

Medial/Lateral Meniscectomy and Rehabilitation

Anatomical considerations: The meniscus is an important load-bearing structure that supports 70% of the load transmitted through the lateral compartment and 50% medially, thus decreasing contact pressures on the articular cartilage. It is also an important secondary stabilizer of the knee, resisting anterior translation. The meniscus has nutritive as well as lubricating properties in the knee joint as well. The medial meniscus is C shaped and thicker posteriorly. It occupies 50% of the articular contact area of the medial compartment. The lateral meniscus is O shaped and of equal thickness throughout. It covers 70% of the lateral tibial plateau. The red zone or fibrous outer portion of the meniscus is vascular and therefore tears there will often heal. The inner 2/3rds or white cartilaginous zone of the meniscus does not have a good blood supply and therefore, tears are less likely to heal in this area. The lateral meniscus is not as firmly attached to the tibia as the medial meniscus and therefore is less prone to injury.

Pathogenesis: The meniscus is most commonly injured by a compressive or weight bearing force, combined with tibiofemoral rotation in the transverse plane as the knee moves from flexion to extension. A tear may therefore occur during activities that require rapid cutting or pivoting.

Epidemiology: The posterior medial meniscus is the most commonly injured portion of the menisci, secondary to it being less mobile and therefore, greater stresses occurring in this area. Athletes and younger individuals most often obtain meniscus tears via non-contact activities like rapid cutting, pivoting or deceleration movements. With increasing age, tears can often occur with trivial injury due to degeneration of the meniscus.

Diagnosis

- Injury followed by pain in area of medial or lateral joint lines
- Most patients describe pain especially when the knee is straightened.
- Following an injury, the knee may click, lock or feel weak
- Positive McMurray's or Apley's tests
- MRI may help to confirm the diagnosis

Nonoperative vs. operative management: The overall treatment goal is to preserve as much meniscal tissue as possible while addressing the clinical symptoms caused by the meniscal tear. Nonoperative treatment which consists of anti-inflammatory medications and careful strengthening exercises may allow for the menisci to heal, especially if the tear lies in the outer third of the structure. This treatment may take 6-8 weeks in order for meniscal healing to occur. If the patient continues to complain of symptoms following 6 weeks, arthroscopic meniscectomy may be considered. Non-operative treatment is usually more appropriate for patients who are less active or sedentary. Meniscal tears that extend beyond the outer third or vascular zone will not heal and therefore a partial meniscectomy is recommended. A complete meniscectomy may be performed especially with significant degenerative tears to the meniscus.

Both complete and partial meniscectomies result in a significant increase in the load across the joint and on the articular cartilage and reduce the shock absorption capacity of the knee. A partial meniscectomy leaves a rim of tissue in place, which maintains some stress protection for the articular cartilage, in contrast to a total meniscectomy, which (in the absence of regeneration) is associated with increased cartilage degeneration, joint narrowing, alterations in bone geometry, and osteophyte formation. Due to these factors, many surgeons choose to preserve the meniscus with a meniscal repair or in some cases reconstruction with an allograft. In addition to the location of the tear, the pattern of the tear may also indicate if surgery may be required. Longitudinal tears have a favorable healing potential except for a bucket-handle tear (a variant of a longitudinal tear) in which circumferential fibers are involved. Radial or flap meniscus tears also involve the circumferential fibers. These tears are more easily managed with debridement/meniscectomy. Degenerative tears also respond better to meniscectomy than repair.

Surgical procedure: Although meniscectomy was originally performed by open arthrotomy, the procedure is almost universally done today by arthroscopic means. Partial meniscectomy is indicated in unstable tears that are not repairable due to location or configuration and serves to preserve as much of the normal meniscus as possible. In this procedure, the surgeon removes only the damaged or unstable portion of the meniscus, and balances the residual meniscal rim. The procedure for a total meniscectomy, the entire meniscus may be removed.

Preoperative rehabilitation: Pre operative rehab for a meniscal injury that is to undergo a meniscectomy may involve: (1) Swelling and pain control, (2) range of motion exercises, (3) quadriceps strengthening and (4) aquatic therapy for strengthening if pain is preventing strengthening with normal weight bearing

POSTOPERATIVE REHABILITATION

Rehab following a partial medial or lateral meniscectomy can usually progress as tolerated, with no contraindications or limitations due to the fact that there is no anatomic structure that must be protected. Goals are early control of pain and edema, immediate weight bearing, obtaining and maintaining full ROM and regaining proper quadriceps strength. The following is a rehab progression provided by S. Brent Brotzman and Kevin E. Wilk.

Phase 1: Acute phase

Goals: Diminish inflammation and swelling
 Restore ROM
 Reestablish quadriceps muscle activity

Intervention:

Days 1-3

- Cryotherapy
- Light compression wrap
- Electrical muscle stimulation to quadriceps
- Strengthening Exercises: Straight leg raises, hip adduction and abduction, ¼ and/or ½ squats
- Active assisted ROM stretching, emphasizing full knee extension (flexion to tolerance)
- Weight bearing as tolerated (use of axillary crutches as needed)

Days 4-7

- Cryotherapy and continued use of compression wrap
- Electric muscle stimulation to quadriceps
- Strengthening Exercises: Straight leg raises, quadriceps sets, hip adduction and abduction, knee extension 90-40 degrees, ¼ and/or ½ squats
- Balance/proprioceptive drills
- Active assisted, passive ROM, and stretching exercises (hamstrings, gastrocsoleus, quadriceps)
- Weight bearing as tolerated

Days 7-10

- Continue all exercises and add: Leg press (light weight), toe raises, and hamstring curls
- Bicycle (when ROM 0-105 degrees with no swelling)

Phase 2: Internal Phase

Goals: Restore and improve muscular strength and endurance
 Reestablish full nonpainful ROM
 Gradual return to functional activities

Intervention:

Days 10-17

- Bicycle, Stairmaster and/or elliptical trainer for motion and endurance
- Strengthening and coordination exercises: Lateral lunges, front lunges, ½ squats, leg press, lateral step ups, knee extension (90-40 degrees), hamstring curls, hip adduction and abduction, hip flexion and extension, toe raises
- Proprioceptive and balance training
- Stretching exercises

Day 17-Week 4

- Continue all exercises
- Pool program (deep water running and leg exercises)

- Compression brace may be used during activities

Criteria for progression to Phase 3: Satisfactory clinical examination (minimal effusion)
 Full/nonpainful ROM
 No pain or tenderness
 Satisfactory isokinetic test

Phase 3: Advanced Activity Phase – Weeks 4-7

Goals: Enhance muscular strength and endurance
 Maintain full ROM
 Return to sport/functional activities

Intervention:

- Therapeutic exercises: Continue to emphasize closed-kinetic chain exercises
 May begin plyometrics
 Begin running program and agility drills

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