joint (called synovitis), small fractures of the bone under the cartilage (called subchondral bone), stretching of nerve fibers over bone spurs that form (called osteophytes), and loose bone chips in the joint.

Another portion of the pain may be mechanical in nature, whereby the torn piece of meniscus or articular cartilage gets trapped in the joint and causes sharp episodes of pain, which can take a few days to resolve. Persons who have pain of this nature can often have repeated episodes of having the meniscus or cartilage piece become trapped.

The meniscus gets its blood supply from the outside of the knee toward the inside of the knee. If there is a tear of the meniscus in a region with good blood supply (toward the outside of the knee), and the tear is of an appropriate size and there is not too much advanced arthritis the meniscus can be repaired rather than removed.



For those patients that fail to improve with non-operative treatment there are surgical options available to try and alleviate some of their symptoms. Arthroscopy is a surgical procedure that orthopedic surgeons use to visualize,

diagnose and treat problems inside of a joint. In an arthroscopic examination, the doctor makes a small incision in the patient's skin and inserts pencil-sized instruments that contain a small lens and lighting system to magnify and illuminate the structures inside the joint. The doctor can then determine the amount and type of injury, and then repair or correct the problem, if it is necessary.

The procedure to repair the meniscus involves suturing the torn ends of meniscus back together with sutures that are left inside your knee joint. The benefit of repairing the meniscus is that you are left with an intact shock absorber inside your knee that will ideally help protect against the development of later arthritis.

The risks of meniscus repair surgery include but are not limited to:

- Infection
- Bleeding
- Excessive swelling
- Blood clots
- Joint stiffness
- Pain, postoperative and/or persistent
- Meniscus repair may fail as often as 20% of the time, leading to the need to perform additional surgery to remove the sutures and the meniscus

Rehabilitation and protection of the meniscal repair are crucial after your surgery. One major reason for failure of a meniscal repair is failure on the part of the patient to adhere to postoperative instructions and restrictions.

Remember, though, that people who have arthroscopy can have many different diagnoses and preexisting conditions, so each patient's arthroscopic surgery is unique to that person. Recovery time will reflect that individuality. It is very rare that your recovery will be the same as that of a friend or family member who also had "arthroscopic surgery."

Postoperative Instructions

You will wake up in the operating room with an ice pack in place. You will also have white compression stockings on both legs. These are to help prevent blood clots and should be worn for the first two weeks following surgery.

You will be sent home with a prescription for pain medication. In addition to the pain medication you should take one adult strength aspirin every day for 14 days, in order to help prevent blood clots. The pain medication can make you constipated. If this is the case, take an over the counter stool softener such as Colace while taking the pain medication.

You will be sent home from the recovery room after a few hours. You will need someone else to drive you home.

Activities and advice for in the hospital and while at home:

1. Please call with any concerns: (860) 832-4666
2. Apply ice to the knee, as it will be quite helpful. After two days, you can change the dressing to a smaller one to allow the cold to better get to the knee. Be sure to leave the little pieces of tape (steri-strips) in place.
3. After two days it is okay to shower and get the wound wet, but do not soak the wound as you would in a bath tub or hot tub.
4. After knee surgery there is a variable amount of pain and swelling. This will dissipate after several days. Continue to take the pain medicine you were prescribed as needed. Remember it is called pain control, not pain elimination. If you notice calf pain or excessive swelling in the lower leg, call your doctor.
5. It is important to look out of signs of infection following surgery. These can include: fever (temperature > 101.5), chills, nausea, vomiting, diarrhea, redness around your incision, or yellow or green drainage from your incision. Should any of these be present please contact your doctor's office immediately.
6. You will have crutches after surgery. These are for your comfort only. When you feel like you no longer require the crutches for walking, it is fine to discontinue using them.
7. You will have an office visit scheduled approximately 10 to 14 days after your surgery.

REHABILITATION AFTER MENISCAL REPAIR

Phase I: Maximum Protection Phase (weeks 1 to 2 after surgery)

Goals:

1. Control pain and swelling
2. Initiate knee movement
3. Activate quadriceps muscles

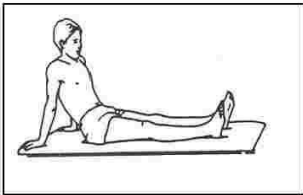
Activities:

1. The novocaine that is put in your knee at the time of surgery lasts six to eight hours. Begin taking the pain medication when you start feeling sensation return. The knee will be painful for several days after the arthroscopy.
2. You can fully extend (straighten) the knee. However, to avoid placing stress on the meniscal repair, do not bend your knee beyond 90 degrees (a right angle).
3. You will go home with crutches and a knee brace. You can bear weight as tolerated, but use the crutches to help your walking. The knee brace should be locked in extension when walking around. You can unlock the brace to sit or move the knee when not walking.
 - a. If you cannot bear weight without pain place some of your weight on the crutches so that there is no pain with weight bearing
 - b. If you are able to bear full weight without pain you can start using one crutch. Hold the crutch in the opposite hand to the operative knee.
 - c. If you continue to have no pain, you can discontinue using the crutch and just wear the brace locked in extension for weight bearing.
4. Remove the outer bandage when you get home and apply cold directly to the knee. Change the bandages whenever needed.
5. Apply cold to reduce pain and swelling. Use ice on the knee 20 minutes/on and 20 minutes/off for the first day when awake. Then apply cold as often as needed for 15 to 20 minutes at a time for the next several days. Place a towel or cloth between the skin and the ice to prevent skin injury.
6. You may shower and get your incision wet after two days. Do not soak the incision in a bathtub or Jacuzzi for at least two weeks after surgery. If there is any drainage from the wound, do not get the wound wet.
7. Take an aspirin each morning for the first two weeks.
8. Wear an elastic stocking (TED) below the knee, and do at least 10 ankle motion exercises each hour to control swelling and to help prevent blood clots in the veins.
9. You should have an appointment to see physical therapy by 5 days. You will see Dr. Bet in 10 to 14 days.

