

**American College of Physicians - Internal Medicine Meeting 2024  
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**Diagnosis-Driven Physical Examination of the Knee**

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# DIAGNOSIS-DRIVEN PHYSICAL EXAMINATION OF THE KNEE

ACP Musculoskeletal Medicine Teaching Group  
ACP National Conference 2024

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## ACP KNEE EXAM CLINICAL SKILLS WORKSHOP FACULTY



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## OBJECTIVES

1. Organize the knee musculoskeletal exam
2. Identify key historical factors in a patient with knee pain
3. Palpate key anatomical structures of the knee
4. Perform key provocative maneuvers of the knee exam and interpret towards likely diagnosis

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## MUSCULOSKELETAL ORGANIZATIONAL SCHEME

- History
- Inspection
- Palpation
- Range of motion
- Provocative tests

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## COMMON PRIMARY CARE KNEE CONDITIONS

- Essential
  - Patellofemoral syndrome (PFPS)
  - Meniscus tear
  - Osteoarthritis (OA)
- Bonus
  - Anterior cruciate ligament (ACL) tear
  - Medial collateral ligament (MCL) tear
  - Pes anserine bursitis
  - Iliotibial band (ITB) syndrome

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**KEY KNEE HISTORY:  
MOST COMMON DIAGNOSES IN PC**

	Patellofemoral pain syndrome (PFPS)	Meniscus tear	OA
<b>Demographic</b>	Younger/female	Young- middle age	Older
<b>Activity</b>	Overuse injury	Acute or degenerative	Acute or overuse
<b>Swelling</b>	Soft tissue (no effusion)	+/- effusion	+/- effusion
<b>Locking</b>	May endorse but usually crepitus	If bucket handle tear	May endorse but usually crepitus
<b>Instability</b>	Pain may lead to this esp. down hills/ stairs	Not usually	Preceded by pain

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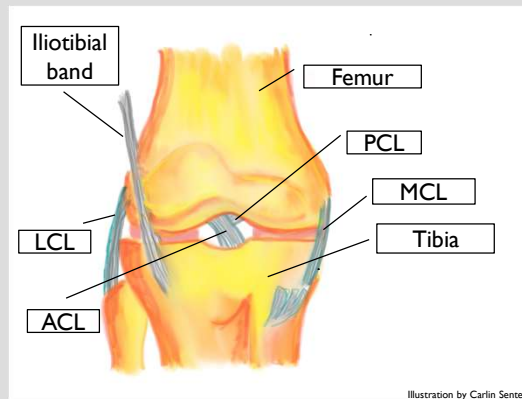
**BONUS CONDITIONS**

	ACL tear	MCL tear	Pes anserine bursitis	ITB syndrome
<b>Demographic</b>	Usually under 40	Any age	Middle/Upper age	Any age
<b>Mechanism of injury</b>	Traumatic/twisting injury (noncontact)	Valgus force to the knee	Overuse/limping	Running, overuse
<b>Swelling</b>	Yes, within an hour	Yes, medially	Yes	No
<b>Locking</b>	No, unless concomitant bucket handle meniscal tear	No	No	No
<b>Location of pain</b>	Nonlocalizable, possibly lateral	Medial knee	Anteromedial aspect of the proximal tibia	Lateral knee
<b>Instability</b>	Yes	No, unless high grade tear	No	No

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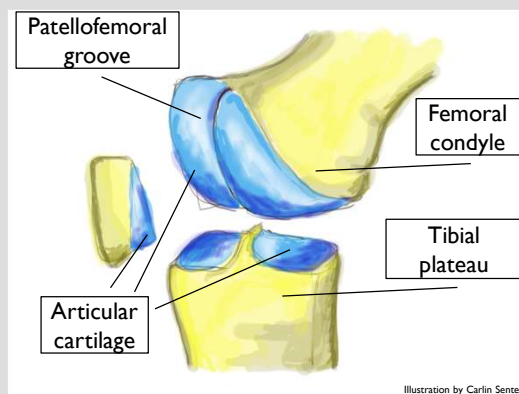
## KNEE ANATOMY – 4 LIGAMENTS

