



Patient adherence with postoperative restrictions after rotator cuff repair

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Hypothesis: This study aimed to measure self-reported patient adherence to postoperative restrictions after rotator cuff repair, to evaluate correlations between adherence and functional outcome, and to identify possible indicators of poor adherence. We believed that poor adherence would correlate with poor functional outcome.

Methods: Fifty consecutive patients undergoing repair for rotator cuff tears were included and instructed to wear an abduction brace for 6 weeks after surgery. Functional evaluations, including American Shoulder and Elbow Surgeons score, University of California–Los Angeles shoulder score, and Simple Shoulder Test, were made preoperatively and postoperatively. Patients commented on their adherence with a medical adherence measurement questionnaire.

Results: Average adherence was 88% (range, 59.2–100). There were no significant correlations between adherence and improvement in American Shoulder and Elbow Surgeons, University of California–Los Angeles, or Simple Shoulder Test scores after rotator cuff repair ($P = .06245, .5891, \text{ and } .7688$). Of the patient demographics analyzed, only smoking status had a positive effect on adherence ($P = .00432$; coefficient, 9.867). All other demographics, including hand dominance, mechanism of injury, repair complexity, comorbidities, living status, employment status, and age, had no significant effect on self-measured adherence to postoperative restrictions ($P = .7876, .5889, .6444, .4190, .0609, .4171, .5402$).

Conclusions: Patients' self-reported adherence did not correlate with shoulder outcome as measured on any of 3 functional outcome scores.

Level of evidence: Level II, Prospective Cohort, Treatment Study.

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Keywords: Adherence; rotator cuff repair; functional outcome; indicators; demographics; postoperative; restriction; physical therapy

Rotator cuff repair is one of the most common procedures performed by the orthopedic surgeon.¹⁰ Although a significant body of research exists evaluating surgical methods to improve postoperative function, few analyses

have been done to evaluate the patient's contribution to postsurgical rehabilitation, most notably in the 6 weeks immediately after surgery. An article by Lee has demonstrated the importance of this period, showing that rehabilitation protocols can be major contributors to anatomic failure of the repair.⁶ During these 6 weeks, early healing occurs, and immobilization by abduction brace is thought to prevent unwanted strain at the insertion site and subsequent repair failure.³ However, even if a surgeon counsels

This study was approved by the Stanford University IRB, study 8374.

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a patient to remain in the arm sling, it is difficult to ensure that patients will be adequately movement restricted, given that the arm sling restriction occurs at home under normal constraints. Indeed, poor adherence has been identified by the World Health Organization as one of the greatest causes in the failure to recover from long-term illnesses.¹² A study by Cuff and Pupello² has demonstrated that poor adherence may be connected to poorer functional outcome but did not assess for possible indicators of poor adherence beyond workers' compensation status. The purpose of this study was to investigate patients' reported adherence to postoperative restrictions after rotator cuff repair and to evaluate whether patients' reported adherence has a correlation with functional outcome. The secondary aim of this study was to identify particular indicators of patient nonadherence to postoperative restrictions after rotator cuff repair.

Materials and methods

Patient selection, demographics, and injury characteristics

From April 2007 to June 2009, 50 consecutive patients who underwent rotator cuff repair were enrolled in this study. These patients had rotator cuff tears diagnosed by a combination of physical examination and magnetic resonance imaging and subsequently underwent rotator cuff repair by a single operating surgeon at a single facility. All patients consented to be included in the study during regularly scheduled preoperative or postoperative visits. Of the initial 50 patients, 5 were lost to follow-up, resulting in a final enrollment of 45. Power analysis was performed and predicted a sensitivity to correlations of $r = .430$ and above, allowing type I error to be 5% and type II error to be set at 20%.

Patient demographics and injury characteristics were obtained by chart review and chosen on the basis of their implication as risk factors in other studies or clinical observation (Table I). Of the 45 patients, 18 received an isolated arthroscopic rotator cuff repair and 27 received rotator cuff repair with at least another additional procedure. Additional procedures are listed in Table II.

Functional preoperative and postoperative evaluations

Full functional evaluations were performed no more than 3 weeks preoperatively and between 6 and 25 months postoperatively with a mean and median follow-up of 12 months. Three separate standard and validated scores were used: the American Shoulder and Elbow Surgeons (ASES) score, the University of California–Los Angeles shoulder score (UCLA), and the Simple Shoulder Test (SST).⁹ These measurements were tabulated concurrently with a validated shoulder questionnaire during preoperative and postoperative visits. If a patient did not receive a questionnaire during the normal visit, answers were retrieved by telephone interview (8 and 12 patients for preoperative and postoperative questionnaires done by telephone, respectively). For the UCLA score, the questionnaires were supplemented by the results of a physical examination performed by a single senior

Table I Patient demographics

Variable	Frequency, n (%)
Gender	
Male	20 (44.4)
Female	25 (55.6)
Age (mean, range)	64 (30-89)
Injury location	
Dominant arm	28 (62.2)
Nondominant arm	17 (37.8)
Nature of injury	
Degenerative	19 (42.2)
Traumatic	26 (57.8)
Repair complexity	
Complex	18 (40.0)
Simple	27 (60.0)
Comorbidities	
≤2	24 (53.3)
>2	21 (46.7)
Smoking status	
Yes	9 (20.0)
No	36 (80.0)
Living status	
With friends or family	29 (64.4)
Independent	16 (35.6)
Employment status	
Employed	20 (44.4)
Unemployed or retired	25 (55.6)

Table II Additional procedures performed concurrently with rotator cuff repair

Concurrent procedure	Frequency
Subacromial decompression	28
Extensive débridement	25
Biceps tenotomy	22
Distal clavicle excision	10
Labral repair	4
Revision rotator cuff repair	2
Latissimus transfer	1

author who was the primary orthopedic surgeon for enrolled patients, again at intervals no more than 3 weeks preoperatively and between 6 and 25 months postoperatively.

Adherence

Patients were instructed to wear an abduction brace for 6 weeks postoperatively with limited time out of the sling. Specifically, they were instructed that they were allowed to come out of the sling for up to a total of 1 hour per day, to do pendulum exercises 3 times per day and to perform hygiene. To measure adherence, an augmented medical adherence measurement questionnaire¹³ was given to patients during their 6-week follow-up appointment in the clinic (Fig. 1). Patients who did not receive the questionnaire during the 6-week follow-up appointment (12 patients) were interviewed by telephone to complete the questionnaire. Adherence

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