The 5 Minute Knee Exam for the Generalist

Christina R. Allen, MD
Clinical Professor
UCSF Sports Medicine

History - 95% of the Diagnosis

- What, How, When did the injury happen?
- Mechanism
- Where does it hurt?
- Did you hear/feel a “pop”?
- Swelling? If so, immediate or delayed?
- Locking, or inability to go through a FROM?

RED FLAGS - Don’t Miss these…

- Night pain
- Fever
- Weight Loss
- Limp
- THINK ABOUT INFECTION OR TUMOR!!!
  - Always check the hip and back

Knee Physical Exam-General

- Standing Evaluation
- Supine
- Sitting
- Modify Exam for Acute Injury
- Always examine both knees - Normal vs Abnormal

Disclosures

- OREF (Orthopaedic Research and Education Foundation) - Research Grant Recipient
Physical Examination - Standing

• Always examine both knees
• Standing position:
  • Gait
  • alignment (Varus, Valgus),
  • obesity, LLD, atrophy
  • torsional deformities (tibial)
  • feet (pronation)
  • Squat ability, pain with squat (where)?- Patellofemoral or Meniscus based on location
  • Thessaly’s Test- Meniscus

THESSALY TEST

Physical Examination - Supine

Supine position:
• Always examine both knees
• Effusion (15 cc-> quad inhibition)
• Quadriceps Atrophy
• Range of Motion
• Palpate soft tissues
• Joint Line Tenderness
• McMurray’s test (Meniscus)
• Ligament Exam
  • ACL, PCL, MCL, Posterolateral Corner

JOINT LINE TENDERNESS

• Palpation of the anterior, middle, and posterior parts of both the medial and lateral joint spaces.

<table>
<thead>
<tr>
<th>SENSITIVITY</th>
<th>SPECIFICITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>85%</td>
<td>30%</td>
</tr>
</tbody>
</table>

Fowler and Lubliner, 1989

MCMURRAY’S TEST

• Knee is flexed and placed in external rotation
• Examiner applies a valgus or varus force
• Knee is then extended.
• (+) = Pain and/or a popping/snapping sensation.

<table>
<thead>
<tr>
<th>SENSITIVITY</th>
<th>SPECIFICITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>29%</td>
<td>96%</td>
</tr>
</tbody>
</table>

Fowler and Lubliner, 1989

McMurray’s Test

ACL Injury

ANTERIOR DRAWER TEST
- Hip flexed at 45°, knee flexed at 90°
- With both thumbs placed on the joint line, the tibia is gently drawn forward.
- Excursion of the tibia is compared with the unaffected side.

SENSITIVITY: 41%
SPECIFICITY: 95%

Katz and Fingeroth, 1986

LACHMAN’S TEST
- 15° - 30° of knee flexion
- The femur is stabilized with one hand and the tibia is gently drawn forward with the opposite hand.
- (+) = Anterior translation of the tibia with a “soft” or “mushy” endpoint
- BEST TEST FOR ACL INJURY

SENSITIVITY: 82%
SPECIFICITY: 97%

Katz and Fingeroth, 1986
LACHMAN’S TEST

PIVOT SHIFT TEST

- Tibia is internally rotated and axially loaded while applying a gentle valgus stress to the knee. Start at full extension.
- Knee is then slowly brought into flexion.
- (+) = “Shift” felt with subluxation/reduction of the lateral tibial plateau anteriorly as the knee is brought into further flexion at ~30°

<table>
<thead>
<tr>
<th>SENSITIVITY</th>
<th>SPECIFICITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>81%</td>
<td>98%</td>
</tr>
</tbody>
</table>

Katz and Fingeroth, 1986

PIVOT SHIFT TEST

Galway RD, Beaupre A, Macintosh DL: Pivot Shift: A Clinical Sign of Symptomatic ACL Insufficiency

PCL Injury
POSTERIOR SAG SIGN

- Knee is placed in a resting position at 90 degrees flexion
- (+) = “Sag” posteriorly
- Compare with the opposite side.

POSTERIOR DRAWER TEST

- Hip flexed at 45°, knee flexed at 90°
- With both thumbs placed on the joint line, the tibia is gently pushed posteriorly.
- Excursion of the tibia is compared with the unaffected side.

PCL INJURY

LCL Injury
VARUS STRESS TESTS

- A Varus stress is applied both in full extension and in 20-30° of flexion
- Test in extension checks for injury of posterolateral corner structures (may see some laxity with isolated LCL injury)
- Test in flexion evaluates LCL
- Grading of Injury based on Jt. Space opening:
  - Grade I: 0 to 5 mm
  - Grade II: 6 to 10 mm
  - Grade III: 11 to 15 mm

VARUS STRESS TEST-LCL INSTABILITY

PLRI- Dial test

- Patient may be tested supine or prone
- Side to side difference > 15° abnormal
- Test at 30 and 90 degrees of flexion
- ↑ External rotation at 30°: Isolated PLS injury
- ↑ External rotation at 30°, 90°: PLS+PCL injury

MCL Injury
VALGUS STRESS TESTS
- A Valgus stress is applied both in full extension and in 20-30° of flexion
- Test in extension checks for injury of posteromedial corner structures (capsule, semimembranosus connections)
- Test in flexion evaluates MCL
- Grading of Injury based on Joint Space opening:
  - Grade I: 0 to 5 mm
  - Grade II: 6 to 10 mm
  - Grade III: 11 to 15 mm

MCL Instability
- Patella Mobility/glide (quadrant system)
- Patella Tilt (retinaculum tightness)
- Apprehension Test (instability)
- Clarke’s sign (PF pain)
- Patella Facet and condyle tenderness
- Symmetric strength/flexibility of quads, hamstrings, gastroc/soleus, ITB, hip flexors, hip Ext Rotators
- Hip ROM
- Q-angle
- Lateral Position: Ober’s test- IT band

Patellar Apprehension Sign
- PF instability Tests
  - 90° seated “Q” angle
    - avg. nl = 4.3°
  - “J” tracking with extension
  - ligamentous laxity
    - elbows, knees, thumb-forearm
    - 2nd MCP joint, shoulders
- Ligament Exams
  - ACL- Modified Lachman Test

Physical Examination-Supine
- Patella Mobility/glade (quadrant system)
- Patella Tilt (retinaculum tightness)
- Apprehension Test (instability)
- Clarke’s sign (PF pain)
- Patella Facet and condyle tenderness
- Symmetric strength/flexibility of quads, hamstrings, gastroc/soleus, ITB, hip flexors, hip Ext Rotators
- Hip ROM
- Q-angle
- Lateral Position: Ober’s test- IT band

Physical Examination-Sitting
- Patella Mobility/glade (quadrant system)
- Patella Tilt (retinaculum tightness)
- Apprehension Test (instability)
- Clarke’s sign (PF pain)
- Patella Facet and condyle tenderness
- Symmetric strength/flexibility of quads, hamstrings, gastroc/soleus, ITB, hip flexors, hip Ext Rotators
- Hip ROM
- Q-angle
- Lateral Position: Ober’s test- IT band
Modified Lachman’s Test (ACL)