Evaluation of the Painful Knee in the Primary Care Setting

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Disclosure of Financial Relationships

C. Christopher Smith, MD

Has no relationship with any entity producing, marketing, reselling or distributing health care goods or services consumed by, or used on patients.
The Painful Knee

- Anatomy
- History
- Essentials of the knee exam
- Specific physical exam maneuvers
- Additional diagnostic studies
- Initial treatment
A 23-year-old male with no prior orthopedic injuries presents to your clinic one day after injuring his right knee during a game of touch football. He recounts that the injury occurred when another player fell onto the lateral aspect of his right knee. He was able to continue playing, but with a slight limp.

He did not notice a “pop,” or immediate swelling. There is no laxity or “catching.” The pain is on the medial aspect of his right knee, just above the joint line.

Exam reveals slight medial swelling, but no ecchymosis. There is tenderness to palpation just superior to the medial joint line and pain with valgus stress, but a solid end point and no laxity.
Causes of Knee Pain

**Acute Knee Pain**
- MCL/LCL injury
- ACL/PCL injury
- Fracture
- Bursitis
- Infection

**Chronic Knee Pain**
- Osteoarthritis
- Patellofemoral Pain
- Rheumatoid Arthritis
- Tumor

- Meniscal Injury
- Osteoarthritis
- ACL
The Painful Knee

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  • History
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History

- Prior Injury
- Location of Pain
- Exacerbating/Alleviating Factors
- Mechanism of Injury
Mechanism of Injury

Right Knee
History

- “Pop”
- Immediate swelling?
- “Giving way” or “Laxity”
- “Locking” or “Catching”
- Able to return to activity?
- Bear weight?
The Painful Knee

• Anatomy
• History
• Essentials of the knee exam
• Specific physical exam maneuvers
• Initial treatment
Physical Examination

- Inspect
  - Gait
  - Alignment
  - Quad Atrophy
  - Bruising
  - Deformity

Varus  Valgus
Physical Examination

- Palpation
  - Tibial Tuberosity → Patella
  - Bursae
  - Joint lines
  - Popliteal fossa
  - Intra/Extra Articular Swelling
    - Ballotment
    - Milking
Physical Examination

- Range of Motion
  - Passive and Active
    - Flexion (130-150 degrees)
    - Extension (0-minus 10 degrees)
      - Pain with active but not passive ROM indicates soft tissue disorder
      - Pain equal with active and passive ROM likely indicates intraarticular process
  - Patella Tracking
  - Valgus and Varus Stress
Physical Examination

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Medial Collateral Ligament Sprain

- “Sprained” Knee
- Direct trauma to the side opposite the location of pain (valgus stress)
- If mild, can continue with activity
  - Most commonly involves proximal MCL
  - Pain with valgus stress
Medial Collateral Ligament Sprain

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- Direct trauma to the side opposite the location of pain (valgus stress)
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- Most commonly involves proximal MCL
- Pain with valgus stress
What is the best next step in the management of this patient?

A. X-ray of the knee to rule out a fracture
B. MRI of the knee to determine severity of MCL injury
C. Refer to orthopedics to help manage the MCL injury
D. Intra-articular steroid injection to relieve pain
E. Rest, Ice, Compression, Elevation, NSAIDs and Physical Therapy
Valgus Stress and MCL Strain

▪ First Degree Sprain
  • Tenderness along MCL
  • <5mm laxity but solid end point

▪ Second Degree Sprain
  • Laxity at 30° flexion, not in full extension
  • Solid end point

▪ Third Degree Sprain
  • Significant laxity at 30°; laxity in full extension
  • No solid end point
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Treatment of MCL Strain

- Grade I and II managed conservatively
- Rest, Ice, Compression, Elevation and NSAIDs
- Physical Therapy to restore ROM and to regain muscle strength
- Brace to protect knee from further injury
- Grade III can also be treated conservatively but would need to rule out other ligamentous injury
  - MRI
  - Refer to orthopedics
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  - Refer to orthopedics
A 39-year-old male presents to you office on a wheelchair pushed by his 14-year-old son. This morning while playing soccer with his son, he stopped suddenly and planted his right knee to turn; his knee gave out and he fell to the ground. He noted a “pop” and immediate pain and swelling in her knee. He had to be helped off the field and reports that his leg feels “unstable.”
What is your diagnosis?

A. Anterior Cruciate Ligament Injury
B. Posterior Cruciate Ligament Injury
C. Meniscal Injury
D. Medial Collateral Ligament Strain
E. Lateral Collateral Ligament Strain
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Anterior Cruciate Ligament Injury

- History of forced hyperextension (clipping), noncontact deceleration or “cutting” or “twisting” movement—especially with planted foot and valgus stress
boston.com, accessed 9/08
http://www.boston.com/sports/football/patriots/gallery/09_07_08_brady?pg=2
Which group records the highest incidence of ACL injuries?

A. Men with contact injuries  
B. Men with non-contact injuries  
C. Women with contact injuries  
D. Women with non-contact injuries
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Anterior Cruciate Ligament Injury

- History of forced hyperextension (clipping), noncontact deceleration or "cutting" or twisting movement—especially with planted foot and valgus stress
- "Pop"
- Unable to continue activity
- Reported instability
- Rapid effusion
- More common in women
Anterior Cruciate Ligament Injury

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- “Pop”
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- Rapid effusion
- More common in women

Spindler, NEJM 2008
In suspected ACL injury, which maneuver is the most useful in confirming the diagnosis?

