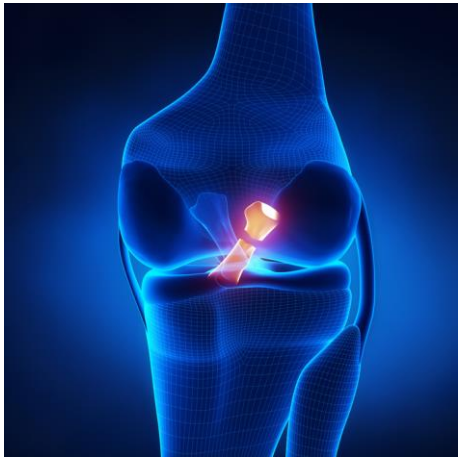
TRAUMATIC SPORTS RELATED KNEE INJURIES



Adae Amoako, MD

Sports Medicine and Acute Care

Objective

- Provide an overview of traumatic meniscal injuries
- Provide an overview of traumatic ligamentous injuries
  - ACL
  - PCL
  - MCL
  - LCL
- At the end of session, participants should be aware of common acute knee injuries diagnosis and management

Lateral and Medial Meniscus

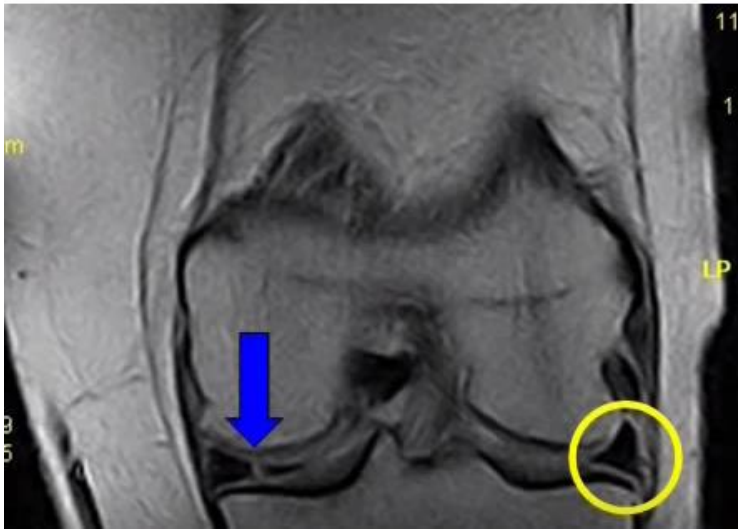
- Medial > lateral (3:1)[1]
- 60-70 per 100,000 incidence[1]
- 1/3 associated with ACL tear[2]
- M > F (3:1)[3]
- Younger pts yrs = traumatic[4]
- Older pts = degenerative[4]

Lateral and Medial Meniscus

- Symptoms
  - Localized pain
  - May recall hearing or feeling of a pop
  - Acute, delayed or recurrent swelling
  - Pain with squatting
  - Painful clicking, catching / locking
- Physical Exams
  - Joint line tenderness
  - Swelling
  - Joint line tenderness
  - McMurrays
  - Thessaly
  - Apleys

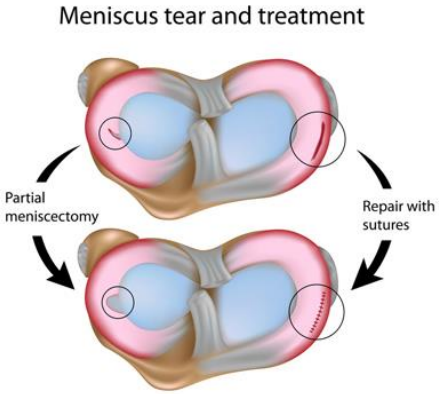
Lateral and Medial Meniscus

- Diagnostics
  - MRI is the gold standard
  - Highly sensitive and specific (comparable to PE)



