

Science Education Collection

Elbow Exam

URL: <https://www.jove.com/science-education/10207>

Overview

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The elbow is a hinged joint that involves the articulation of 3 bones: the humerus, radius, and ulna. It is a much more stable joint than the shoulder, and because of that, the elbow has less range of motion. The elbow and its structures are prone to significant injuries, particularly with repetitive motion. Lateral and medial epicondylitis (also called tennis elbow and golfer's elbow) are two common diagnoses and often occur as a result of occupational activities.

When examining the elbow, it is important to remove enough clothing so that the entire shoulder and elbow can be inspected. It is important to compare the injured elbow to the uninvolved side. A systematic evaluation of the elbow includes inspection, palpation, range of motion (ROM) testing, and special tests, including maneuvers to evaluate ligamentous stability and stretch tests to accentuate pain caused by epicondylitis.

Procedure

1. Inspection

1. When inspecting the elbow, compare to the uninvolved side while looking for swelling, redness, warmth, and carrying angle.
2. If swelling is present, determine if it is in the bursa or in the joint. Swelling in the elbow joint will appear anteriorly at the brachial fossa. The most common site for swelling in the elbow is posterior, in the olecranon bursa.
3. Note if redness or warmth is present; these may suggest olecranon bursitis or infection.
4. Compare the size of the elbows, looking for atrophy. Remember that it is common to see adaptive hypertrophy of the dominant elbow in a thrower.
5. Note the carrying angle, which is formed by the upper and lower arm in the anatomic position. It is normally 5-10° in males and 10-15° in females. This angle can be altered by prior supracondylar fracture or infection.

2. Palpation

Palpation is extremely helpful in pinpointing the source of elbow pain. It is helpful to generally localize elbow pain to anterior, posterior, medial, or lateral.

Palpate the following important structures in each of these areas:

1. Anterior elbow
 1. Biceps tendon: Palpate for a tight cord in the medial aspect of the anterior elbow (best felt with the elbow bent to 90°).
 2. Brachial artery: Feel for the pulsation just medial to the biceps tendon.
 3. Palpate for tenderness over the median nerve located medially to the brachial artery.
 4. Palpate for tenderness over the anterior joint capsule.
2. Posterior elbow
 1. Triceps: Palpate along the posterior upper arm to the tip of the olecranon process.
 2. Olecranon process: Palpate the prominent bump at posterior elbow.
 3. Olecranon fossa: Feel the depression just superior to the olecranon process.
 4. Olecranon bursa: Palpate posteriorly to the proximal ulna; this can only be felt if inflamed and swollen.
3. Medial elbow
 1. Medial epicondyle: Palpate the bony prominence at the medial elbow.
 2. Wrist flexor and pronator muscles: Feel for the tendons at the medial epicondyle.
 3. Medial collateral ligament (MCL): Palpate from medial epicondyle to the olecranon. The MCL lies deep to flexor-pronator muscles.
 4. Ulnar nerve: Palpate from medial epicondyle to the olecranon process just above the MCL of the elbow. Tapping over the nerve may cause uncomfortable sensations when inflamed (Tinel's sign).
4. Lateral elbow
 1. Lateral epicondyle: Feel the bony prominence on the lateral elbow.
 2. Extensor and supinator muscles: Palpate the tendons attached at the lateral epicondyle.
 3. Radial head: Palpate at the lateral elbow, best felt while supinating and pronating the wrist.
 4. Radialcapitellar joint: Palpate just proximal to the radial head.
 5. Palpate four fingerbreadths distal to the lateral epicondyle for tenderness: Pain in this area is associated with compression of posterior interosseous nerve.

