KNEE EXAM & INJECTION

Learning Objectives:
- Learners will be able to perform a systematic examination of the knee
- Learners will understand when to perform x-rays using the Ottawa Knee Rules
- Learners will demonstrate the necessary steps to perform a knee aspiration and injection

Case: A.J. is a 17 year old football player that presents to your office for evaluation of right knee pain. He reports that he injured it yesterday during a football game. He reports that he was running to catch a pass, when he suddenly felt his knee give out and he fell down. He reports that his knee began to swell immediately and he needed help to get off the field to the sidelines. He reports that he is unable to fully bear weight on his right leg and he has difficulty bending and straightening his leg. His pain is currently 7/10 and is relieved with rest and Tylenol.

Knee Examination (I PASS): A useful mnemonic for the knee exam (and any musculoskeletal exam) is I PASS
I: Inspection-Inspect the knee and surrounding area for landmarks, redness, mal-alignment and swelling.
P: Palpation-Identify the following structures and palpate for tenderness: Patellar/peripatellar area, patellar tendon, medial joint line/MCL, lateral joint line/LCL, pes anserine bursa, and popliteal fossa.Also perform patellar ballotment and milking the joint fluid for the presence of knee effusion and palpate for popliteal pulse
A: Active range of motion-Flexion and extension of the knee, noting degree of limitation, if any
S: Strength testing-Test hamstrings and quadriceps with the patient seated and compare with the other leg
S: Special Tests
ACL: Anterior drawer and Lachman ● PCL: Posterior drawer ● Collateral ligaments (MCL/LCL): Valgus and Varus stress tests at 30 and 0 degrees ● Meniscus: Mcmurray and Squat test ● Patellar: Patellar apprehension
Ottawa Knee Rules: Applies only to patients with isolated acute knee injury, age >17, non-pregnant, early assessment, no drugs, and neurologically intact. Patients should have a knee x-ray in any of the following scenarios: Age >55 ● Isolated patellar tenderness ● Fibular head tenderness ● Flexion <90 degrees ● Inability to bear weight immediately or with 4 steps

Knee Aspiration/Injection:
___ Informs patient/guardian reason for performing knee aspiration/injection
___ Briefly explains procedure to patient/guardian
___ Informs patient/guardian of risks and benefits
___ Obtains informed consent and signature is witnessed by office staff member
___ Observes universal precautions
___ Positions patient properly-supine with abdominal and lower extremity muscles as relaxed as possible and knee extended
___ Outlines landmark for entry point (needlecap, thumbnail, indelible pen) at lateral aspect of knee 1cm superior and 1cm lateral to the superolateral aspect of patella
___ Skin preparation for procedure (betadine swabs or alcohol wipes)
___ Maintains proper sterile technique
___ Appropriate local/topical anesthesia (25-gauge needle to infiltrate skin with 1-2mL of 1% Lidocaine or 0.25-0.5 mL of Bupivicaine or topical vapo-coolant) at area of needle entry for aspiration/injection
___ Explains steps of procedure to patient while performing procedure
___ Using an 18-gauge 1.5 inch needle, insertion is made in area of previously determined landmark. The needle should be directed posteromedially along the undersurface of the patella while withdrawing the plunger of the syringe
___ Able to recognize and correct potential reasons for lack of flow (needle repositioning due to placement within the fat pad or thick synovium)
___ Once aspiration is complete, hemostat is used to clamp needle tip in place within the knee joint as the aspirating syringe is removed and the injecting syringe is attached
___ Prior to injecting medication, aspirates slightly to avoid intravascular injection
___ Able to recognize and correct potential reasons for significant resistance or pain during the procedure (needle repositioning without removal from joint space)
___ When aspiration complete, application of compressive dressing and instructions for patient to rest for 24-48 hours, elevate lower extremity and use ice for 20 minutes at a time
___ Sharps disposed of in appropriate container
___ Brief note placed in chart (procedure, sterile technique, tolerated well, hemostasis achieved, neurovascularly intact)

SHOULDER EXAM & INJECTION

Learning Objectives:
• Learners will be able to perform a systematic examination of the shoulder
• Learners will demonstrate the necessary steps to perform a shoulder (AC joint and subacromial) injection

Case: A 48 year old right-handed woman who works as a tennis instructor presents with a four- month history of left-sided shoulder pain of increasing frequency and severity. It is sharp in nature, worse with abduction or internal rotation of the left shoulder and by laying on her left side. No significant weakness, numbness, or popping sensation in the shoulder. Multiple nonsteroidal analgesics have provided insufficient pain relief. Pain is currently 7/10.

