Knee Arthrocentesis Pre-Work

1. For intraarticular knee injections, which approach has been shown to be the most accurate site for needle placement?
   a. Lateral midpatellar
   b. Superolateral
   c. Anteromedial
   d. Anterolateral

Explanation: In a systematic review, the superolateral approach had the highest accuracy for achieving intraarticular needle placement, with an accuracy of ~90%, compared to ~70% for anteromedial and anterolateral approaches (1). The superolateral approach is also the most reliable site for aspiration (2).

(1) Hermans J, Bierma-Zeinstra SMA, Bos PK, Verhaar JAN, Reijman M. The most accurate approach for intra-articular needle placement in the knee joint: a systematic review. Semin Arthritis Rheum. 2011;41(2):106-115.
(2) Wind WM, Jr, Smolinski RJ. Reliability of common knee injection sites with low-volume injections. J Arthroplasty 2004;19:858–861.

2. When performing a steroid injection usingthe superior- lateral approach, what is the proper patient positioning?
   a. Supine – Leg fully extended
   b. Supine – Leg at 30 degrees of flexion
   c. Supine – Leg at 90 degrees of flexion
   d. Sitting up – Leg at 90 degrees of flexion
   e. Sitting up - Leg at 30 degrees of flexion

Explanation: The supine position, with leg fully extended or even hyper extended – relaxes the quadricep and patella tendons, providing more space to enter the joint space from the superolateral access site.

3. 65-year-old man with chronic R knee pain without a significant preceding injury. He has 15 minutes of stiffness in the morning which improves throughout the day. You suspect osteoarthritis; which exam finding is MOST suggestive of OA as the diagnosis?
   a. Crepitus on passive motion
   b. **Palpable bony enlargement**
   c. Genu varum deformity
   d. Normal temperature (e.g. no increased temperature) when palpating the joint

Explanation: Palpable bony enlargement has a +LR of 12 for knee OA. The other findings are also associated with knee OA, but less predictive (LRs are closer to 1).

McGee SR. Evidence-Based Physical Diagnosis. 3rd ed. Elsevier/Saunders; 2012.

4. Which of the following medications have the most evidence for efficacy when injected intraarticularly for a patient with knee osteoarthritis?
    a. Hyaluronic acid
    b. Corticosteroids
    c. Platelet-rich plasma
    d. Multipotent stem cells

Explanation: Of these options, corticosteroids are the best studied: intraarticular corticosteroids have been shown in some (but not all) studies to provide **small to moderate improvements in pain for ~6 weeks post-injection**. According to a 2015 Cochrane review, the specific benefits were a decrease in pain of 1 cm on a 10-cm visual analogue pain scale and an improvement in function of 0.7 units on the WOMAC knee disability scale, which ranges from 0-10. Physical therapy has been shown to be MORE effective than steroid injections for knee pain. All of the other therapies listed here have limited or uncertain efficacy (and are very costly).

Jüni P, Hari R, Rutjes AWS, et al. Intra-articular corticosteroid for knee osteoarthritis. Cochrane Database Syst Rev. 2015;2015(10):CD005328.

5. A 50-year-old patient presents to clinic with left medial knee pain that developed over the past month. She did not have any preceding trauma, but she did increase her walking over the past several months. Exam is notable for point tenderness over the upper medial tibia at the site identified in the photo. What is the most likely diagnosis?

    a. IT band syndrome
    b. Medial meniscus tear
    c. Medial compartment osteoarthritis
    d. **Pes anserine bursitis**
    e. Patellofemoral syndrome

Explanation: Pes anserine bursitis refers to pain at the common insertion site of the sartorius, gracilis, and semi-tendinosis tendons, which is located on the anteromedial tibia. While the symptoms may be mistaken for conditions causing medial joint line tenderness (e.g. medial meniscus tear), the point of maximum tenderness with pes anserine bursitis is anterior and medial to the joint line.

6. A 70-year-old man presents to your clinic with 2 months of worsening right medial knee pain. He does not recall a preceding trauma to the knee. The pain has been impairing his ability to go on daily walks, but he's had no swelling, locking, or instability. Exam is notable for pain along the medial joint line on palpation, as well as pain and clicking during external rotation when performing McMurray's test. What is the best next step in management?
    a. Corticosteroid injection
    b. **Physical therapy referral**
    c. Order an MRI
    d. Orthopedics referral

Explanation: For most patients with degenerative meniscal tears (e.g. tears in older adults with concomitant osteoarthritis), physical therapy is similarly effective as surgery for improving pain and function. MRI is not recommended in cases such as this, where conservative management is appropriate.

Khan M, Evaniew N, Bedi A, Ayeni OR, Bhandari M. Arthroscopic surgery for degenerative tears of the meniscus: a systematic review and meta-analysis. CMAJ. 2014;186(14):1057-1064.

7. In a patient with a suspected meniscal tear, which of the following findings suggest the patient may need surgery (rather than conservative management)?
    A. Patient has moderate medial compartment osteoarthritis on plain films
    B. Patient is unable to fully extend the leg at the knee
    C. Swelling develops gradually (rather than immediately) over 24-48 hours after an initial injury
    D. Patient reports pain during McMurray's maneuver only on deep knee flexion

Explanation: Young patients with acute meniscal tears causing mechanical symptoms (e.g. locking, or the inability to fully extend at the knee) are more likely to benefit from surgery. Patients with concomitant OA, gradual onset of swelling, or pain only on deep flexion are likely to improve with conservative management.

8. When giving an intraarticular corticosteroid injection to a patient with Type 2 Diabetes, what – on average – is the effect on blood glucose that the patient should be told to expect?
    a. Increase in blood glucose of <100 mg/dL lasting 6-12 hours
    b. Increase in blood glucose of >100 mg/dL lasting 6-12 hours
    c. Increase in blood glucose of <100 mg/dL lasting 24-48 hours
    d. **Increase in blood glucose of >100 mg/dL lasting 24-48 hours**
    e. No increase in blood glucose

    Explanation: While there is large variability between individual patients, studies show a mean elevation of blood glucose of >100 mg/dL lasting several days after injection. The

effect on blood glucose tends to be greatest in patients with worse diabetes control at baseline.

Waterbrook AL, Balcik BJ, Goshinska AJ. Blood glucose levels after local musculoskeletal steroid injections in patients with diabetes mellitus: a clinical review. Sports Health. 2017;9(4):372-374.

Shin WY, An MJ, Im NG, et al. Changes in blood glucose level after steroid injection for musculoskeletal pain in patients with diabetes. Ann Rehabil Med. 2020;44(2):117-124.

9. Which of the following is an absolute contraindication to intraarticular knee corticosteroid injection?
    a. Use of an anticoagulant
    b. Type 2 diabetes on insulin
    c. **Presence of hardware in the joint**
    d. Upcoming knee surgery in 6 months

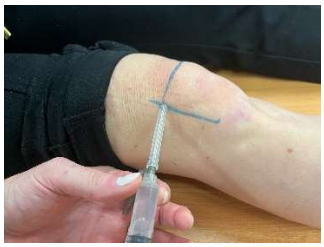
Explanation: Presence of hardware in the joint is the only absolute contraindication listed. It's generally safe to inject a steroid for patients taking anticoagulants, those with well controlled diabetes, or those with surgery >3 months from the time of injection.

10. Which insertion point and needle angle best represents an appropriate superolateral approach?

A.

B.

C.



D.

E.

Explanation: C is the correct answer. In general, the needle should be aimed parallel to the floor and either directly perpendicular to the axis of the patient's leg, or just slightly towards the toes. Other trajectories are likely to hit bony or tendinous structures.