Dynamic Chiropractic

SPORTS / EXERCISE / FITNESS

Wrist Injuries: Part I

Working with students in the college clinic or at sporting events or with doctors at seminars, it has been my observation that most chiropractors (and probably medical doctors) are least familiar and comfortable with wrist complaints compared to almost any other joint. If the patient does not have an obvious carpal tunnel or a subluxated lunate, the doctor is often left with no sense of direction. I would like to think that this was less due to an inadequate education (being an educator) and more due to the obvious. What you don't see often (or get tested on) tends to be a low priority. Ironically, the wrist is often an occupational victim for the busy side-posturing chiropractor. This is when many doctors search for a logical approach to wrist complaints. For the sports chiropractor, wrist complaints are far more common than for the general practitioner. The wrist, therefore, should be comfortable territory easily navigated without the luxury of a quick escape to the reference shelf (while the patient believes your absence is an indication of your popularity). Following is a short overview to help direct the examiner through a logical approach to patients with wrist complaints (peripheral nerve entrapments will be discussed in another article).

Although the wrist is not considered a weightbearing joint, it is transformed into one when athletes protect themselves from a fall with an outstretched arm/hand. The wrist is subjected to the compressive or shearing effects of a high-force contact injury. Repetitive weightbearing injury is a natural consequence of many gymnastic maneuvers: handstands, transition support through various flips, and propulsion with vaulting. So common is wrist pain with gymnasts, that many consider it part of the price you pay to the sport, just like finger calluses with bar events. In either a single-event acute injury or repetitive weightbearing injury, radiographs must be taken to detect fracture or a reactionary process in bone, such as avascular necrosis or osteophyte formation. Hidden, yet prevalent, is ligamentous injury. It is often assumed that when radiographs are negative that the patient has a simple sprain and needs a minimal period of taping or bracing. It is possible though that more severe ligamentous damage has occurred. This can only be detected by a careful physical examination for stability, coupled with specialized radiographs and markings.

Many other injuries are the result of repetitive overstrain. Although there are a number of tendons that may become involved, localization is usually possible through a selected tension approach as described below. Additionally, a sport-specific predisposition occurs due to the demands of a given activity. For example, DeQuervain tenosynovitis involving the abductor policis longus (APL) and the extensor policis brevis (EPB) is more common in golf and bicycle riding, where a tight grip coupled with repetitive wrist movement result in an inflammatory process. Extensor carpi ulnaris (ECU) tendinitis is the second most common tenosynovitis (following DeQuervain's), found most commonly in wrist-intensive sports (rowing, racquet sports, golf, and baseball). Intersection syndrome involving the radial wrist extensors as they cross under the APL and EPB is more common with rowers and canoeists ("oarsman's wrist") and weightlifters performing repetitive, high-resistance, wrist or arm curls.[1]

History

When there is a report of a single traumatic event, combining the mechanism of injury with pain location narrows down the possibilities. The two most common general mechanisms are a fall onto

the wrist or direct contact with a sports apparatus such as a bat or club.

- fall on an outstretched hand (dorsiflexed wrist) -- Axial loading usually occurs to the ulnar, palmar side of the wrist creating compressive and shearing forces. Common injuries include scaphoid and distal radius fractures, scapholunate and lunotriquetral ligament damage leading to varying degrees of instability, and triangular fibrocartilage injury at the ulnar side of the wrist.

- fall on a flexed hand -- This may result in a compression injury to the flexor (palmar) wrist with avulsion or stretch injury to the dorsal wrist. Similar structures are involved as in dorsiflexion injuries with slightly different fracture patterns, additionally, dorsal capsule avulsion may occur.

- misjudged bat or club swing -- If the centrifugal force of the bat exceeds the grip of a baseball batter, the hypothenar region may be directly hit, causing a hook of the hamate fracture. A similar mechanism in golfing involves hitting the ground instead of the ball.

When there is no single event recalled, it is important to determine first if a constant compression force is applied during a sports activity.

- bicycling -- Compression of the ulnar nerve in the tunnel of Guyon may cause distal pain and numbness over the fifth finger and ulnar half of the fourth finger (sometimes the hypothenar area is also involved).

- gymnastics -- Handstands, walkovers, vaulting, and other forms of springing off of dorsiflexed wrists add substantial pressure to the dorsal wrist causing a number of dorsal impaction reactions such as a localized hypertrophic synovitis or bony hypertrophy of the ulna or scaphoid. Another condition more common in gymnasts is triangular fibrocartilage complex (TFCC) perforations.

