

5 Points on Nonoperative Treatment of Rotator Cuff Tears

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Rotator cuff disease is extremely common, yet indications for surgery are not well established. Unfortunately, data on the natural history of patients with rotator cuff disease are lacking, as are high-level studies evaluating the effectiveness of rotator cuff repair. This deficit is highlighted by the recent American Academy of Orthopaedic Surgeons clinical practice guideline on optimizing the management of rotator cuff problems,¹ in which none of the position statements were based on high-level evidence, and 22 of 25 statements were inconclusive or based on weak evidence or represented the panel's consensus opinion. Although the traditional teaching is that rotator cuff tears (RCTs) should be surgically repaired, the present article reviews the evidence supporting physical therapy as a treatment for atraumatic full-thickness RCTs.

1 Less than 5% of people with RCTs undergo surgery

Studies on symptomatic and asymptomatic patients have found a high incidence of RCTs in the population at large.^{2,3} By conservative estimate, 10% of people older than 65 years have full-thickness RCTs. Therefore, the 2010 US Census⁴ finding of 57 million people over age 65 years translates to 5.7 million with full-thickness RCTs. In the United States, about 275,000 rotator cuff surgeries are performed annually.⁵ That is, less than 5% of people with RCTs undergo surgery each year.



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2 Symptoms do not correlate well with RCT severity

Pain is statistically more likely in patients who experience RCT progression than in those who do not.⁶⁻⁸ However, RCTs may progress without pain, or there may be pain without progression, making pain a poor sign of RCT progression.⁹ The Multicenter Orthopaedic Outcome Network (MOON) Shoulder Group, studying a cohort of patients with atraumatic full-thickness RCTs, found no relationship between RCT severity and pain,¹⁰ symptom duration,¹¹ or activity level,¹² suggesting the relationship between RCTs and symptoms is not robust.

3 The high failure rates of surgical repairs do not affect patient-reported outcomes

Postoperative imaging has demonstrated high failure rates for rotator cuff repairs, yet patient-reported outcome scores do not differ between cases of intact and failed repairs.^{13,14} Strength is better, however, in intact repairs.¹⁴

4 Physical therapy is effective in treating atraumatic RCTs

The MOON Shoulder Group conducted a prospective cohort study to determine the predictors of failed physical therapy for atraumatic full-thickness RCTs and to help define the indications for rotator cuff surgery.¹⁵ All enrolled patients started with a well-defined physical therapy program, and they could opt out and have surgery at any time. The physical therapy program, derived from a systematic review of the literature, was found to be effective in more than 80% of patients with follow-up of 2 years or longer.¹⁵ The most important predictor of failed nonoperative treatment was patient expectations: For a patient who thought physical therapy would work, it worked; for a patient who thought it would not work, surgery was the more likely choice. No measure of pain or RCT severity predicted the need for surgery.¹⁶ For 2 randomized trials that compared surgery and physical therapy, the success of nonoperative treatment was similar: 76% (Moosmayer and colleagues¹⁷) and 92% (Kukkonen and colleagues¹⁸).

5 What are the indications for surgery?

These data suggest that physical therapy is reasonable for patients with atraumatic RCTs. Some data suggest that traumatic RCTs should be treated with surgery

and that it should be performed early.¹⁹ Other data suggest strength is better after rotator cuff repair.^{13,14} What, then, are the indications for surgery? Patients with acute tears probably should have surgery; patients concerned about weakness should consider surgery but should keep in mind that its benefit depends on an intact rotator cuff repair; and patients with low expectations about the effectiveness of physical therapy probably should consider surgery.

When discussing options with a patient, you might approach informed consent as follows:

“Mr. Smith, you have a rotator cuff tear. So do at least 6 million other Americans over age 60 years. Only 5% of those undergo surgery. If your problem is weakness or functional loss, you should have surgery, though there is about a 30% chance the repair will fail. I don’t know how to predict the outcome of repair yet, but I worry your atraumatic tear is at risk for repair failure.

“If your problem is pain, you have an 80% chance of improving with physical therapy, and pain relief seems to last at least 2 years. If you go with physical therapy, however, there is a risk your tear could progress and start causing symptoms. I don’t yet know how likely it is your tear will progress or, if it does progress, how likely it is the tear will cause symptoms. I wish we had better information to help you make your decision.”