Lateral and Medial Meniscus

- Treatment
  - Age, occupation, activity level, symptoms
  - Physical therapy
    - Knee strengthening (Quadriceps, esp. VMO)
    - ROM
    - Strengthening of other lower limbs (hips, pelvis)
  - Arthroscopic Surgery[5]
    - Partial meniscetomy (80%–90% satisfactory results at short-term follow-up <2 yrs)
    - Meniscal repair – almost exclusively in young



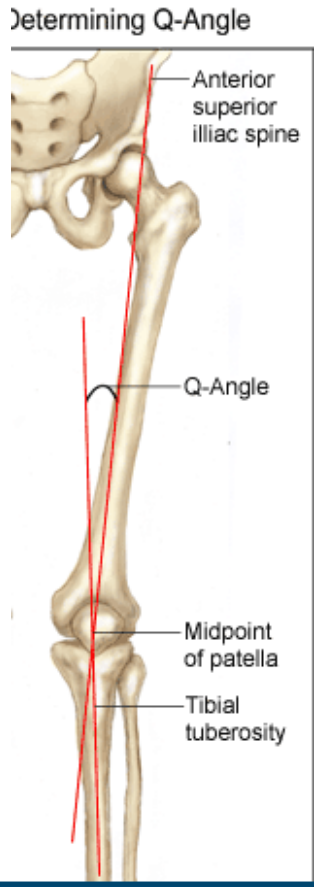
Ligamentous Injuries

- 4 main ligaments
  - Anterior cruciate ligament *(ACL)*
  - Posterior cruciate ligament *(PCL)*
  - Medial collateral ligament
  - Lateral collateral ligament

ACL Injury

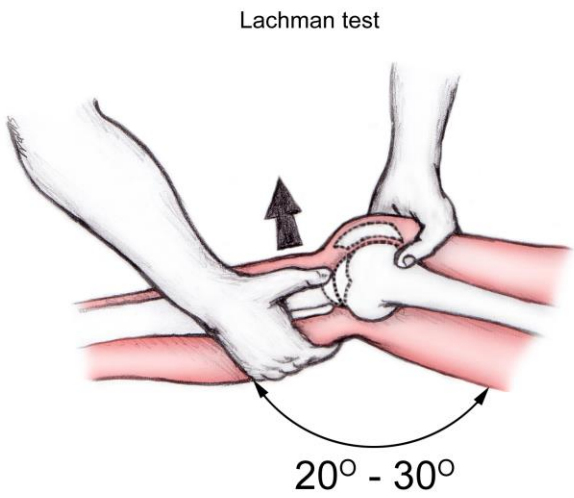
- Noncontact pivoting injury (~70%)
- Associated injuries
  - MCL, Medial Meniscus
  - Osteochondral contusions
- Risk Factors
  - Gender
    - Q angle (f > m)[6]
  - Different neuromuscular[7]
  - Different hormonal influences (estrogen)[8]


Complete tear of the ACL



ACL Injury

- Symptoms
  - Acute pain / swelling
  - Instability
  - Pop sensation
  - Quadriceps avoidance gait
- Physical exams
  - Lachman test *(most sensitive)*
  - Anterior drawer
  - Pivot shift

