OPINION ARTICLE

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Author's Contribution
A – Study Design
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E – Manuscript Preparation
F – Literature Search
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Use of arthroscopy in wrist instabilities

Key words: *wrist instabilities, diagnosis, operative treatment*

SUMMARY

Wrist arthroscopy is one of the most important tools in diagnosis of wrist pathologies. This invasive method of diagnosis can provide us a true view of cartilage, ligamentous stability giving also a possibility of dynamic probing. Diagnosis is a first step of the arthroscopy. Then some treatment procedures can be performed. Wrist arthroscopy has emerged as the gold standard for accurate diagnosis of wrist instabilities and has shown promise for some therapeutic values. Many other therapeutic methods are being tested as techniques and equipment are being continuously refined, and its indications are broadening.

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BACKGROUND

There has been increased emphasis on minimally invasive procedures, as well as those performed with the assistance of an arthroscope over the past few decades. Procedures, such as partial arthroscopic menisectomy and arthroscope assisted ACL reconstruction in the knee, have proven track records, while others, such as arthroscopic rotator cuff repair, have not been accepted as universally. So, does wrist arthroscopy have a role in the diagnosis and treatment of wrist pathologies? Absolutely.

Currently, the most common indications for wrist arthroscopy remain diagnosis and treatment of TFCC pathologies and as an aid in treatment of intraarticular distal radius fractures in my practice, but they are not covered in this article. We will limit the discussion to use of arthroscopy for wrist instabilities.

DIAGNOSIS OF WRIST INSTABILITIES

Wrist instability is a complex problem that is not always easy to diagnose. Our physical exam findings lead us to suspect a diagnosis, but often this diagnosis can neither be confirmed nor refuted based on examination and plain films alone, especially when it involves so-called „dynamic" instability.

Computed Tomography (CT) is not very helpful unless instability is associated with fractures. When compared with arthrography, bone scans were 88% accurate for evaluating interosseous tears [1]. As always, however, bone scans are more sensitive than specific, and that the results of bone scans correlated poorly with patients who had incomplete or partial interosseous ligament disruptions.

MRI has been compared with arthroscopic findings. Johnstone concluded that MRI was not accurate enough in diagnosing scapholunate (SL) ligament tear and lunotriquetrial (LT) ligament tears after finding a sensitivity of. 37 and a specificity of 1.0 for the former and a sensitivity and specificity of 0 and. 97 respectively for the latter [2]. It can be helpful for identifying occult fractures or osteonecrosis. As MRI technology improves (higher Tesla scanners, dedicated extremity scanners, wrist coils), the accuracy of MRI may improve as well; currently, MRI is not the imaging modality of choice for wrist instability.

Arthrography had been popular, but is falling out of favor due to high false positive findings [3]. Weiss et al. found triple-injection cinearthrography to be only 56% and 83% as sensitive and specific as arthroscopy in detecting SL and LT ligament tears, respectively [4].

Videofluoroscopy has been used as a diagnostic tool, but mostly for evaluation of midcarpal instability [5]. The gold standard for evaluating wrist instability remains arthroscopy.

OUR STANDARD WRIST ARTHROSCOPY TECHNIQUE

The affected arm is placed on a hand table and a traction tower is used to place approximately 15lbs of traction through fingertraps placed on the index and middle fingers. The tower also allows the wrist to be held distracted in a slightly flexed position while maintaining either radial or ulnar deviation, depending on the structures that are being evaluated.

Initially, the 3-4 portal is created. Lister's tubercle is identified and a scalpel is used to carefully incise the skin 1 cm distal to this. The subcutaneous structures are spread with a hemostat and a blunt trocar is used to carefully enter the joint, remembering that the distal radius has an 11 degree volar tilt and a 22 degree ulnar inclination. The joint is then examined with a 30-degree 2.7mm arthroscope. It is important to verify that the scope is within the radiocarpal joint. If the bones of the distal carpal row are visible, the scope is in the radial midcarpal portal; the 3-4 portal is easily entered approximately 1cm proximal to this.

