Wrist Arthroscopy for Athletic Injuries

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KEYWORDS

• Wrist arthroscopy • Wrist injuries • Sports • Athletes

KEY POINTS

- Management of wrist pain in athletes must take into consideration the timing and achievement of sport-specific goals.
- Wrist arthroscopy is the standard for diagnosing intracarpal derangements.
- A variety of wrist procedures can be safely and effectively performed through the arthroscope.

INTRODUCTION

Hand and wrist injuries are common in athletes, accounting for approximately 3% to 9% of all sports-related injuries.[1] Specific sports, such as football, gymnastics, and combat sports may have a higher incidence. Trauma to the hand and wrist is the second most common injury in mixed martial artists and boxers.[2–4] Hand and wrist injuries may affect up to 46% to 87% of gymnasts.[1] Management strategies for athletes are often tailored to their sport-specific goals, which can involve a combination of operative repair, early rehabilitation, and/or minimally invasive techniques.

The goal is to provide reliable healing with expeditious return to sport. Wrist arthroscopy is a useful tool in the surgeon's armamentarium; it is widely considered the most sensitive and specific method of evaluating carpal derangements,[5,6] and in appropriate cases, may provide a minimally invasive solution. This article reviews the relevant anatomy of the carpus, clinical evaluation of the patient with wrist pain, and sports-related injuries that are commonly treated using arthroscopy.

ANATOMY

The carpus is composed of 8 bones arranged in 2 rows. The proximal row articulates with the radius to form the radiocarpal joint and with the distal row to form the midcarpal joint. The distal row articulates with the 5 metacarpals to form the carpometacarpal joints. The intrinsic ligaments directly connect the bones within a row. In the proximal row, the scapholunate interosseous ligament (SLIL) provides static volar and dorsal stability to the scaphoid and lunate. The lunotriquetral interosseous ligament (LTIL) similarly connects the lunate and triquetrum.

The distal row consists of multiple intercarpal connections similarly named according to their intercarpal origins and insertions. The volar extrinsic ligaments confer stability across the radiocarpal joint and are arranged in a "double V" orientation (**Fig. 1**). The dorsal extrinsic ligaments include the dorsal intercarpal ligament and the radiotriquetral ligament. The triangular fibrocartilage complex (TFCC) separates the wrist from the distal radioulnar joint. It consists of the articular disk, meniscus homologue, volar and dorsal radioulnar ligaments, extensor carpi ulnaris

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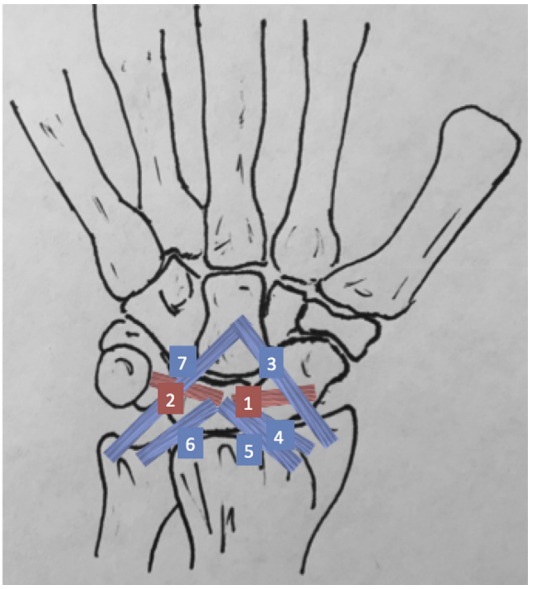

Fig. 1. Drawing of the major intrinsic (*red*) and volar extrinsic (*blue*) ligaments: (1) Scapholunate, (2) lunotriquetral, (3) radioscaphocapitate, (4) long radiolunate, (5) short radiolunate, (6) ulnolunate, and (7) ulnotriquetral capitate complex.

(ECU) subsheath, and the ulnolunate and ulnar triquetral ligaments. In an ulnar neutral wrist, it absorbs 18% of the load across the carpus.[7] The radioulnar ligaments of the TFCC also impart stability to the distal radioulnar joint (DRUJ).

Motion of the wrist is passively transmitted through the crossing tendons and guided by the bony geometry and ligamentous architecture. As a result of the helicoid geometry of the midcarpal joint, motion at the wrist is often "paired" for most sports-related movements. The "dart-throwers motion" nicely illustrates the combinations of radial deviation/extension and ulnar deviation/flexion, which guide smooth and synchronous movement.

EVALUATION OF WRIST PAIN

A thorough history provides useful information in making the diagnosis. The character and onset of pain, mechanism of injury, location of pain, and associated, relieving, and exacerbating symptoms help focus the examination. We find it helpful to ask patients to point with 1 finger to the 1 area of the most intensity. As many structures comprise and cross the carpus, the differential diagnosis includes many possibilities, which can be organized by location (**Table 1**). The treating physician should ask additional questions regarding hand dominance, sport-specific season and goals, sport-specific difficulties, and level of competitiveness.

Physical examination should begin with inspection for skin lesions, wounds, swelling, and deformity. Palpation along the carpus begins away from the side of pain (eg, if the patient has radial wrist pain, then start by palpating ulnar structures). When palpating the wrist, the examiner should systematically palpate each osseous, tendinous, and ligamentous structure in that region. Range of motion, grip strength measurements, and neurovascular testing are included in the examination. Special provocative maneuvers are performed last and may provide injury-specific information (**Table 2**). Radiographs, arthrography, computed tomography, and MRI are useful diagnostic

Table 1
Differential diagnosis for wrist pain

Radial Wrist Pain	Dorsal Wrist Pain	Ulnar Wrist Pain
Thumb basal joint arthritis	Intersection syndrome	TFCC tear
STT arthritis	Extensor tendon synovitis	DRUJ instability
Radioscaphoid arthritis	Keinbock disease	Ulnocarpal abutment
deQuervain tenosynovitis	SLIL tear	ECU tendinitis
Radial artery aneurysm	Occult ganglion	FCU tendinitis
Scaphoid fracture	Radiocarpal arthritis	Pisotriquetral arthritis
FCR tendinitis	DRUJ arthritis	Lunotriquetral ligament tear
Preiser disease	Distal radius fracture	Hook of Hamate fracture
SLIL tear	Inflammatory arthritis	Ulnar styloid fracture
Radial styloid fracture	Septic arthritis	Hypothenar hammer syndrome
Radial sensory neuritis	Perilunate dislocation	Ulnar sensory neuritis

Abbreviations: DRUJ, distal radioulnar joint; ECU, extensor carpi ulnaris; FCR, flexor carpi radialis; FCU, flexor carpi ulnaris; SLIL, scapholunate interosseus ligament; STT, scaphotrapeziotrapezoid; TFCC, triangular fibrocartilage complex.