References

1. Pedowitz RA, Yamaguchi K, Ahmad CS, et al. American Academy of Orthopaedic Surgeons clinical practice guideline on: optimizing the management of rotator cuff problems. *J Bone Joint Surg Am.* 2012;94(2):163-167.
2. Reilly P, Macleod I, Macfarlane R, Windley J, Emery RJ. Dead men and radiologists don’t lie: a review of cadaveric and radiological studies of rotator cuff tear prevalence. *Ann R Coll Surg Engl.* 2006;88(2):116-121.
3. Teunis, T, Lubberts B, Reilly BT, Ring D. A systematic review and pooled analysis of the prevalence of rotator cuff pathology with increasing age. *J Shoulder Elbow Surg.* 2014;23(12):1913-1921.
4. Werner CA. The older population: 2010 (2010 Census briefs). US Census Bureau website. <http://www.census.gov/prod/cen2010/briefs/c2010br-09.pdf>. Published November 2011. Accessed December 13, 2015.
5. Colvin AC, Egorova N, Harrison AK, Moskowitz A, Flatow EL. National trends in rotator cuff repair. *J Bone Joint Surg Am.* 2012;94(3):227-233.
6. Mall NA, Kim HM, Keener JD, et al. Symptomatic progression of asymptomatic rotator cuff tears: a prospective study of clinical and sonographic variables. *J Bone Joint Surg Am.* 2010;92(16):2623-2633.
7. Moosmayer S, Tariq R, Stiris M, Smith HJ. The natural history of asymptomatic rotator cuff tears: a three-year follow-up of fifty cases. *J Bone Joint Surg Am.* 2013;95(14):1249-1255.
8. Safran O, Schroeder J, Bloom R, Weil Y, Milgrom C. Natural history of nonoperatively treated symptomatic rotator cuff tears in patients 60 years old or younger. *Am J Sports Med.* 2011;39(4):710-714.
9. Kuhn JE. Are atraumatic rotator cuff tears painful? A model to describe the relationship between pain and rotator cuff tears. *Minerva Orthop Traumatol.* 2015;66:51-61.
10. Dunn WR, Kuhn JE, Sanders R, et al. 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;96(10):793-800.
11. MOON Shoulder Group: Unruh KP, Kuhn JE, Sanders R, et al. The duration of symptoms does not correlate with rotator cuff tear severity or other patient-related features: a cross-sectional study of patients with atraumatic, full-thickness rotator cuff tears. *J Shoulder Elbow Surg.* 2014;23(7):1052-1058.
12. Brophy RH, Dunn WR, Kuhn JE; MOON Shoulder Group. Shoulder activity level is not associated with the severity of symptomatic, atraumatic rotator cuff tears in patients electing nonoperative treatment. *Am J Sports Med.* 2014;42(5):1150-1154.
13. Slabaugh MA, Nho SJ, Grumet RC, et al. Does the literature confirm superior clinical results in radiographically healed rotator cuffs after rotator cuff repair? *Arthroscopy.* 2010;26(3):393-403.
14. 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;96(4):265-271.
15. Kuhn JE, Dunn WR, Sanders R, et al; MOON Shoulder Group. Effectiveness of physical therapy in treating atraumatic full-thickness rotator cuff tears: a multicenter prospective cohort study. *J Shoulder Elbow Surg.* 2013;22(10):1371-1379.
16. Dunn WR, Kuhn JE, Sanders R, et al. Defining indications for rotator cuff repair: predictors of failure of nonoperative treatment of chronic, symptomatic full-thickness rotator cuff tears. Paper presented at: Open Meeting of the American Shoulder and Elbow Surgeons; March 23, 2013; Chicago, IL.
17. Moosmayer S, Lund G, Seljom US, et al. Tendon repair compared with physiotherapy in the treatment of rotator cuff tears: a randomized controlled study in 103 cases with a five-year follow-up. *J Bone Joint Surg Am.* 2014;96(18):1504-1514.
18. Kukkonen J, Joukainen A, Lehtinen J, et al. Treatment of non-traumatic rotator cuff tears: a randomised controlled trial with one-year clinical results. *Bone Joint J Br.* 2014;96(1):75-81.
19. Oh LS, Wolf BR, Hall MP, Levy BA, Marx RG. Indications for rotator cuff repair: a systematic review. *Clin Orthop Relat Res.* 2007;(455):52-63.

Erratum

In the January 2016 issue of *The American Journal of Orthopedics*, Dr. Jeffrey Sawyer’s disclosure statement for his guest editorial “The Changing Face of Pediatric Orthopedics” [*Am J Orthop.* 2016;45(1):10-11] was incorrect. The corrected disclosure statement is below. We apologize for the error.

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