Inside-out Anatomy and Exposure: Medial and Lateral Anatomy
Case-based Symposium: Management of Meniscus Injuries

AOSSM Specialty Day March 5, 2016. Orlando, FL

Matthew Matava, M.D.
Chief, Sports Medicine Section, Washington University
St. Louis, MO

I. Patient Positioning
   • Principles
     o Patient supine with foot of bed flexed 90° in Trendelenburg position preferred
     o Leg holder around distal thigh to allow varus/varus stress
     o Contralateral limb abducted (for medial meniscal repair) and flexed in leg holder
     o Paralysis by anesthesiologist helpful for exposure

II. Equipment
   • Headlight for surgical assistant
   • Kocher clamp
   • Needle driver
   • Suture scissors
   • Henning (popliteal) retractor, teaspoon, tablespoon, or pediatric vaginal speculum
   • Cannulated suture guides (single- and double-barrel) in straight and curved options
   • 2-0 non-absorbable braided sutures with 10-inch double-armed Nitinol needles
   • Meniscal rasp (ball or curved)
   • Kick bucket or basin

III. Lateral Meniscal Repair
   • Surface Anatomy and Skin Incision
     o Surface landmarks
       a. Lateral joint line
       b. Lateral collateral ligament
       c. Lateral epicondyle
       d. Fibular head
     o Knee flexed to 90° and a 3 cm vertical incision placed 1/3 above and 2/3 below the lateral joint line
     o Incision posterior to LCL
     *Incision should be parallel to the longitudinal axis of the lower extremity with knee extended

   • Deep Anatomy
     o Subcutaneous dissection down to iliobial (IT) band
     o Deep incision between posterior edge of the IT band and anterior edge of biceps femoris short head
     o “Hockey” stick extension in IT band distally may be needed to facilitate exposure
o Fascia posterior to LCL is dissected to level of fibular head
o Blunt dissection between lateral joint capsule and lateral head of gastrocnemius
  a. Adhesions may be present between capsule and lateral gastrocnemius
  *Caution: Perforation of capsule will cause fluid extravasation
o Common peroneal nerve palpated posterior to biceps femoris but not routinely identified
o Henning popliteal retractor or spoon placed anterior to lateral gastrocnemius at joint line level to retract the common peroneal nerve posteriorly
  *Caution: Inferior lateral geniculate artery may be visualized inferiorly and cauterized

IV. Medial Meniscal Repair
  • Surface Anatomy and Skin Incision
    o Surface landmarks
      a. Medial joint line
      b. Medial collateral ligament (MCL)
      c. Medial epicondyle
    o Knee flexed to 90° and a 3 cm vertical incision placed 1/3 above and 2/3 below the medial joint line
    o Incision posterior to superficial MCL in-line with longitudinal axis of knee
      *Caution: Infrapatellar branch of the saphenous nerve and saphenous vein posterior and inferior to incision

  • Deep Anatomy
    o Subcutaneous incision through Sartorial (crural) fascia with pes tendons (Sartorius, gracilis, and semitendinosus) reflected posteriorly
    o Sheath over the direct arm of the semimembranosus is dissected to identify the tendon insertion heading to proximal tibia
    o Medial head of gastrocnemius deep to and crossing the semimembranosus
    o Dissection between the inferior surface of semimembranosus and medial head of gastrocnemius
      *Caution: Deep exposure superior to semimembranosus may result in suture needles passing inferior to popliteal retractor resulting in neurovascular risk
    o Blunt dissection between the posteromedial capsule and medial gastrocnemius
      *Caution: Adhesions may be present between capsule and gastrocnemius
    o Retractor or spoon placed between capsule and gastrocnemius at joint line level

V. Suture Repair Technique
  • Positioning and Exposure
    o Assistant surgeon sits at knee level on side of repair with headlight to facilitate view of needle passage
o Instrument ‘holster’ (Kocher clamp) clamped at knee level with suture scissors and needle holder contained in finger holes
o Kick bucket or basin placed on floor next to seated assistant to drop needles in
o Second assistant positioned next to surgeon on side opposite of repair to pass sutures
o Knee flexed to 20°-30° with varus/valgus force applied by surgeon to open the involved compartment
o 30° arthroscope placed through either the same or opposite compartment to facilitate viewing while allowing placement of the suture cannula
o ‘Pie-crusting’ of deep MCL with 18-gauge needle occasionally needed to expose posterior horn of medial meniscus in tight knees

- Meniscal Suturing
  o Tear and adjacent synovium braded with meniscal rasp or shaver (without suction) to facilitate fibrovascular healing response
  o Curved suture cannula brought in from opposite compartment in order to guide needles away from the midline neurovascular structures
    *Trans-patellar tendon portal may be useful to pass sutures if the tibial spine blocks cannula passage*
  o Meniscus tear is reduced with the suture cannula, and a 10-inch suture needle is passed under direct visualization through the meniscus and capsule in a divergent fashion until the needle hits the popliteal retractor
  o Sutures placed first on the superior meniscal surface to reduce the tear, then on the inferior surface in an alternating pattern

  ![Image](image1.jpg)

  ![Image](image2.jpg)

  o The assistant retrieves the needle carefully (Nitinol wire VERY flexible) and the second needle is passed in a similar fashion on the other side of the tear in a vertical mattress configuration
    *Vertical mattress preferred over horizontal mattress sutures*
  o Sutures placed 3-5 mm apart

  ![Image](image3.jpg)

  ![Image](image4.jpg)

  o Cycle knee multiple times to confirm stability of the repair
References