Stage I Exercises: Week 1 (prior to starting PT)

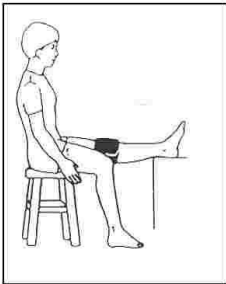
Program: 7 days per week, 3 to 4 times per day

Quadriceps setting	1 to 2 sets	15 to 20 reps
Heel prop	5 minutes	
Heels slides with towel assist	5 to 15 minutes	
Sitting heel slides	1 to 2 sets	15 to 20 reps
Ankle pumps	10 per hour	



Quadriceps setting

Lie or sit with knee fully straight. Tighten and hold the front thigh muscle making the knee flat and straight (this should make your knee flatten against the bed or floor). Hold 5 seconds for each contraction.



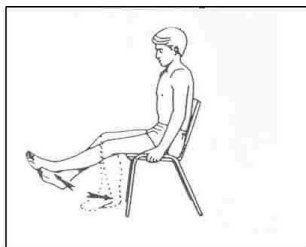
Heel prop

Lie on your back with a rolled up towel under your heel, or sit in a chair with the heel on a stool. Let the knee relax into extension (straight). If the knee will not straighten fully, you can place a small weight (2-5 lbs) on the thigh just above the kneecap. Try to hold for 5 minutes. Try to practice quadriceps setting in this position.



Heel slides with towel assist

While sitting or lying on your back, actively slide your heel backward to bend the knee. Hold this bent position for five seconds then slowly relieve the stretch and straighten the knee. While the knee is straight, you may repeat the quadriceps setting exercise. You can assist by using a towel to pull your heel back.



Sitting heel slides

While sitting in a chair or over the edge of the bed, support the operated leg with the uninvolved leg. Lower the operated leg, with the unoperated leg controlling, allowing the knee to bend. Do not go past 60 degrees of bend at the knee. Hold for 5 seconds and slowly relieve the stretch by lifting the foot upward with the uninvolved leg to the straight position.

Phase II: Weeks 2 through 6 after surgery

This stage will begin once you begin working with your therapist. In addition to demonstrating these exercises, your therapist will give you a home exercise program. It will be important to perform these exercises daily in order to ensure maximum results after your surgery. Remember to adhere to your precautions in order to maximize your results.

Goals:

1. Protect the knee from overstress and allow healing
2. Regain knee motion, but limit flexion to 90 degrees
3. Begin muscle strengthening

Activities:

1. Range of motion: You can fully extend (straighten) the knee. However, to avoid placing stress on the meniscal repair, do not bend your knee beyond 90 degrees (a right angle).
2. Brace and Crutches: You can continue to bear weight as tolerated, but use the crutches to help your walking. The knee brace should be locked in extension when walking around. You can unlock the brace to sit or move the knee when not walking.
 - a. If you cannot bear weight without pain, place some of your weight on the crutches so that there is no pain with weight bearing.
 - b. If you are able to bear full weight without pain you can start using one crutch. Hold the crutch in the opposite hand to the operative knee.
 - c. If you continue to have no pain, you can discontinue using the crutch and just wear the brace locked in extension for weight bearing.
3. Use ice as needed for any swelling or pain.

Exercises:

- *Strengthening exercises*
 - Multi-angle quad isometrics
 - SLR (all 4 planes)
 - Knee extension 90-0 degrees
 - CKC mini-squats 0-45 degrees
 - CKC wall squats
 - CKC weight shifts (diagonal)
 - Balance training (cup walking)
 - Bicycle (once ROM appropriate)
- Avoid twisting, deep squatting and stooping
- Avoid hamstring curls
- Progressively increase ROM to 90 degrees, continue stretching

Phase III: Weeks 6 through 12 after surgery

Goals:

1. Progress weight bearing
2. Regain full motion
3. Regain full muscle strength

Activity:

1. You can bear weight and walk on the leg as much as you are able. Try to avoid limping and walk with a heel - toe pattern. Avoid squatting or pivoting on the operated knee.
2. You can begin to gradually increase the range of motion of the knee past 90 degrees. You may discontinue use of the brace.
3. Continue to ice the knee to reduce pain and swelling. Ice the knee three times a day for 15 to 20 minutes. Always place a towel or cloth between the skin and the ice to prevent skin injury.

Exercises:

- Continue ROM and stretching to maintain 0-135 degrees
- Progress strengthening exercises
 - Leg press 70-0 degrees
 - Knee extension 90-40 degrees
 - Hip Abduction/Adduction
 - Wall squats 0-70 degrees
 - Vertical squats 0-60 degrees
 - Lateral step-ups
 - Front and lateral lunges
 - Hamstring curls
- Balance/proprioception training
- Biodex stability
- Squats rocker board
- Cup walking (step overs)
- Standing on foam single leg
- Bicycle (if ROM permits)
- Pool program (may begin running in pool)

Phase IV: Return to Activity (week 12 and beyond)

Goals:

1. Regain muscle strength
2. Work on cardiovascular conditioning
3. Initiate sports-specific training

Criteria to progress to Phase IV:

- Full non-painful ROM
- No pain or tenderness
- Satisfactory clinical exam
- Satisfactory isokinetic test

Exercises:

- Continue and progress all strengthening exercises and stretching drills
- Deep squatting permitted at 4 months (nothing past 90°)
- Initiate straight line running: 4 months
- Initiate pivoting and cutting: 5 months
- Initiate agility training: 5 months
- Gradually return to sports: 6 months