3. Range of Motion (ROM)

The ROM at the elbow should be evaluated by comparing between the two sides. A lack of motion suggests stiffness (due to injury or arthritis) or a mechanical block within the joint (due to a loose body). Normal ROM is shown in parentheses. Check for the following motions:

1. Extension (0°): Ask the patient to extend the elbow so the arm is straight. Keep in mind it is common to see slight flexion contracture in a thrower.
2. Flexion (150°): Ask the patient to flex the elbow by trying to touch the hand to the shoulder.
3. Pronation (70°): With the patient's elbow bent to 90° and the thumb pointing up, ask the patient to turn the hand so the palm is facing down toward the floor.
4. Supination (90°): With the patient's elbow bent to 90° and the thumb pointing up, ask the patient to turn the hand so the palm is facing upward (as if trying to hold soup in the palm).

4. Strength Testing

Strength testing is done by checking resisted movements described above. Pain with these resisted motions is commonly due to tendonitis or epicondylitis. Strength should be evaluated in the following motions:

1. Supination of forearm (see above): Resistance will aggravate lateral epicondylitis (supinator tendons attach at lateral epicondyle).
2. Pronation of forearm (see above): Resistance will aggravate medial epicondylitis (pronators tendons attach at medial epicondyle).
3. Extension of wrist: With the patient's wrist straight and the palm facing down, move the patient's hand in an upward direction. Resistance will aggravate pain of lateral epicondylitis (wrist extensors attach at lateral epicondyle).
4. Flexion of wrist: With the patient's wrist straight and the palm facing down, move the patient's hand in a downward direction. Resistance will aggravate pain of medial epicondylitis (wrist flexors attach at medial epicondyle).
5. Resisted long finger extension: With the patient's wrist straight and the palm facing down, move the patient's middle finger in an upward direction. Resistance will aggravate the pain of lateral epicondylitis.
6. Elbow flexion (see above): Resistance will test biceps strength, and pain suggests tendonitis.
7. Elbow extension (see above): Resistance will test triceps strength, and pain suggests tendonitis.

5. Stretch Tests

These tests will aggravate pain caused by medial or lateral epicondylitis by pulling at the epicondyle.

1. Stretch the wrist into flexion or pronation (described above); this pulls at the lateral epicondyle and aggravates the pain of lateral epicondylitis.
2. Stretch the wrist into extension or supination (described above); this pulls at the medial epicondyle and aggravates the pain of medial epicondylitis.

6. Collateral Ligament Testing

The collateral ligaments of the elbow should be evaluated for pain and/or laxity. The medial collateral ligament is injured much more commonly than the lateral.

Two tests are used to evaluate these ligaments:

1. Varus/valgus stress
 1. Passively rotate the patient's shoulder outward (full external rotation), and flex the elbow to 30° to unlock the olecranon from the olecranon fossa.
 2. Place one palm over the patient's lateral elbow and push medially with your other hand (valgus stress is applied to assess the medial collateral ligament).
 3. Perform varus stress test to assess the lateral collateral ligament by placing your palm over the patient's medial elbow and pushing in a lateral direction.
 4. Check for pain and/or laxity.
 5. Grade the severity of ligament injury.
 Grade I (ligament stretched): Pain with no laxity.
 Grade II (partial tear): Pain with minimal laxity. Soft endpoint.
 Grade III (complete tear): Pain with no good endpoint.
2. Milking maneuver: Bend the affected elbow to 90° and full supination with thumb extended. Reach opposite arm under involved elbow and grasp thumb. Pulling laterally on thumb creates valgus stress at the medial collateral ligament of the affected elbow.

Summary

Examination of the elbow is best done by following a stepwise approach with the patient in a sitting position. It is important to have the patient remove enough clothing so that that surface anatomy can be seen and compared to the uninvolved side. The exam should begin with inspection, looking for asymmetry between the involved and uninvolved elbow. Next, palpation of key structures is done, looking for tenderness, swelling or deformity.

This is followed by assessing ROM, first actively and then against resistance to assess strength. Pain with resisted motion suggests epicondylitis or tendonitis, while weakness may suggest a tear. Stability of the ulnar collateral ligament can be assessed by using the valgus stress test or the milking maneuver, while the lateral collateral ligament is assessed by the varus stress test.