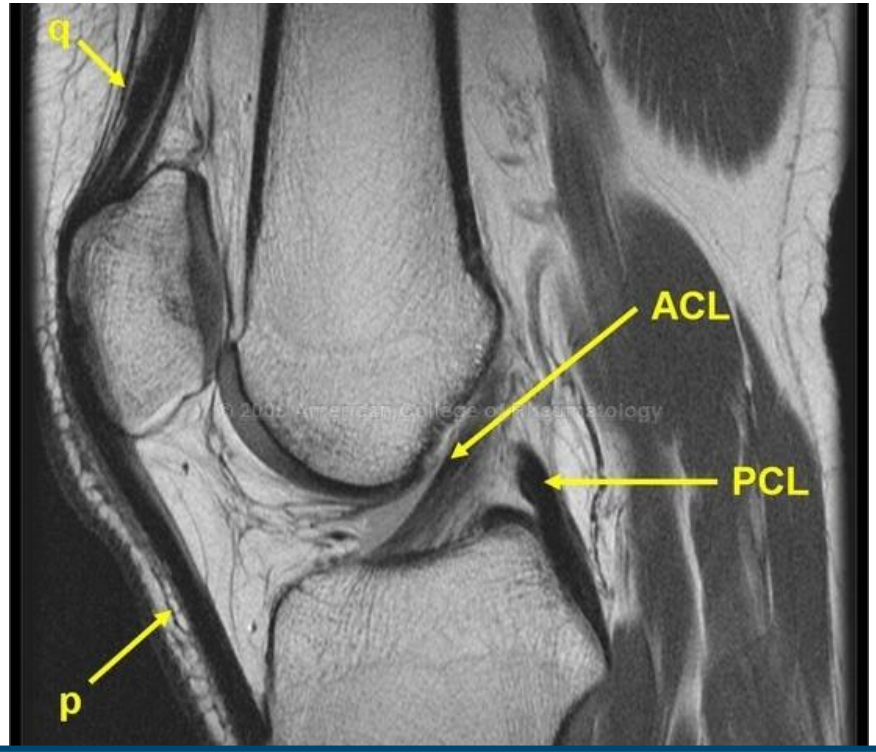


ACL Injury

- Diagnostics
  - X-ray – may show segond

ACL Injury

- Diagnostics
  - MRI is the gold standard
  - Highly sensitive and specific



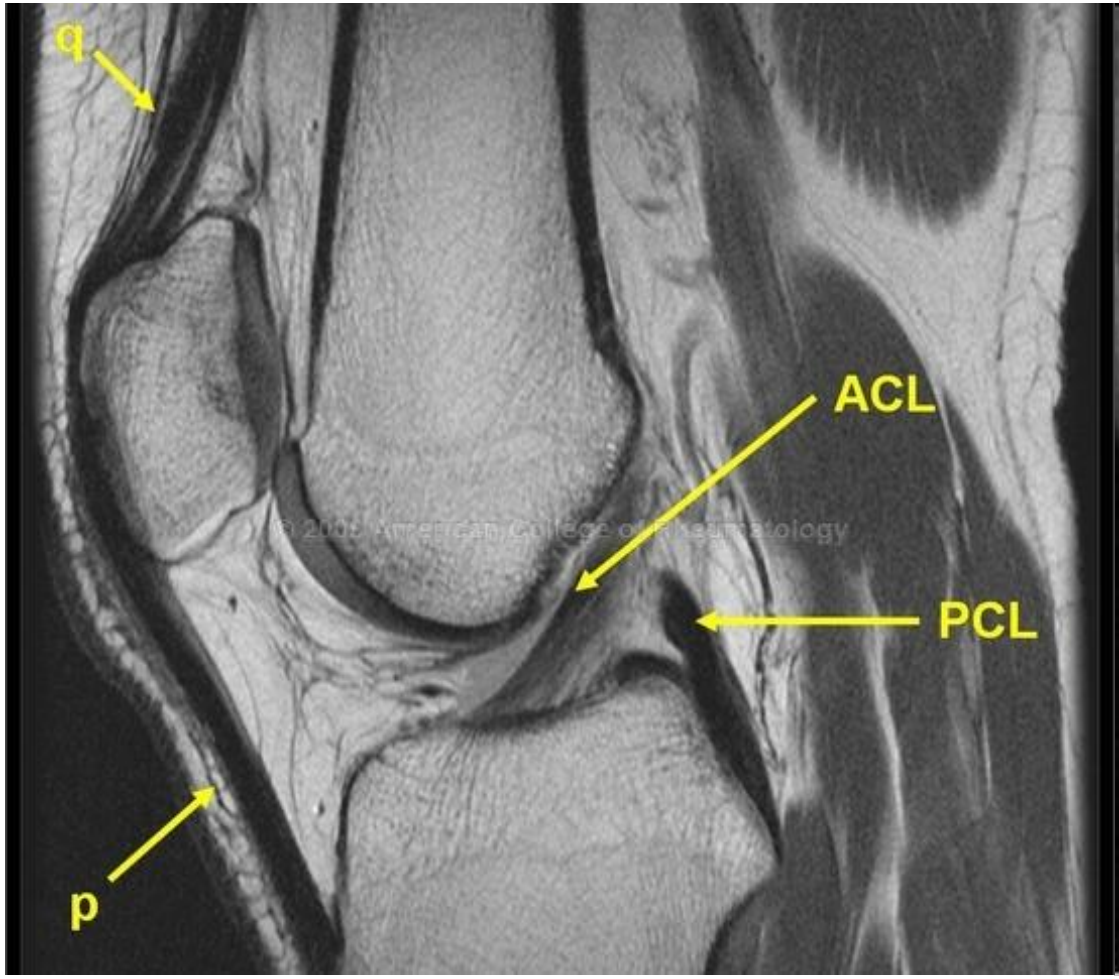
ACL Injury

- Treatment
  - Age, occupation, **activity level, stability,** associated injuries
  - Physical therapy
    - Balance and proprioception training [9]
    - Open-chain strength training[10]
  - Knee bracing[11]
  - Surgery (ACL Reconstruction)
    - Patella tendon vs Hamstrings tendon
      - None recommended over the other[12]
    - Double-bundle vs Single Bundle
      - Limited evidence of superior results with double bundle[13]
    - Allograft vs Autograft
      - Increase risk of rupture with allograft[14,15]

PCL Injury

- Mechanisms
  - Direct blow to anterior tibia *(dashboard injury)*
  - Hyperflexion (noncontact)
  - Hyperextension
- Symptoms
  - Anterior tibial contusion
  - Popliteal ecchymosis
- Physical Exams
  - Posterior sag
  - Posterior drawer sign
  - Quadriceps active test