A. Anterior Drawer
B. Posterior Drawer
C. Lachman Test
D. Tibial Sag
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Anterior Drawer Test
Lachman Maneuver
### Physical Exam of ACL

<table>
<thead>
<tr>
<th></th>
<th>Sensitivity</th>
<th>Specificity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anterior Drawer:</td>
<td>48-62%</td>
<td>67-87%</td>
</tr>
<tr>
<td>Lachman:</td>
<td>84-87%</td>
<td>93-100%</td>
</tr>
<tr>
<td>Composite Exam:</td>
<td>82%</td>
<td>94%</td>
</tr>
</tbody>
</table>

- Exam is less accurate if hemarthrosis
- 70% of acute knee hemarthrosis due to ACL
- Limited data on historical features
- Assess for other injuries
  - Isolated ACL tear in <10%

Jackson, Ann Intern Med 2003
Scholten, J Fam Pract 2003
Solomon, JAMA 2001
Treatment of ACL Injuries: Not everyone needs surgery!

- Depends on injury and level of patient activities
- Consider surgery in patients with complete tear and
  - <40 years of age--*new data may challenge this*
  - High function level for recreation, work, sports
  - Associated damage to menisci or collateral ligaments
  - Ongoing knee pain, swelling or episodes of laxity
  - Able to commit and comply with rehab (6-12 months)

- Without surgery many develop OA

Frobell, BMJ 2013; Frobell, NEJM 2010
A 42-year-old female presents with two weeks of intermittent knee pain. It began when she accidentally stepped off the curb, twisting her knee. She was able to continue her walk with only mild discomfort. The next day she noted a small effusion, which now “comes and goes.” Her pain is exacerbated by twisting and turning. She also notes that her knee frequently “catches” or “locks.”
What is your diagnosis?

A. Anterior Cruciate Ligament Injury  
B. Posterior Cruciate Ligament Injury  
C. Meniscal Injury  
D. Medial Collateral Ligament Strain  
E. Lateral Collateral Ligament Strain
What is your diagnosis?

A. Anterior Cruciate Ligament Injury
B. Posterior Cruciate Ligament Injury
C. Meniscal Injury
D. Medial Collateral Ligament Strain
E. Lateral Collateral Ligament Strain
What is the most appropriate next step in management of this patient?

A. MRI of the knee
B. Arthrocentesis
C. Orthopedic surgery referral
D. Physical therapy
Meniscal Injuries

- Very common knee injury
- Either Acute or Chronic Pain
- Twisting or cutting while weight bearing
Meniscal Injuries

http://commons.wikimedia.org/wiki/File:Gray349.png
Meniscal Injuries: History

- Twisting or cutting while weight bearing
- Often initially able to continue activity
- Clicking, catching, locking
  - Especially if tear extends anteriorly beyond the MCL ("bucket-handle tear")
- Delayed effusion
- Intermittent pain—usually with rotational movements

Englund, NEJM 2008
Meniscal Injuries are Common!

- 35% of all patients
- 80% of patients with osteoarthritis
- Therefore important to be sure of the diagnosis

Englund, NEJM 2008
Meniscal Injury—Physical Exam

- Joint line tenderness
- Thessaly test
- Duck Walk
- McMurray’s test
- Lachman—one third also have ACL injury
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Grover, Am Fam Phys, 2012

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Management of Meniscal Injuries

- Treatment depends on degree of symptoms and patient’s functional status
  - Anti-inflammatory medications
  - PT—straight leg raises to restore strength
  - Consider orthopedic referral if pain and disability persist for 2-4 weeks.
- In setting of OA and meniscal tear, arthroscopic surgery and PT had similar outcomes
With a negative clinical examination, what is the likelihood of having a significant mechanical derangement of the knee?

A. 1.5%
B. 5%
C. 10%
D. 25%
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Power of Physical Examination

- Given prevalence in primary care setting, likelihood of ligamentous or meniscal tear is <1.5% if exam is negative
- If exam is positive, post test probability is 50%
- MRI is slightly more sensitive, but less specific

Jackson, Ann Intern Med 2003
Scholten, J Fam Pract 2001
Solomon, JAMA 2001
Rose, Arthroscopy 1996
Summary

- Knee pain is a common presentation to primary care providers
- There is a wide range of causes of both acute and chronic knee pain
- A detailed history can provide invaluable clues to the diagnosis
- A careful, systematic physical examination is essential to confirm the etiology of knee pain
- Most causes of knee pain can be accurately diagnosed and treated by PCPs
Summary

- Look for clues in the history—pop, laxity, catching
- Systematic examination—inspection, palpation, ROM and specific maneuvers
- MCL “sprain”—valgus stress, tenderness along MCL
- ACL—sudden deceleration/hyperextension, pop, laxity, immediate effusion, Lachman
- Meniscus—plant/twist injury, delayed effusion, catching, joint line pain, McMurray
Selected References

Clinical Evaluation of the Knee—Review Article and Video
Teresa L. Schraeder, MD, Richard M. Terek, MD, & C. Christopher Smith, MD


July 22, 2010

Selected References

Selected References

- Solomon D, et al. Does This Patient Have a Torn Meniscus or Ligament of the Knee? JAMA 2001;286:1610-1620.
- Spindler K, Wright R. Anterior Cruciate Ligament Tear. NEJM 2008;359:2135-42.