Science Education Collection

Wrist and Hand Examination

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Overview

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The wrist is a complex joint made up of 8 carpal bones and their numerous articulations and ligaments. Overlying the wrist are the tendons and muscles of the hand and fingers. The hand is made up of 5 metacarpal bones, and the tendons that run to the hand overlie these bones. Finally, the fingers consist of 14 phalanges with their articulations held together by collateral ligaments and volar plates. Common mechanisms of both acute and chronic wrist injury include impact, weight bearing (which can occur in gymnastics), twisting, and throwing. Osteoarthritis of the hand commonly affects distal interphalangeal (DIP) and proximal interphalangeal (PIP) joints, while rheumatoid arthritis (RA) is seen in the metacarpophalangeal (MCP) and PIP joints.

It is important to compare the injured wrist or hand to the uninvolved side. Key aspects of the wrist and hand exam include inspection, palpation for tenderness or deformity, testing the range of motion (ROM) and strength, neurovascular assessment, ligaments and tendon testing, and the special tests.

Procedure

1. Inspection

Insect both hands and wrists comparing between the sides, and look for the following:

1. Swelling or masses in the joints or soft tissue, commonly seen with arthritis or ganglion cysts.
2. Redness or warmth, which may suggest inflammation or infection.
3. Atrophy of muscles, which can be seen with severe nerve injury or entrapment.

2. Palpation

1. Wrist palpation
   Ask the patient to bend the elbow; then, palpate the wrist for tenderness and deformity using the tips of your index and middle fingers (see the structures of the wrist in List 1).
   Perform palpation of structures on the dorsal side with the patient's palm facing down and the structures on the palmar (volar) side with the palm facing up.
2. Hand palpation
   Palpate the hand, looking for tenderness or deformity.
   1. Palpate the following structures on the dorsal side of the hand with the patient's elbow bent and the palm facing down.
      1. Extensor tendons: Feel for the rope-like structures extending to the proximal end of the distal phalanx of each finger across the dorsum of the hand. Tenderness here may suggest tendonitis.
      2. Metacarpals and phalanges: Palpate each bony segment for tenderness, which may suggest a fracture.
   2. Palpate the following structures on the volar side of the hand with the patient's elbow bent and the palm facing up.
      1. Flexor tendons (flexor digitorum profundus and superficialis): Feel for rope-like structures across the palm of the hand, extending to the base of the middle phalanx (superficialis) and base of the distal phalanx (profundus) of each finger. Tenderness here may suggest tendonitis, and popping over the MCP area with finger flexion suggests a trigger finger.
      2. Thenar eminence: Palpate the muscle mass on the radial side of the palm located proximally to the base of the thumb. Atrophy here can be seen with median neuropathy (carpal tunnel syndrome).
      3. Hypothenar eminence: Palpate the smaller muscle mass on the ulnar side of the palm, located just beyond the distal wrist crease. Atrophy here can be seen with ulnar neuropathy.
   3. Lastly, palpate the joints:
      1. MCP, PIP, and DIP joints: Palpate in each finger and note any tenderness and/or swelling that may be seen with arthritis.
      2. Collateral ligaments: Palpate along either side of each PIP and MCP joint. Tenderness may indicate a strain or tear of the ligament (seen in a jammed finger).

List 1. Structures of the wrist to be examined by palpation

1. **Radial dorsal side:**
   A.Radial styloid
   B.Scaphoid (anatomic snuff box)
   C. 1st CMC joint and base of 1st MC (arthritis)

D.Abductor pollicis longus (APL) and extensor pollicis brevis (EPB) tendons (De Quervain's tendonitis)
2. **Central dorsal side**
A.Lunate (Kienbock's disease or scapholunate dissociation) and capitate
B.Extensor carpi radialis longus and brevis (Intersection syndrome where they cross APL and EPB tendons)
C.Ganglion cysts common (may be occult)
3. **Ulnar dorsal side:**
A.Ulnar styloid
B.Triquetrum and hamate bones
C.Triangular fibrocartilage complex (TFCC)
4. **Radial volar side:**
A.Scaphoid tubercle
B.Long finger flexors and palmaris longus
C.Median nerve (carpal tunnel)
5. **Ulnar volar side:**
A.Hook of hamate and pisiform bones
B.Ulnar nerve and artery (Guyon's canal)

3. Range of Motion

Range of motion (ROM) should be assessed first actively and then passively, if needed. Normal motion generally follows the "rule of 90s" in the wrist and fingers. Compare side-to-side, looking for deficits in the ROM.