PCL Injury

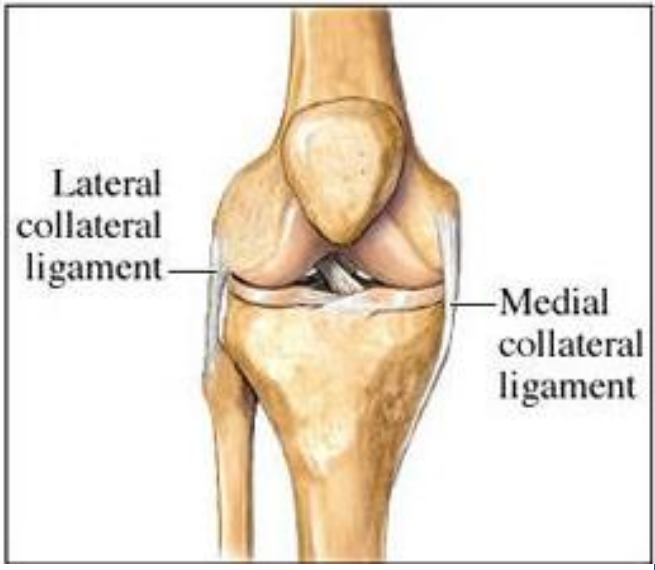


PCL Injury

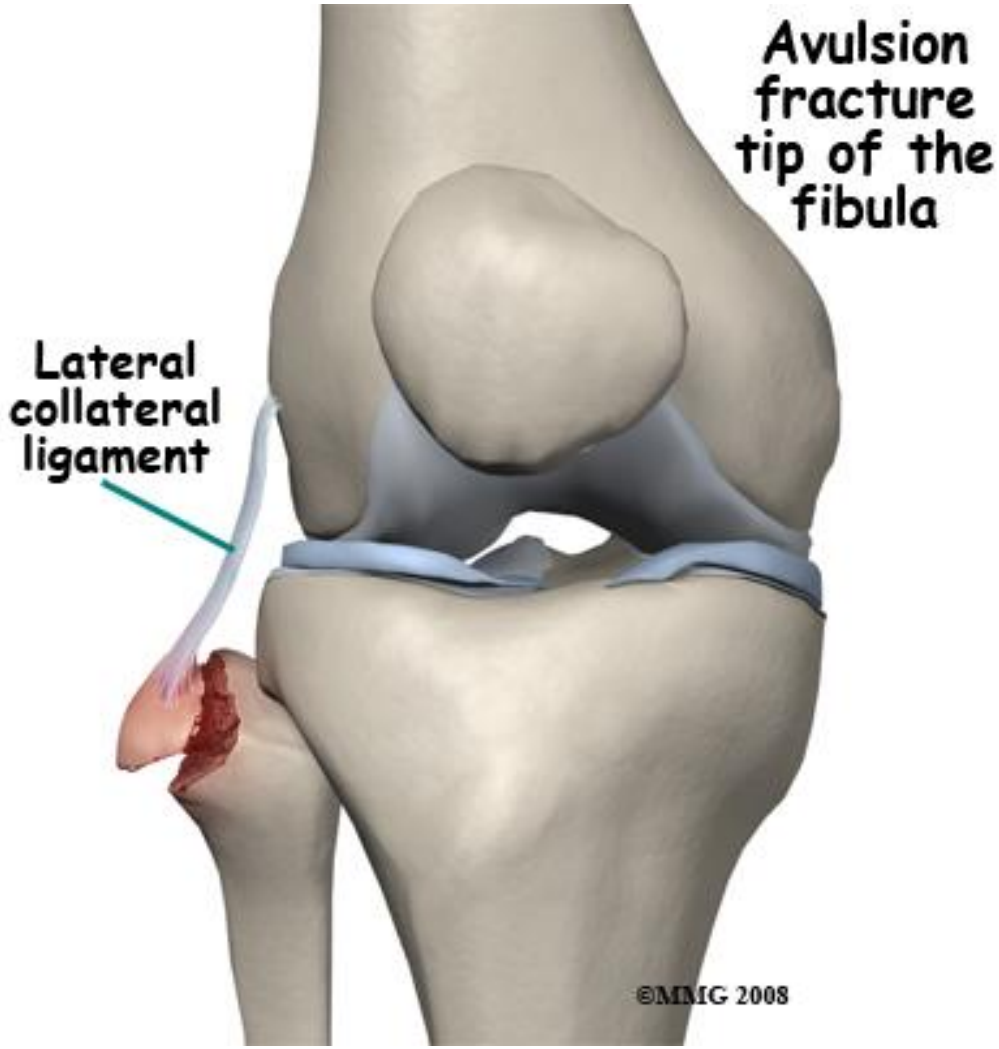
- Treatment
  - –Grades 1-2[16]
    - Physical therapy
      - –Focus on quadriceps strengthening
  - –Grades 3
    - Surgery – PCL reconstruction[17]

Lateral and Medial Collateral Ligaments

- The MCL is injured more often than the LCL. Due to the more complex anatomy of the outside of the knee,
- History of trauma with valgus/valrus mechanism
- Medial or lateral knee pain
- Physical exam
  - Tenderness / swelling
  - Medial/lateral joint space opening with valgus/valrus stress at 30° (grade 0-3)



Lateral and Medial Collateral Ligaments



Lateral and Medial Collateral Ligaments

Collateral ligaments Injury

- Treatment
  - –Most isolated heal –non-surgically
    - Bracing[18]
    - PT[18]
  - –If not isolated or instability/laxity persist then surgery[19]

Traumatic Fractures/Tendon Ruptures

- Patella
- Tibia Plateau
- Fibula head
- Quadcriceps tendon rupture
- Patella tendon ruptures