- martial arts -- It is believed that the compression from punching may be the cause of a higher incidence of Keinbock's disease (avascular necrosis of the lunate) in young men.[2]

Next determine if there are any demands for repetitive wrist movements, such as those that occur in rowing, throwing, and racquet sports. Some examples include:

- DeQuervain's tenosynovitis -- This is more common in sports that require a forceful grip and/or repetitive use of the thumb while in ulnar deviation, including golf (left thumb of right-handed golfer), fly fishing, racquet sports, javelin and discus throwing).

- intersection syndrome -- This is found with anyone who must use a repetitive wrist movement; most common with rowers, canoeists, weightlifters (heavy wrist or forearm curls), and tennis players.

- Extensor carpi ulnaris tendinitis -- This is found in racquet sports, baseball, golf, and rowing.

- Flexor carpi ulnaris tendinitis -- This is found commonly in golf and racquet sports.

Examination

Observe the involved wrist and compare it to the uninvolved one to determine any obvious deformity suggestive of fracture. Palpation of the wrist may reveal small nodular swellings especially on the dorsal surface. These often represent ganglions and are more common in

gymnasts. Unless fracture is obvious or likely, proceed to instability testing. Keep in mind that many wrists pop and click. The hard positive for these instability tests is painful popping or clunking.

- Watson's test for scapholunate stability -- The examiner presses the scaphoid from anterior (volar) to posterior (dorsal) with the wrist first in ulnar deviation. Moving it passively into radial direction, a painful clunk or pop may be produced indicating that the proximal pole of the scaphoid subluxated over the posterior rim of the radius.

- Lunotriquetral ballottement test -- The examiner stabilizes the lunate between a thumb and index finger and does the same with the triquetrum. A shearing between the bones is accomplished by moving the bones in opposite directions (i.e., lunate forced posterior while triquetrum is forced anterior). A painful clunk or pop is indicative of lunotriquetral joint instability.

- Midcarpal instability -- By either having the patient actively or examiner passively pronate and ulnar deviate the wrist, a painful pop is felt on the ulnar aspect of the wrist. This indicates midcarpal instability.

If these tests are negative, it is important to realize that instability is not ruled out. A radiographic evaluation described in next month's column should also be included. It is also important to realize that many of these tests are also testing for accessory motion between carpal bones. The difference is that accessory motion testing (motion palpation) evaluates restriction of movement, as opposed to the excessive movement found with instability testing.

Palpation, range of motion and strength testing can be combined to produce a comprehensive evaluation of tendon involvement. Knowing the insertion point of each tendon and the movement accomplished by the tendon, a strategy using palpation, stretch, and contraction may localize the involved tendon. Below is a summary of several possibilities:

- Extensor carpi radialis -- Tenderness may be found at the base of the second and third metacarpals (dorsal surface); pain may be increased with stretching into wrist flexion and ulnar deviation, or contraction from this stretch position into radial deviation and wrist extension.

- Extensor carpi ulnaris -- Tenderness may be found at the base of the fifth metacarpal (dorsal surface); pain may be increased with stretching into wrist flexion and radial deviation, or contraction from this stretch position into ulnar deviation and wrist extension.

- Flexor carpi radialis -- Tenderness may be found at the base of the second metacarpal (palmar surface); pain may be increased with stretching into ulnar deviation and wrist extension, or contraction from this stretch position into radial deviation and wrist flexion.

- Flexor carpi ulnaris -- Tenderness may be found at the pisiform; pain may be increased with stretching into radial deviation and wrist extension, or contraction from this stretch position into ulnar deviation and wrist flexion.

- DeQuervain's (APL & EPB) -- The patient is asked to clench the hand over the thumb. The examiner then passively ulnar deviates the wrist taking care not to press on the metacarpophalangeal joint of the thumb. Although this maneuver is uncomfortable it is usually not painful; compare it to the opposite, uninvolved side.

Next month, we will discuss imaging and management options.

References

1. Plancher KD, Peterson RK, Steichen JB. Compressive neuropathies and tendinopathies in the athletic elbow and wrist. Clin Sports Med 15; 331-371: 1996.
2. Howse C. Wrist injuries in sports. Sports Med 17; 163-175: 1994.

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