The radioscapholunate (RSL) ligament is directly volar to the 3-4 portal, between the short and long radiolunate (RL) ligaments which are ulnar and radial respectively. The RCL ligament appears to be mostly a neurovascular structure supplying the scapholunate (SL) ligament rather than a true ligament in the mechanical sense of the term [6]. Its appearance through the arthroscope confirms this, as it looks more like a tuft of fat surrounded by synovial tissue [7]. It does have clinical significance, however. In our experience, we have not encountered an SL ligament injury in the face of an intact RSL ligament. The radioscapholunate (RSL) ligament is radial to the long RL ligament. The Lunotriquetral (LT) ligament and radial side of the TFCC is also examined.

Once these ligaments have been identified, particular attention should be paid to the SL ligament. If an obvious tear is not present, a 4-5 and/or 6-R portal should be created in order to insert a small probe to test the mechanical integrity of the SL ligament.

Next, the ulnar ligaments of the wrist can be examined if the scope is inserted through the 4-5 or 6R portal (and the probe can be inserted through the 3-4 portal). Through this portal, the lunotriquetrial (LT) ligament, ulnocarpal ligaments, and TFCC can be best evaluated. Again, use the probe to test the integrity of these structures.

The midcarpal joint should always be evaluated during wrist arthroscopy. The radial midcarpal portal is created 1cm distal to the 3-4 portal. From this portal, it is possible to evaluate the distal articular surfaces of the proximal carpal bones and the proximal articular surfaces of the distal carpal bones. The latter can be very important if a proximal carpal row (PRC) excision is being considered. Integrity of the SL ligament and LT ligament can be further evaluated by examining the gap and/or motion between the proximal carpal bones. While the 3-4 portal best visualizes the proximal membranous and fibocartilaginous portions of the SL and LT ligaments, the midcarpal portal may better visualize the thicker, more distal, mechanically important portions of the SL and LT ligaments [8]. Hofmeister, et al. showed that midcarpal portal evaluation of SL and LT instability was more accurate than the evaluation through radiocarpal portals. In their study, instability diagnosed through radiocarpal portals was never missed when the midcarpal portals were used [9]. However, the reverse was not always true and the evaluation of these interosseous ligaments by midcarpal arthroscopy often led to higher grading of instability, and thus, a more accurate diagnosis, than that provided by radiocarpal arthroscopy alone.

Abe et al. advocated use of a volar portal (just radial to the flexor carpi radialis) to examine the volar region of the SL interosseous ligament better [10]. They reported no complication while using the volar portal in over 250 cases of various wrist pathologies. They also reported no progression of rotary subluxation of the scaphoid after debridement of volar region of the SL ligament tear in dynamic cases.

THERAPEUTIC WRIST ARTHROSCOPY

We primarily use wrist arthroscopy as a diagnostic tool. After accurate diagnosis, arthroscopy can be used to treat some intraarticular pathologies. Synovectomy is done, and partial ligament tears can be treated with debridement. Thermal shrinkage of the partially torn or loosened interosseous ligament can also be performed. Despite the failure of the thermal shrinkage technique in treatment of recurrent dislocation of the shoulder, we believe we may have a better chance with dynamic instabilities because we can immobilize the wrist better than the shoulder afterward. Short term results have been favorable, but there are no published long term results [11,12].

If an interosseous ligament tear is associated with static carpal instability, we prefer open techniques, such as repair or reconstruction of the damaged ligaments, capsulodesis, limited intercarpal arthrodesis, or proximal row carpectomy, to restore stability and some mobility to the wrist and hopefully alleviate pain.

However, others have advocated using wrist arthroscopy for other carpal instability treatments, including but not limited to arthroscopic repair of interosseous ligaments, radial styloidectomy, proximal row carpectomy, limited carpal fusions with bone graft, interposition arthroplasty.

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