References

1. Hede A, Jensen DB, Blyme P, Sonne-Holm S. Epidemiology of meniscal lesions in the knee. 1,215 open operations in Copenhagen 1982–84. Acta Orthop Scand. 1990;61(5):435–437.
2. Poehling GG, Ruch DS, Chabon SJ. The landscape of meniscal injuries. Clin Sports Med. 1990;9(3):539–549.
3. Nielsen AB, Yde J. Epidemiology of acute knee injuries: a prospective hospital investigation. J Trauma. 1991;31(12):1644–1648.
4. Greis PE, Bardana DD, Holmstrom MC, Burks RT. Meniscal injury: I. Basic science and evaluation. J Am Acad Orthop Surg. 2002;10(3):168–176.
5. Veronica Mezhov, Andrew J Teichtahl, Rupert Strasser, Anita E Wluka, Flavia M Cicuttini·Meniscal pathology - the evidence for treatment. Arthritis Res Ther. 2014; 16(2): 206.
6. Anh-Dung Nguyen, Michelle C. Boling, Beverly Levine, and Sandra J. Shultz. Relationships Between Lower Extremity Alignment and the Quadriceps Angle. Clin J Sport Med. 2009 May; 19(3): 201–206.
7. Mandelbaum BR, Silvers HJ, Watanabe DS, Knarr JF, Thomas SD, Griffin LY, Kirkendall DT, Garrett W Jr. Effectiveness of a neuromuscular and proprioceptive training program in preventing anterior cruciate ligament injuries in female athletes: 2-year follow-up. Am J Sports Med. 2005 Jul;33(7):1003-10.
8. Hewett TE, Zazulak BT, Myer GD.Effects of the menstrual cycle on anterior cruciate ligament injury risk: a systematic review. Am J Sports Med. 2007 Apr;35(4):659-68.
9. Trees AH, Howe TE, Grant M, Gray HG. Exercise for treating anterior cruciate ligament injuries in combination with collateral ligament and meniscal damage of the knee in adults. Cochrane Database Syst Rev. 2007 Jul 18;(3):CD005961.
10. Tagesson S, Oberg B, Good L, Kvist J. A comprehensive rehabilitation program with quadriceps strengthening in closed versus open kinetic chain exercise in patients with anterior cruciate ligament deficiency: a randomized clinical trial evaluating dynamic tibial translation and muscle function. Am J Sports Med. 2008;36(2):298–307.
11. Swirtun LR, Jansson A, Renstrom P. The effects of a functional knee brace during early treatment of patients with a nonoperated acute anterior cruciate ligament tear: a prospective randomized study. Clin J Sport Med. 2005;15(5):299–304
12. Mohtadi NG, Chan DS, Dainty KN, Whelan DB. Patellar tendon versus hamstring tendon autograft for anterior cruciate ligament rupture in adults. Cochrane Database Syst Rev. 2011 Sep 7;(9):CD005960.
13. Tiamklang T, Sumanont S, Foocharoen T, Laopaiboon M. Double-bundle versus single-bundle reconstruction for anterior cruciate ligament rupture in adults. Cochrane Database Syst Rev. 2012 Nov 14;11:CD008413.
14. Ellis HB, Matheny LM, Briggs KK, Pennock AT, Steadman JR. Outcomes and revision rate after bone-patellar tendon-bone allograft versus autograft anterior cruciate ligament reconstruction in patients aged 18 years or younger with closed physes. Arthroscopy. 2012 Dec;28(12):1819-25.
15. Kaeding CC, Aros B, Pedroza A, Pifel E et al. Allograft Versus Autograft Anterior Cruciate Ligament Reconstruction: Predictors of Failure From a MOON Prospective Longitudinal Cohort..Sports Health. 2011 Jan;3(1):73-81.
16. Fernandez, Matthew; Pugh, David (2012). "Multimodal and interdisciplinary management of an isolated partial tear of the posterior cruciate ligament: a case report". Journal of Chiropractic Medicine 11 (2): 84–93.
17. Wind, William M.; Bergfeld, John A.; Parker, Richard D. (2004). "Evaluation and Treatment of Posterior Cruciate Ligament Injuries: Revisited". The American Journal of Sports Medicine 32 (7): 1765–75.
18. Stannard JP. Medial and posteromedial instability of the knee: evaluation, treatment, and results.Sports Med Arthrosc. 2010 Dec;18(4):263-8.
19. Duffy PS, Miyamoto RG. Management of medial collateral ligament injuries in the knee: an update and review.Phys Sportsmed. 2010 Jun;38(2):48-54

Thank You