

An Evaluation of the Reliability of Wrist Arthroscopy in the Assessment of Tears of the Triangular Fibrocartilage Complex

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Purpose Wrist arthroscopy is generally considered the reference standard in the diagnosis of triangular fibrocartilage complex (TFCC) injuries. There is a paucity of data examining the reliability of wrist arthroscopy as a diagnostic modality for TFCC injuries. The goal of this study was to evaluate the interobserver and intraobserver reliability of the diagnosis of TFCC pathology during wrist arthroscopy.

Methods Twenty-five intraoperative digital videos were captured by the senior author during diagnostic and surgical arthroscopy of the wrist joint for known or suspected articular pathology. The senior author (P.K.B.) confirmed TFCC resilience on visual inspection and ballottement (trampoline effect) to make the diagnosis. Two videos were excluded for poor quality and inadequate visualization. Three hand surgeons subsequently reviewed the remaining 23 videos in a blinded fashion at 2 time points separated by 4 weeks. The reviewers determined if the trampoline test was positive and if a TFCC tear was present. Tears were classified using a morphologic classification. Statistical measures of reliability including percentage agreement and κ coefficients were calculated.

Results Agreement between observers for the presence or absence of a tear was 66.7%. The average intraobserver agreement regarding the presence or absence of a tear was 67.4%. The kappa value for interobserver agreement was 0.33, whereas the intrarater agreement was 0.88. The 3 reviewers identified an average of 11.3 positive trampoline tests. Agreement between observers for a positive trampoline test was 65.2%. The average percentage of intraobserver agreement regarding a positive trampoline test was 49.3%. In cases where all 3 reviewers agreed on the presence of a TFCC tear, the agreement regarding tear location was 76.6%.

Conclusions Wrist arthroscopy remains instrumental in the treatment of TFCC tears. However, given that inter-rater reliability in the assessment of these tears is probably too low, reconsideration should be given to arthroscopy as the reference standard in the diagnosis of these tears. (*J Hand Surg Am.* 2018; ■(■): ■–■. Copyright © 2018 by the American Society for Surgery of the Hand. All rights reserved.)

Type of study/level of evidence Diagnostic III.

Key words Reliability, TFCC tears, wrist arthroscopy.

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WRIST ARTHROSCOPY IS COMMONLY used in the diagnosis and treatment of ulnar sided wrist pain, and tears of the triangular fibrocartilage complex (TFCC) are frequently the focus of this intervention. Although magnetic resonance imaging is an important diagnostic modality in assessing ulnar-sided wrist pain, several studies have shown that it lacks sensitivity in detecting peripheral TFCC lesions.^{1–3} Therefore, wrist arthroscopy is generally deemed the reference standard in diagnosing TFCC injuries.^{4,5}

Several investigators have shown mixed results regarding the reliability of identifying pathologic findings during hip and knee arthroscopy.^{6,7} Unfortunately, there is a paucity of data examining the reliability of wrist arthroscopy as a diagnostic modality.^{8–10} The goal of this study was to evaluate the interobserver and intraobserver reliability of the diagnosis of TFCC pathology during wrist arthroscopy. We hypothesized that, during arthroscopic evaluation of the TFCC, observers would have poor reliability regarding the presence or absence of a tear.

METHODS

Institutional board review approval was obtained before the beginning of the study. Patients who underwent diagnostic and therapeutic arthroscopy of the wrist joint for known or suspected articular pathology, including intercarpal ligament injuries and tears of the TFCC, were eligible for inclusion. No patients in this group were treated arthroscopically for a fracture of the distal radius. In all cases, the arthroscopy was captured using digital video by the senior author (P.K.B.). The study group consisted of 25 patients and comprised 12 women and 13 men with an average age of 45 years (range, 21–60 y).

All of the procedures were performed with patients under sedation with regional anesthesia. A traction tower (ConMed, Largo, FL) with 10 to 15 lbs of distraction was used in all cases. All arthroscopies were performed with a 1.9- or 2.7-mm, 30° arthroscope (Stryker, Kalamazoo, MI), which was introduced into the 3-4 portal by the standard technique. Outflow was established through the 6-U portal, and the work portals included the 6-R or 4-5 portal. All videos included a systematic, arthroscopic wrist examination as described by Löw et al.¹¹ Integrity of the TFCC was evaluated by visual inspection, and by using the “trampoline” test, which evaluates the tautness or laxity of the TFCC with ballottement of the articular disk using a surgical probe (Fig. 1).¹² Twenty-five videos were then assessed for quality

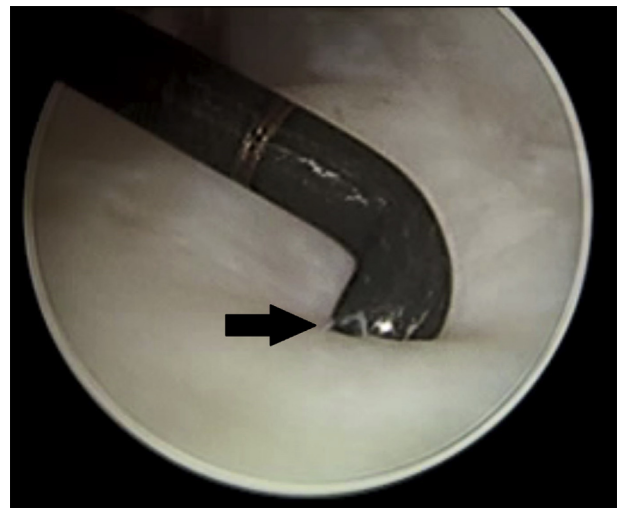


FIGURE 1: Arthroscopic image of a ballottement of the central disk of the TFCC using a probe. The dark arrow indicates the probe tip on the articular disk.

and edited by the senior author (P.K.B.) to include only the ulnar side of the wrist. Two videos were excluded for poor quality, inadequate visualization, or inadequate probing of pathologic lesions.⁷ Twenty-three videos averaging 50 seconds in length were chosen for analysis.

Three additional fellowship-trained hand/upper extremity orthopedic surgeons with extensive experience in wrist arthroscopy participated in this study as video reviewers. The surgeons, who averaged 16 years (range, 7–27 y) in postfellowship practice, reviewed the videos using a personal computer. Each of the 3 reviewers performs between 20 and 30 arthroscopic surgeries per year. The reviewers were blinded to the patients’ history and the diagnosis of the treating surgeon. They assessed whether each video was adequate, and documented the presence or absence of a TFCC tear based on their overall evaluation of the video. If a tear was determined to be present, reviewers were then asked to classify the TFCC tear according to location: central, radial, or ulnar peripheral (Fig. 2). The videos were reordered, and then 4 weeks later each surgeon reviewed them a second time to evaluate intraobserver reliability.

Measures of reliability including percentage agreement and κ coefficient were calculated.¹³ κ calculations are probably a better measure of reliability than percent agreement because they control for chance agreement. Interobserver agreement between multiple respondents surveyed at the same time was assessed using Fleiss’ κ coefficient for multiple raters. Intraobserver agreement was evaluated by Cohen’s κ coefficient.

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