Shoulder Examination:
1) Start with neck exam including range of motion and Spurling's test
2) Inspection: Observe patient with arms at sides for asymmetry. • Note any muscle atrophy • Observe any prominence or swelling of the sternoclavicular (SC), acromioclavicular joints (AC), or subacromial bursa
3) Palpation: • SC joint • Clavicle • AC joint • Acromion and subacromial bursa (passively extend at shoulder to move subacromial bursa and rotator cuff into palpable position) • Greater tuberosity of the humerus (lateral and inferior to the acromion) • Bicipital groove (best palpated with arm in external rotation)
4) Range of Motion: First, test active ROM. If the patient is able to complete full ROM actively, there is no need to test passive ROM
5) Strength: Supraspinatus, infraspinatus, teres minor, subscapularis, biceps, and deltoid
6) Sensation: This is important to test if there is suspected dislocation, instability, or fracture
7) Vascular Exam: Again, important to test in suspected dislocation or fracture
8) Specific Maneuvers: AC Joint (Cross arm test) • Biceps tendon (Speed's test) • Impingement (Neer's and Hawkins) • Rotator Cuff tear (Empty can test, resisted external rotation, lift-off test, and belly press test) • Labrum (Crank test, apprehension test, O'Brien's active compression test) • Shoulder Injection

Shoulder Injection:
___ Explains procedure to patient/guardian, reason for procedure, and informs patient/guardian of risks and benefits (bleeding, infection, steroid flare); obtains informed consent
___ Properly prepares equipment for the procedure
___ 2 syringes: 1 – local anesthetic; 2 – steroid/anesthetic mixture for injection
___ Ensures needles are in place and secure on syringes #1 and 2 above
___ Ensures stopper seals on syringes are freely mobile
___ Mayo table set-up and positioned for ease of use
___ Observes universal precautions
___ Positions pt properly-seated with arm internally rotated and resting on lap
___ Outlines landmark for entry point (needlecap, thumbnail, indelible pen) posterior AC joint/lateral edge of the acromion
___ Skin preparation for anesthesia (alcohol wipes)
___ Appropriate local anesthesia (25-gauge needle to infiltrate skin with 1-2mL of 1 or 2% Lidocaine without epinephrine) at area of needle entry for injection
___ Reconfirms landmark for entry point
___ Skin preparation for procedure (betadine swabs and/or alcohol wipes)
___ Maintains proper sterile technique throughout procedure
___ Explains steps of procedure to patient while performing procedure
___ Using a 25-gauge 1.5 inch needle, insertion is made in area of previously determined landmark. The syringe should be directed at a 30-degree angle from vertical (parallel to the joint line)/angled slightly upwards under the acromion to full length
___ Prior to injecting medication, aspirate slightly to avoid intravascular injection
___ Able to recognize and correct potential reasons for significant resistance or pain during the procedure (needle repositioning without removal from joint space)
___ When injection complete, application of compressive dressing and instructions for patient to limit activity for 48-72 hours, and use ice for 20 minutes at a time
___ Sharps disposed of in appropriate container
___ Procedure note placed in chart (consent, procedure, sterile technique, tolerated well, hemostasis achieved, neurovascularly intact)
___ Overall is able to perform properly, and in sequence, the necessary steps for shoulder injection

HAND/WRIST/ELBOW EXAMINATION

Learning Objectives:

- Learners will be able to perform a systematic exam on the hand, wrist and elbow
- Learners will become familiar with diagnosing common hand/wrist/elbow injuries

Hand/Wrist/Elbow Examination (I PASS):

I: Inspection-Inspect the hand, wrist and elbow for landmarks, redness, malalignment, and edema. Check resting hand and elbow position and that the index, middle, ring, and pinky digits point towards the scaphoid bone in flexion (clenched fist).

P: Palpation-Palpated the bones of the hand, wrist, and elbow for tenderness

A: Active range of motion-Flexion and extension of the wrist, radial and ulnar deviation. Grip and MCP/PIP/DIP flexion and extension. Thumb flexion, extension, abduction and adduction. Elbow flexion, extension, pronation and supination.

S: Strength-Resisted strength testing of the above motions

S: Special tests

a. Watson test (scaphoid shift test)
b. Allen test
c. UCL stress test
d. Shuck test
e. Finklestein's test
f. Phalen's test
g. Tinel's test
h. Valgus/Varus test of elbow

ANKLE/FOOT EXAMINATION

Learning Objectives:
- Learners will be able to perform a systematic examination of the ankle and foot
- Learners will understand when to perform x-rays using the Ottawa Ankle Rules
- Learners will become familiar with diagnosing common ankle/ foot injuries

Ankle/Foot Examination (I PASS):
I: Inspection-Inspect the ankle/foot for landmarks, redness, malalignment, and edema. Also inspect the foot for arch height, toe position and callus formation on foot
P: Palpation-Palpated the bones/tendons of the ankle/foot for tenderness
A: Active range of motion-Plantar flexion and dorsiflexion ankle, inversion and eversion. Flexion and extension of the toes.
S: Strength-Resisted strength testing of the above motions
S: Special Tests
a. Inversion Talar Tilt
b. Eversion Talar Tilt
c. Thompson Test
d. Anterior Drawere
e. Heel Tap Test
f. Homan's Sign
g. Syndesmosis Squeeze Test
h. Tinel's Test

Ottawa Ankle and Foot Rules for acute injury*:

- ankle x-rays only required if pain in malleolar zone and any of
  - bone tenderness at posterior edge or tip of lateral malleolus OR
  - bone tenderness at posterior edge or tip of medial malleolus OR
  - inability to bear weight both immediately and in emergency department
- foot x-ray only required if any pain in midfoot zone and any of
  - bone tenderness at base of fifth metatarsal OR
  - bone tenderness at navicular bone OR
  - inability to bear weight both immediately and in emergency department
  - with pain or tenderness secondary to blunt ankle trauma due to any mechanism of injury, including twisting, falls and direct blows

*Rules do not apply to isolated skin injuries, ankle injury > 10 days old, intoxication, head injury, multiple painful injuries, diminished sensation due to neurological deficit

*After initial study, rules subsequently validated in adults and children

LOW BACK PAIN

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Problems in Adults:

• Low back problems are extremely prevalent and costly.
• Primary care physicians are ideally suited to being back problem experts.
• The most important diagnostic instruments are the history and physical exam.
• A tiny percentage of primary care patients have serious conditions that can be suspected from the history.
• Routine spinal imaging test are NOT indicated; imaging tests are indicated in setting of red flags (see below) or severe problems persisting beyond 1 month.
• Most back problems improve spontaneously; therefore, conservative management is almost always indicated.
• The most important therapeutic instrument is patient education.
• Most patients will have recurrent back problems.
• A small but substantial percentage of patients will have chronic problems.
• Early and gradual return to usual activities is superior to bedrest.

Initial Approach to the Patient:

1) Is there a serious systemic disease causing the pain?
2) Is there neurologic compromise that might require surgical evaluation?
3) Is there social or psychological distress that may amplify or prolong pain?

Low Back Pain Red Flags:

Cancer, Spinal Stenosis: age > 50 • prior history of cancer • unexplained weight loss • failure to improve (> 1 month), age > 50 • pseudoclaudication • leg pain on walking or standing • relief by sitting or spinal flexion
Compression Fx, Ankylosing Spondylitis: age > 50 • cortico-steroid use • trauma, onset < 40, gradual onset • pain duration > 3 months • morning stiffness • improved by exercise
Cauda Equina Syndrome: nerve root compression causing urinary retention, bilateral weakness saddle anesthesia • neuro-surgical emergency • caused by massive midline disc herniation • prevalence among all with low-back pain: 0.0004

DISC	ROOT	REFLEX	MUSCLE	SENSATION
L3-L4	L4	Patella	Anterior Tibilais	Medial Leg & Medial Foot
L4-L5	L5	---	Extensor Halucis	Lateral Leg & Dorsum of Foot
L5-S1	S1	Achilles	Personeus Longus & Brevis	Lateral Foot

Back Examination:

The goal of the examination of the patient with low back pain is to determine whether they have signs of a serious problem and differentiate primary back pain from referred back pain from the hip, SI joint, or abdomen. 85% of patients with back pain will not receive a definitive diagnosis but 90% resolve within 6 weeks. The following should be performed when a patient presents to you for the first time with low back pain:

• **History for red flags** (cancer, infection, AAA, cauda equina syndrome, fracture): abdominal pain, recent history of trauma, pain unrelieved by rest, saddle anesthesia, or acute urinary or fecal incontinence, age > 50, h/o

cancer, fever, or other infectious symptoms, other rheumatologic symptoms
• **Inspection** of the back for deformity
• **Palpation** of vertebral bodies and paraspinal muscles for tenderness
• **Motor Exam**: Flexion, extension, lateral rotation
No Neurologic Sx: toe walk (SI) • heel walk (L4, L5)
Neurologic Sx: great toe extension (SI) • foot dorsiflexion (L4, L5) • single toe raise (SI) • knee extension (L4)
• **Sensory Exam**:
No Neurologic Sx: medial foot • mid foot
Neurologic Sx: medial heel (L4) • first web space (L5) • lateral foot (SI) & Brevis
• **Deep tendon reflexes** of the knee (L4) and ankle (SI)
• **Root tension signs**: Straight leg raise, crossed straight leg
• **FABER** Test
• **Rectal Exam** (if bowel, bladder, leg weakness): sphincter tone, perirectal sensation
• **Hoover Test** if necessary
• *Waddell's signs are not useful*

Straight Leg Raise:
• Ask the patient to localize the pain by pointing
• At the point the patient feels pain, lower the leg and dorsiflex the foot to reproduce sciatic nerve pain
• A positive test is when pain occurs when the angle between the bed and the leg is 30° and 60°
• Note if pain occurs in opposite leg (crossover)

FABER (Flexion, Abduction, External Rotation) Test:
• As the patient lies supine, place the foot of the affected side on the opposite knee, which flexes, abducts, & externally rotates the hip
• Pain in the groin
• Hip problem
• Press down on the flexed knee and the opposite anterior superior iliac crest
• Pain in the sacroiliac area
• SI joint problem

Hoover Test to judge patient effort:
• Ask the patient to lift the leg on the painful side while place your hand under the calcaneous of the opposite foot.
• You should feel downward pressure on this leg as the other leg is lifted.
• Lack of pressure is suggestive that the attempt to raise the leg was not genuine