
COMMENTARY & PERSPECTIVE

Once Again, the Status of the Rotator Cuff Does Not Correlate with Patient Symptoms

Commentary on an article by James D. Wylie, MD, MHS, et al.: “Mental Health Has a Stronger Association with Patient-Reported Shoulder Pain and Function Than Tear Size in Patients with Full-Thickness Rotator Cuff Tears”

Michael Khazzam, MD

Decision-making strategies for the appropriate treatment of patients with symptomatic, atraumatic, full-thickness rotator cuff tears are becoming increasingly difficult. It is becoming clear that symptoms of rotator cuff tears do not correlate with disease severity. There have been several recent studies attempting to define a relationship of rotator cuff tears with symptoms such as pain and patient-reported outcome measures¹⁻³.

In this Level-II prospective cohort study, Wylie et al. evaluated 169 patients and examined the relationship between rotator cuff tear severity on magnetic resonance imaging (MRI) (number of tendons torn, tear size, tear retraction, and tear area) and patient-reported outcomes, pain, and mental health as measured by the Short Form-36 Mental Component Summary (SF-36 MCS) score. The authors pose two important questions regarding the association of rotator cuff tear morphology and patient-reported outcome measures: How does mental health as assessed by the SF-36 MCS correlate with shoulder function and rotator cuff tear severity; and is tear morphology more likely associated with patient-reported shoulder function than pain, American Shoulder and Elbow Surgeons (ASES) scores, or Simple Shoulder Test (SST) scores? Interestingly, the SF-36 MCS correlated with the visual analog scale (VAS) for pain, SST score, and ASES score (all $p < 0.001$) but morphologic measures of tear severity generally did not ($p > 0.05$ except for the association of tear retraction with the SST).

The Multicenter Orthopaedic Outcome Network (MOON) Shoulder Group¹ performed a Level-III cross-sectional cohort study of pretreatment data and found that no anatomic measure of rotator cuff tear severity—including number of tendons ($p = 0.5$), amount of retraction ($p = 0.9$), humeral head migration ($p = 0.3$), or amount of fatty infiltration ($p = 0.4$)—was associated with pain. The group did find that an increasing number of medical comorbidities ($p = 0.002$), race ($p = 0.041$), and lower education level ($p = 0.004$) correlate with increased VAS for pain. Harris et al.² also performed a prospective Level-III cohort study analyzing pretreatment data of the MOON Shoulder Group to determine which factors were associated with worse patient-reported outcomes, including ASES and Western Ontario Rotator Cuff (WORC) index scores. That study found that tear size, tear retraction, and superior humeral head migration did not correlate with patients' pain and were not associated with worse ASES or WORC index scores. The presence of atrophy of the supraspinatus ($p = 0.04$) and infraspinatus ($p = 0.003$) was associated with lower patient-reported outcomes.

The results of these studies are all in agreement that morphologic tear characteristics are not correlated with pain or patient-reported outcome measures, but may be more directly correlated with shoulder physical function. Interestingly, in the current study, Wylie et al. found, using multivariate regression models, that improving SF-36 MCS scores by 15 to 20 points would lead to a clinically important change in pain, ASES score, and SST score. These data identify a patient-related adjustable factor that can be addressed by improving mental health to aid in the treatment of rotator cuff disease. The primary limitation of the current study includes selection bias, as only 39% of eligible subjects were actually enrolled in the study.

The authors provide further evidence that the status of the rotator cuff is not the primary variable that results in patient symptom severity or decline in shoulder-specific health-related quality of life. Future well-designed, prospective cohort studies are needed to identify what is the primary cause of symptoms in patients with rotator cuff tears and why some tears remain asymptomatic.

Michael Khazzam, MD*
UT Southwestern Medical Center, Dallas, Texas

*The author received no payments or services, either directly or indirectly (i.e., via his institution), from a third party in support of any aspect of this work. Neither the author nor his institution has had any financial relationship, in the thirty-six months prior to submission of this work, with any entity in the biomedical arena that could be perceived to influence or have the potential to influence what is written in this work. Also, the author has not had any other relationships, or engaged in any

other activities, that could be perceived to influence or have the potential to influence what is written in this work. The complete **Disclosures of Potential Conflicts of Interest** submitted by authors are always provided with the online version of the article.

References

1. Dunn WR, Kuhn JE, Sanders R, An Q, Baumgarten KM, Bishop JY, Brophy RH, Carey JL, Holloway GB, Jones GL, Ma CB, Marx RG, McCarty EC, Poddar SK, Smith MV, Spencer EE, Vidal AF, Wolf BR, Wright RW. Symptoms of pain do not correlate with rotator cuff tear severity: a cross-sectional study of 393 patients with a symptomatic atraumatic full-thickness rotator cuff tear. *J Bone Joint Surg Am.* 2014 May 21;96(10):793-800.
2. Harris JD, Pedroza A, Jones GL; MOON (Multicenter Orthopedic Outcomes Network) Shoulder Group. Predictors of pain and function in patients with symptomatic, atraumatic full-thickness rotator cuff tears: a time-zero analysis of a prospective patient cohort enrolled in a structured physical therapy program. *Am J Sports Med.* 2012 Feb;40(2):359-66. Epub 2011 Nov 17.
3. Russell RD, Knight JR, Mulligan E, Khazzam MS. Structural integrity after rotator cuff repair does not correlate with patient function and pain: a meta-analysis. *J Bone Joint Surg Am.* 2014 Feb 19;96(4):265-71.