Osteopathic Manipulation for the Knee and Shoulder

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Disclosure Statement
Nothing to disclose
Learning Objectives for the Knee

• Review the approach to the knee exam
• Discuss causes of knee effusion
• Discuss causes of patellar pain
• Discuss causes of joint line pain
• Discuss causes of knee instability
• Demonstrate OMM for several knee diagnoses including meniscus and patellofemoral pain syndrome

Learning Objectives for the Shoulder

• Review the approach to the shoulder exam
• Discuss causes of anterior shoulder pain
• Discuss causes of poor range of motion of the shoulder
• Discuss shoulder pain being referred pain
• Demonstrate OMM for several shoulder diagnoses including tendinitis and capsulitis
General Assessment of the Knee

• It should be an integrated exam borrowing on multiple specialties including rheumatology, orthopaedics and the osteopathic
• Rheumatology = looking for inflammation and swelling
• Orthopaedics = looking for deformity and or ligamentous laxity/stability
• Osteopathic = the above and a structural exam which will encompass the joint above and below
Pathology in the lumbar spine, hip, ankle or foot can refer to the knee

Observation

- Working down from the top of the femur to the foot, examine the patient for visible asymmetry
- Look for evidence of soft tissue injury (swelling, erythema, skin discoloration), bony deformity, positional change or alterations in muscle bulk
- Compare the left side with the right side and areas located superiorly with areas located inferiorly
- Remember T.A.R.T. (Tenderness Asymmetry Restriction of motion Tissue texture changes)
Anatomic Knee Landmarks

- Bone - femur, tibia, head of the fibula and patella.
- Cartilage - the medial and lateral menisci
- Ligaments - Collateral & Cruciate
- Tendon – Patella, iliotibial band, pes anserine, biceps femoris, semi-membranous

Knee Bone Landmarks

- femur
- tibia,
- head of the fibula
- patella
Knee Cartilage Landmarks

- the medial and lateral menisci: plates of fibrocartilage that lie on the articular surface of the tibia.

Knee Ligament Landmarks

- Collateral ligaments
  1. Lateral collateral ligament
  2. Medial collateral ligament

- Cruciate ligaments (not directly palpable)
  1. Anterior cruciate ligament
  2. Posterior cruciate ligament
Knee Tendon Landmarks

- Patella
- Iliotibial band
- Biceps Femoris
- Semimembranous
- Pes Anserine (Sartorius Gracilis Semitendinosus)
Knee Tendon Landmarks

- Iliotibial band

Knee Tendon Landmarks

- Biceps femoris
Causes of Knee Effusion

• Overuse
• Internal derangement
• Hyaline cartilage wear and tear
• Malalignment

Causes of Patellar Pain

• Lateral tracking
• Chondromalacia
• Tight iliotibial band
• Plica band
• Tight hamstrings
Q – Angle and Lateral Tracking

• Q stands for quadriceps
• The angle between a line from the ASIS to the center of the patella and line from center of the patella through the center of the tibial tubercle
• Men: normal in 14 degrees
• Woman: normal is 17 degrees
Patellofemoral Pain Syndrome (PFPS)

• Imbalance between the medial and lateral quadriceps group
• Abnormal patella glide with motion a.k.a. “lateral tracking”
• Tenderness at the facets
• Palpate for plica bands (a sleeve or fold of synovial tissue)

Patellofemoral Pain Syndrome from symptomatic plica bands
Causes of Joint Line Pain

- Meniscal pathology
- Medial collateral ligament sprain

Causes of Knee Instability

- Internal derangement
- Pain
Anterior Cruciate ligament

• Arises from the anterior aspect of the intercondylar area of the tibia
• Extends superior and posterior to medial side of the lateral condyle of the femur
• Prevents anterior displacement of the tibia on the femur
• Prevents hyperextension of the knee

Anterior Cruciate Ligament

• Tear typically causes immediate swelling
• Tested with anterior drawer or Lachman’s test
• Tears when
  • Tibia is driven anterior
  • Femur is driven posterior
  • Hyperextension
ACL Tear

Fig. 3A

In hyperextension

Torn ACL

Fig. 3B

Tibia moving forward under the femur

ACL Tear

[Image of football players in action]
Osteopathic Manipulation For the Knee

• Counterstrain about the knee
• Muscle Energy for hamstrings/adductors/abductors
• HVLA of the fibula head