1. Ask the patient to turn the palms directly upward (90° supination) and downward (90° pronation) while keeping the elbows at sides. Normally these motions can be performed without pain.
2. With the patient's elbows at the side, ask the patient to press the palms together and point fingers upward; then, ask the patient to press the back of the hands together and point the fingers downward. Normally with hands pressed together, wrists should extend and flex approximately to 90°.
3. Ask the patient to make a fist with all fingertips touching the palmar crease. In this position, each MCP and IP joint is flexed to 90°.
4. Ask the patient to touch the tip of the thumb to the base of the pinkie.

4. Strength Testing:

Note any pain or weakness while performing the following tests:

1. Ask the patient to flex and then extend the wrist while you are resisting the movement. This should be painless.
2. Ask the patient to grip your finger and not let you to pull your finger free. This should be painless, and you should not be able to pull your finger free.
3. Ask the patient pinch a piece of paper between the thumb and index finger, and again between the thumb and long finger. It should take a significant tug to get the paper free.

5. Motor Exam

Assess motor function of the hand using the following tests:

1. Ask the patient to flex and extend the thumb; this checks function of median and radial nerves.
2. Ask the patient to "scissor" the fingers together and apart; this checks ulnar nerve function.
3. Ask the patient to place the hand on flat surface palm up and raise the thumb against resistance; this checks median nerve function.

6. Circulation

1. Evaluate the circulation to the hand by palpating for radial and ulnar pulse. Occasionally, the ulnar pulse may not be easily palpable.
2. Check capillary refill by applying pressure to the finger pad. Release the pressure and observe for the skin color. Normal skin color should return in 2 seconds.

7. Sensation

Evaluate sensations by checking for light touch, pinprick, and 2-point discrimination (7 mm or more on finger pads). Specifically check the following: Tip of thumb (median nerve); Tip of fifth finger (ulnar nerve); dorsum of hand (radial nerve).

8. Ligament and Tendon Testing

It is important to stress the ligaments in injured areas to evaluate for possible rupture. Commonly injured ligaments include:

1. Collateral ligaments of the fingers: Assess by applying a varus and valgus stress to the injured joint: stabilize the proximal bone with one hand and push the distal bone in medial (valgus test) and then lateral (varus test) direction. Laxity is indicative of ligament rupture.
2. Ulnar collateral ligament of the thumb: Apply abduction stress to the first MCP joint with the thumb both flexed and extended by pushing the distal phalange in lateral direction. Pain with this test suggests a strain of the ligament, while laxity suggests a tear.

3. DIP extensor and flexor tendons: Evaluate the extensor and flexor tendons of the fingers by stabilizing the PIP joint with your fingers and asking the patient to both flex and extend the DIP joint. The inability to extend suggests rupture of the extensor tendon (Mallet finger), while the inability to flex suggests rupture of the flexor tendon (Jersey finger)

9. Special Tests

There are several important diagnostic specific tests that are commonly done for evaluation of the wrist and hand. These include:

1. Carpal tunnel syndrome tests -these tests will typically aggravate the symptoms associated with Carpal tunnel syndrome (such as tingling, pain and numbness) in the 1st- 3rd fingers.
    1. Tinel's test: Tap on the volar side of the wrist over the median nerve.
    2. Phalen's test: Have the patient hold the wrist in a maximally flexed position.
    3. Carpal tunnel compression test: Press firmly with both thumbs over the carpal tunnel for up to 30 seconds.

2. Finkelstein's test
    1. Have the patient first flex the thumb across the palm, and then flex the other 4 fingers around it.
    2. Ask the patient to bend the wrist towards the little finger (ulnar deviation). Significant pain with this maneuver is suggestive of De Quervain's tendonitis.

3. Arthritis of the thumb (first carpometacarpal joint) tests: Both of these tests will aggravate the pain associated with this condition.
    1. Watson stress test: Ask the patient to place the hand on the table palm up with all fingers extended, and then push down the thumb towards the table.
    2. Grind test: Grasp the patient's thumb, and passively rotate the first carpometacarpal joint while simultaneously applying axial pressure on the thumb (pushing it towards trapezium) to load the joint.

Summary

Examination of the wrist and hand is best done following a stepwise approach, with the patient in a sitting position. The exam should begin with inspection, looking for asymmetry between the involved and uninvolved wrist and hand. This should be followed by palpation of key structures to identify tenderness, swelling, or deformity. The next step is assessing ROM, first actively and then against resistance to assess strength. Pain with resisted motion often suggests tendonitis, while weakness may suggest a tear. A neurovascular assessment should next be done by first assessing sensation and motor strength, followed by checking pulses and capillary refill. Finally, the various ligaments should be checked for stability, and various other special tests should be performed depending on the suspected diagnosis.