1. ACL
2. PCL
3. MCL
4. LCL



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## 3 SURFACES



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## MENISCUS

- Medial and lateral
- Shock absorber
- Stabilizer



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## KNEE BURSAE

1. Suprapatellar bursa
2. Prepatellar bursa  
*“housemaids knee”*
3. Infrapatellar bursa
4. Pes Anserine bursa



[http://www.aidmybursa.com/\\_img/prepatellar-bursitis.jpg](http://www.aidmybursa.com/_img/prepatellar-bursitis.jpg)

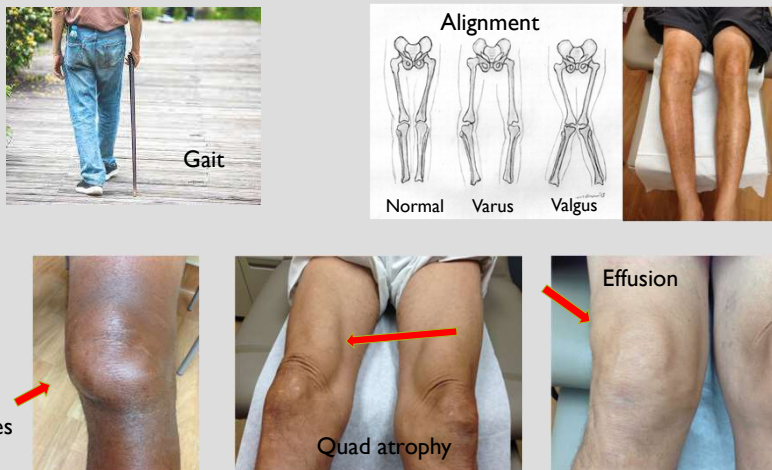
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## KNEE EXAM

- Inspection
    - Abnormal gait
    - Alignment: Varus, valgus, neutral
    - Bony abnormalities
    - Quad atrophy
    - Erythema
  - Palpation with knee extended
    - Evaluate for effusion
    - Quad, patellar tendons, tibial tubercle
    - Patellar facets
    - Patellar grind test
  - Range of motion
  - Crepitus
  - Palpation with knee flexed 90 degrees
    - Joint lines, bony prominences
    - MCL, LCL tenderness
    - ITB, Gerdy's tubercle
    - Pes anserine bursa
  - Provocative Tests
    - Ligaments
      - Anterior/Posterior drawer (ACL/PCL) – 90 degrees
      - Lachman (ACL) – 30 degrees
      - Varus stress (MCL)
      - Valgus stress (LCL)
    - Meniscus
      - McMurray
      - Thessaly\*\* - standing
      - Squat\*\* - standing
- \*\* Standing tests done if suspect meniscal tear and patient doesn't have significant knee OA

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## INSPECTION



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## PALPATION WITH KNEE EXTENDED

- Evaluate for effusion
- Quad, patellar tendons, tibial tubercle
- Patellar facets
- Patellar grind test

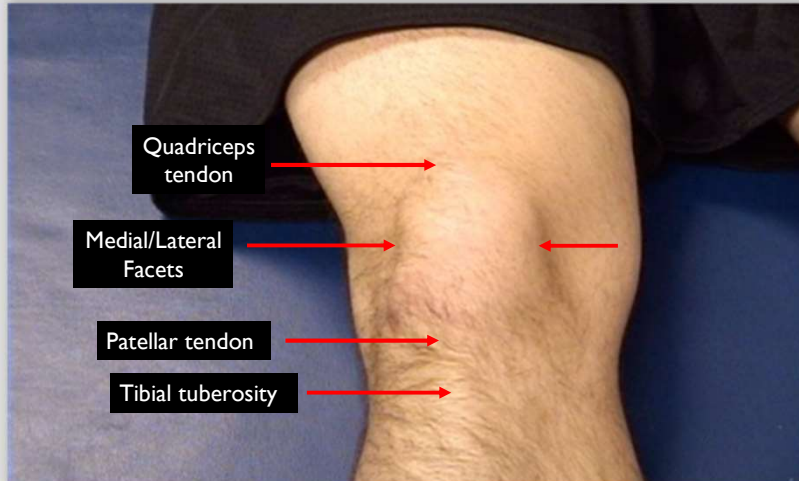
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## EFFUSION



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## PATELLA



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## PALPATION OF PATELLAR FACETS



Note: There is no audio accompanying this video

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## PATELLAR GRIND TEST

Examiner positions hand at superior pole of patella to 'trap' patella then asks patient to gradually and gently contract the quadriceps muscle. Anterior knee pain with this motion is (+) patellar grind test indicating patellofemoral joint pathology.



