

Quantitative Measurement of Hypermobility of the Ulnar Nerve in College Baseball Players

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INTRODUCTION:

Ulnar nerve neuropathy around the elbow is a common pathology in throwing athletes, and occurs due to many factors including valgus elbow and ulnar nerve hypermobility. For those patients with ulnar nerve neuropathy, anterior transposition of the ulnar nerve is common procedures. Meanwhile, Ulnar nerve hypermobility has been reported to be present in 2% to 47% of asymptomatic individuals¹. However, no studies have investigated the rate of ulnar nerve hypermobility in throwing athletes, and, the relationship between ulnar nerve mobility, and clinical symptom and throwing performance. This study was designed to quantify the reliability of the sonographic assessment for the mobility of the ulnar nerve compared to physical evaluation, and to determine whether ulnar nerve hypermobility is associated with clinical symptoms, and throwing performance in baseball players. We investigated ulnar nerve hypermobility using ultrasound to evaluate the relationship between the ulnar nerve hypermobility and clinical sign including throwing performance in college baseball players.

METHODS:

138 elbows in 69 college baseball players were examined. Each participant was queried regarding symptoms attributable to the ulnar nerve. In addition, structural measurements consisting of the Tinel's sign and elbow flexion compression testing² were examined. Sonographic examiners were, unaware of reported symptoms, independently performed a standardized examination of both elbows to assess ulnar nerve hypermobility. For sonographic assessment, the ultrasound probe was located at the medial condyle of the elbow to visualize the ulnar nerve short axis view in the extended elbow position (Figure. 1). During extension to flexion of the elbow, the mobility of ulnar nerves was assessed, and categorized as stable, or hypermobile, which was further subclassified as subluxation, or dislocation (Figure 2A, 2B, 2C). Paired t-test was used to compare the mobility of the ulnar nerve at throwing and non-throwing side. Values of $p < 0.05$ were considered statistically significant.

RESULTS:

In terms of sonographic evaluation of the ulnar nerve, for the three examiners, weighted kappa values on the right and left sides were 0.70 and 0.74, respectively. Ulnar nerve hypermobility was identified in 58% (45) of the 69 elbows in throwing side. Meanwhile, hypermobility was 58 in % (59) in non-throwing side without significant difference, compared to non-throwing side. Elbows with nerve hypermobility did not experience a higher prevalence of subjective symptoms (snapping, pain, and tingling) than did elbows with stable nerves. Provocative physical examination testing for ulnar nerve irritability, however, showed consistent trends toward heightened irritability in hypermobile nerves ($p = 0.04$ to 0.16). Demographic data and anatomic measurements were similar between the subjects with stable nerves and those with hypermobile nerves. Additionally, all participants did not show decrease of throwing performance.

DISCUSSION:

In a prior study, during medical check-up, hypermobility of ulnar nerve was identified in 34% of youth baseball players without sign and symptom³. Meanwhile, in college baseball players, ulnar nerve hypermobility occurs in over half of the baseball players in throwing and non-throwing sides in our study. Utilizing a standardized sonographic examination, a diagnosis of ulnar nerve hypermobility can be established with substantial interobserver reliability. In baseball players, ulnar nerve hypermobility does not appear to be associated with an increased symptomatology attributable to the ulnar nerve and throwing performance.

SIGNIFICANCE/CLINICAL RELEVANCE:

The results of this study demonstrate the reliability of clinically diagnosing ulnar nerve hypermobility with ultrasound, and the lack of association of throwing performance and ulnar nerve hypermobility with symptoms.

REFERENCE: 1. Charles, et al. J. Hand Surg. 2009
2. Calfee, et al. J. Bone and Joint Surg. 2010
3. Kawabata, et al. PM R 2021



Fig 1. Arm position for sonographic assessment and Location of sonographic transducer

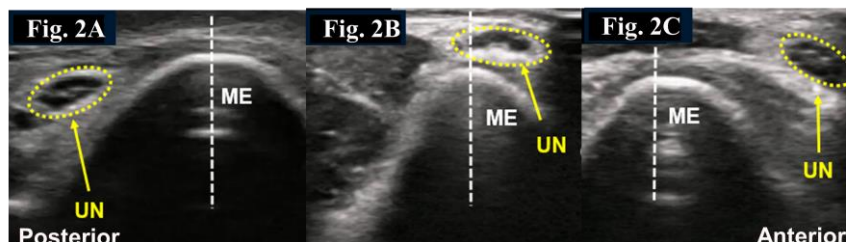


Fig 2. Classification of ulnar nerve mobility with ultrasound
2A: Normal mobility of ulnar nerve, 2B: Subluxation of ulnar nerve, 2C: Dislocation of ulnar nerve
ME, medial epicondyle; UN, ulnar nerve muscle; dotted line, top of medial epicondyle