Counterstrain Principles

• Keep finger on the tender point for the entire treatment
• Treatment is typically for 90 seconds
• In the 90 seconds we are trying to decrease pain, increase blood and lymphatic flow
• The treatment position allows the involved region to be passively shortened
• To be successful there should be 70% improvement in the pain
• Let your patients know they may actually be sore for 24-48 hours after treatment
Muscle Energy Principles

• Operator takes affected region to the barrier
• Patient does active muscle contraction: typically 3-5 lbs. of pressure
• The muscle contraction is towards position of ease
• Operator applies counterforce in an isometric fashion
• Patient contracts 3 to 5 seconds
• Procedure typically repeated 3 to 5 times

Counterstrain for PATELLA

**Indication:** Chondromalacia patella: May also find an acute tender site on the extensor muscle group

| Found in the perimeter of the patella | Pt. Supine. Knee extended. Apply pressure on opposite side of the patella of where the tender point lies |
Medial Meniscus Counterstrain

**Indication:** “Lame knee”, Knee pain, Unable to extend knee

- Medial surface of tibia at the level of the knee joint.
- Pt. Supine, with leg off the table
  - Flex the knee to 40° with marked internal rotation of the tibia. Mild varus of the knee.

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Muscle Energy for the Hamstrings

- Patient is supine
- Stand at same side as tight hamstrings
- With hip and knee at 90 degrees begin extending the leg until you feel the “feather edge” endpoint
- Begin performing muscle energy
Muscle energy for Adduction Dysfunction (Restricted in Abduction): For the gracilis component of the pes anserine

- The physician ADUCTS the supine patient’s restricted hip to the barrier and stands between the leg and the table.
- Have the patient ADDUCT the affected hip while stabilizing the contralateral leg with the other arm. Stabilize the leg in a manner to prevent external rotation. Apply the muscle energy principles.

Muscle energy for an abducted Left Hip for the Tensor Fascia Lata (ITB): doesn’t like to adduct
HVLA: Posterior Fibular Head

• Example = Right posterior fibular head
• Patient is supine...stand at the patient’s right side at the level of the knee
• Place the lateral portion of the proximal end of your left index finger directly behind the head of the R fibula with your left thumb projecting over anterior surface of the tibia
• Grasp the patient’s right leg with your right caudad hand positioned just superior to the malleoli

HVLA: Posterior Fibula Head

• Position the patient’s right knee in extreme flexion
• Corrective movement = apply forward pressure against the head of the fibula with the index finger of the left hand in conjunction with further flexion and external rotation of the tibia with the right caudad hand. This moves the head of the fibula anteriorly on the tibia
• Commonly associated with inversion ankle sprains
HVLA: Posterior Fibula Head

HVLA: Posterior Fibula Head
Approach to the Shoulder Exam

• Inspection
• Palpation
• Range of Motion
• Provocative Testing
Inspection of the Shoulder

- A-C Joint elevation or swelling
- Clavicle head
- Deltoid
- Anterior Shoulder for defects e.g. torn long head of the biceps or pectoralis major
- Scapula
Shoulder Palpation

• A-C joint
• Clavicle head
• Greater Tuberosity
• Long head of the Biceps
• Glenohumeral Joint
• Scapular-Thoracic articulation

Shoulder Range of Motion

• Forward elevation 180 degrees
• Abduction to 180 degrees
• Thumb “hiking” up the back to mid-thoracic spine: T7 in women and T9 in men is the normal landmark. The nondominant limb typically can reach 2 levels higher...this is also known as the Apley scratch test
Apley’s Scratch test (inferior)

Shoulder Provocative Tests

- Neer’s-passive
- Jobe’s-active
- Apprehension-passive
- Cross-over-passive
- Speed’s-active
- Scapular slide test-active
Neer’s Test

• This is a test to evaluate the supraspinatus
• Internally rotate the straightened arm and forward elevate to 180 degrees
• A (+) test produces pain

Neer’s Test – A passive Test
Jobe’s Test

• This tests the supraspinatus
• With the arms abducted to 90 degrees, shoulders internally 180 degrees (so the thumbs are down) bring the arms forward to a position 30 degrees anterior to the true coronal plane
• Have the patient push superiorly against your resistance
• A (+) test creates pain/weakness or both