Note: There is no audio accompanying this video

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## KNEE RANGE OF MOTION

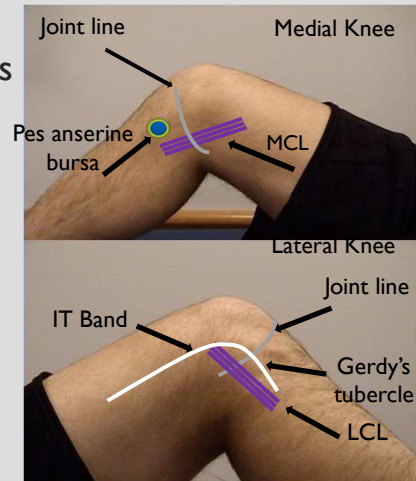
- ROM: normal 0-135
  - Feel for crepitus
  - Determine if knee is locking or if ROM is limited due to:
    - effusion
    - pain/guarding/stiffness
  - Locking: think bucket handle meniscal tear
    - Urgent xrays, MRI
    - Urgent referral to sports surgeon for arthroscopy



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## PALPATION WITH KNEE FLEXED 90 DEGREES

- Joint lines, bony prominences
- MCL, LCL tenderness
- ITB, Gerdy's tubercle
- Pes anserine bursa



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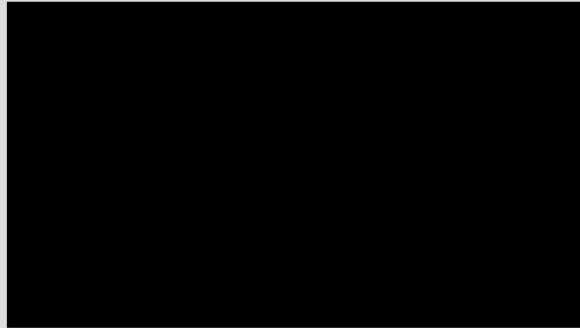
## PROVOCATIVE TESTS

- Ligaments
  - Anterior/Posterior drawer (ACL/PCL) – 90 degrees
  - Lachman (ACL) – 30 degrees
  - Varus stress (MCL)
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- Meniscus
  - McMurray
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\*\* Standing tests done if suspect meniscal tear and patient doesn't have significant knee OA

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## ANTERIOR DRAWER FOR ACL



This is a normal exam (no laxity)

*Low sensitivity 48% and specificity 87% compared to Lachman's test for ACL*

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## POSTERIOR DRAWER FOR PCL



This is a normal exam (no laxity)

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## LACHMAN TEST FOR ACL

This is a negative Lachman test: there is an endpoint to the anterior tibial translation.



Note: There is no audio accompanying this video

*Sensitivity 75-100%, Specificity 95-100%*

Magee, DJ. Orthopaedic Physical Assessment, 5<sup>th</sup> ed. 2008.

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## POSITIVE LACHMAN



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## VALGUS STRESS FOR MCL AND VARUS STRESS FOR LCL



This is a normal exam (no laxity)

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## MENISCUS: MCMURRAY TEST

Lateral meniscus:  
Internally rotate the  
tibia and extend  
Medial meniscus:  
Externally rotate  
the tibia and extend

Pain and/or  
snap/click at the  
joint line =  
concerning for  
meniscus tear

*Sensitivity medial 65%, Specificity medial 93%*

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## MENISCUS: THESSALY TEST

Medial Meniscus:  
Pain medially  
when pivot  
medially  
Lateral Meniscus:  
Pain laterally  
when pivot  
laterally



Note: There is no audio accompanying this video

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## MENISCUS: SQUAT

Deep squat increases compression on posterior horn meniscus. Patient stands flat-footed while examiner holds their hands for balance, and the patient goes as low as possible. (+) if knee medial or posterior joint line pain reproduced or feeling of locking during knee flexion (while knees are bent).



**Sensitivity 75-77%, Specificity 36-42%**  
**(Snoeker BAM et al. JOSPT, 2015)**

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