Jobe’s Test - Active
Apprehension Test

• This is a shoulder stability test
• The examiner places the shoulder in 90 degrees of abduction and flexes the elbow to 90 degrees and the begins externally rotating the shoulder
• A (+) test produces pain and the patient is “worried” you the physician may pop the shoulder out of socket

Apprehension Test - Passive
Cross-Over Test

• This is a passive test to evaluate the A-C joint
• Begin with the arm forward elevated to 90 degrees and shoulder internally rotated 180 degrees so the thumb is down
• Begin slowly “crossing over” past midline to opposite side
• A (+) test creates pain at the A-C joint

Cross-Over test - Passive
Speed’s Test

• A test for long head biceps integrity
• Place the shoulder in 90 degrees of forward flexion with elbow extended and completely supinated
• The patient is then asked to resist as the examiner attempts to push the patient’s arm downward
• A (+) test is pain/weakness or both with this maneuver

Speed’s Test - Active
Scapula Slide Test - Active

- A test to evaluate for scapula dyskinesia
- Shirt off...stand behind patient
- Measure from inferior scapula tip to spinous process (T-7!) of both scapula with arms at side
- Measure again with hands on hips
- A (+) test is >1.5 cm discrepancy is suggestive of impingement and posterior shoulder issues

Scapula Slide Test
Scapular Slide Test

Causes of Anterior Shoulder Pain

- Long head of biceps
- Pectoralis major
- Pectoralis minor
- Supraspinatus
Causes of Anterior Shoulder Pain

- Painful arc
- Frozen shoulder
- Torn supraspinatus
Remember that Shoulder Pain can be referred from the wrist or neck

- Thoracic outlet syndrome
- Foraminal stenosis
- Carpal tunnel syndrome

Osteopathic Manipulation for the Shoulder

- Counterstrain
- Articulatory
- Muscle Energy
Counterstrain for the shoulder

- Supraspinatus
- Long head of the biceps

Counterstrain for supraspinatus
Counterstrain for the Supraspinatus

- Location of the tenderpoint: in the body of the supraspinatus
- Position: pt. supine, flex the shoulder to 45-90 degrees, abduct about 45 degrees, externally rotate to tolerance
- Press on the tender point from superior to inferior and fine tune as you hold for 90 seconds
Counterstrain for long head of the biceps

- Location of the tender point: over the tendon of the long head of the biceps muscle, in the bicipital groove
- Treatment position: pt. supine and dorsum of ipsilateral hand on the forehead, flex shoulder to 90 degrees with the elbow flexed
- Fine tune with internal or external rotation of the shoulder as monitor the tender point with finger pressure from anterior to posterior
Spencer Technique for Shoulder Treatment

• Articulation technique
• Seven (7) articulating procedures
• Includes: traction, stretching, fluid pumping, muscle energy
• Excludes: External Rotation

Indications for Spencer Technique

• Restriction of motion
• Myofascial shortening
• Somatic dysfunction
• Preparation for HVLA
Relative Contraindications for Spencer Technique

• Fracture
• Inflammation
• Infection
• Neurologic signs with treatment
Video of the Spencer Technique

• [https://www.youtube.com/watch?v=YGBJm_1bBmg](https://www.youtube.com/watch?v=YGBJm_1bBmg)
Muscle Energy for the Shoulder

• Tight Pectoralis Minor = causes shoulder protraction, adduction and cuff impingement
• Poor External Rotation of the glenohumeral (g-h) joint

Muscle energy for tight pectoralis minor

• Patient is seated
• Operator behind patient
• Operator places affected shoulder in approximately 120 degrees of abduction with palm up to better isolate the pectoralis minor
• Begin extending the shoulder until you appreciate the “feather edge” barrier
• Start muscle energy
Muscle Energy for tight posterior shoulder capsule which causes poor external rotation of the G-H joint

- Patient is seated
- Operator is behind the patient
- One hand stabilizes the g-h joint
- Abduct affected shoulder to 90 degrees, flex elbow to 90 degrees and then externally rotate the shoulder to 90 degrees with the other hand
- Now begin increasing the external rotation of the shoulder until you meet resistance “feather edge barrier” then begin muscle energy

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