

# Association Between Preoperative Expectations and Postoperative Satisfaction in Patients Undergoing Arthroscopic Rotator Cuff Repair

Qilong Jiang, Yang Liu, Zhi Zhao, Yu Chen and Yu Deng

*Department of Orthopaedic Surgery, Chongqing Orthopaedic Hospital of Traditional Chinese Medicine, Chongqing, China*

## ABSTRACT

The aim of this study was to determine the association between preoperative expectations (PE) and postoperative satisfaction in patients undergoing arthroscopic rotator cuff repair (ARCR). A total of 55 patients, who underwent ARCR between June 2020 and June 2023 were included in this retrospective study. Quantified PE scores were calculated using a modified Musculoskeletal Outcomes Data Evaluation and Management System questionnaire. Postoperative satisfaction was assessed using the Penn Shoulder Score (PSS) questionnaire. The association between PE scores and the PSS were evaluated using a multiple linear regression model. The mean PE score was  $21.07 \pm 6.12$  points, and the mean PSS score was  $60.55 \pm 14.06$  points. The PE scores were significantly associated with the postoperative satisfaction, as measured by the PSS score (standardise / beta coefficients 0.443, 95% CI [0.017, 0.280], ( $p = 0.02$ ). In patients undergoing ARCR, PE is positively associated with postoperative satisfaction.

**Key Words:** Rotator cuff tears, Arthroscopy, Expectations, Patient satisfaction.

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Arthroscopic procedures are performed widely to treat rotator cuff tears (RCTs) and yield good to excellent clinical outcomes. Despite substantial pain relief and functional restoration, up to 20% of patients remain dissatisfied with their postoperative outcomes during the follow-up period.<sup>1</sup> In historical clinical practice, surgical emphasis was mainly placed on restoring the structural integrity of the rotator cuff tendon. Nevertheless, several studies have demonstrated that radiographic healing of the rotator cuff tendon does not assure patient satisfaction after arthroscopic repair.<sup>2</sup> Several patient-specific factors—including age, body mass index (BMI), labour intensity, fatty infiltration, and concomitant pathologies—have been identified as potential independent factors of patient satisfaction after ARCR.<sup>3</sup> In recent studies, preoperative expectations (PE) have been revealed to be correlated with higher postoperative satisfaction and better functional outcomes in procedures such as shoulder arthroplasty, internal fixation, and stabilisation surgery.<sup>4</sup> However, no studies have been found to investigate the influence of PE on postoperative satisfaction following ARCR. The assessment of PE may play a notable role in decision-making and expectation adjustment for patients undergoing ARCR.

This study aimed to assess the association of PE with postoperative satisfaction in patients undergoing ARCR.

This retrospective study was conducted at the Department of Orthopaedic Surgery, Chongqing Orthopaedic Hospital of Traditional Chinese Medicine, Chongqing, China after approval from the Institutional Review Board. Consecutive patients who underwent ARCR between June 2020 and 2023 were screened for enrollment. Data of the enrolled patients were extracted from the hospital's electronic medical record system. Patients with complete PE scores, postoperative Penn Shoulder Score (PSS) records, and follow-up duration of more than six months were included. Patients with concomitant surgical procedures or crossover to open surgery were excluded.

The PE refers to the results that patients expect after ARCR. Quantified PE scores were calculated by using the modified version of Musculoskeletal Outcomes Data Evaluation and Management System (MODEMS) questionnaire. It was composed of six questions, each scored on scale from one to five, with one indicating the lowest level of expectation and five indicating the highest.

At the six months of follow-up, all patients were asked to complete patient-reported outcome measures using the PSS questionnaire.<sup>5</sup> This 100-point scale includes three domains: Pain (0-30 points, where 30 corresponds to the worst pain), function (0-60 points, where 60 corresponds to the best function), and satisfaction (0-10 points, where 10 corresponds to the highest satisfaction).

Correspondence to: Dr. Yu Deng, Department of Orthopaedic Surgery, Chongqing Orthopaedic Hospital of Traditional Chinese Medicine, Chongqing, China  
E-mail: dengyu1984gkyy@126.com

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**Table I: Demographic and clinical characteristics of the studied population.**

| Variables   | Values  |
|---|---|
| Age, years  | 61.7 ± 8.5  |
| Gender (male / female)                                      | 26 (47.3%) / 29 (52.7%)                                       |
| BMI, kg/m <sup>2</sup>                                      | 21.99 (2.40)  |
| Intensity of labour (unemployed / light / heavy)            | 18 (32.7%) / 23 (41.8%) / 14 (25.5%)                          |
| Smoking status (Yes / No)                                   | 29 (52.7%) / 26 (47.3%)                                       |
| Dominant arm (Yes / No)                                     | 34 (61.8%) / 21 (38.2%)                                       |
| Comorbidities (Yes / No)                                    | 16 (29.1%) / 39 (70.9%)                                       |
| Preoperative opioid use (Yes / No)                          | 27 (49.1%) / 28 (50.9%)                                       |
| Diagnosis (partial / small / medium / large / massive)      | 10 (18.2%) / 14 (25.5%) / 15 (27.3%) / 10 (18.2%) / 6 (10.9%) |
| Duration of symptoms, months                                | 11.18 ± 5.91  |
| Fatty infiltration (Goutallier grade 0/1/2/3/4)             | 11 (20.0%) / 17 (30.9%) / 12 (21.8%) / 10 (18.2%) / 5 (9.1%)  |
| Concomitant pathologies (Yes / No)                          | 32 (58.2%) / 23 (41.8%)                                       |
| Repair technique (single row / double rows / suture bridge) | 15 (27.3%) / 18 (32.7%) / 22 (40.0%)                          |
| Quantified PE   | 21.07 (6.12)  |

Continuous variables are presented as SD. Categorical variables are presented as counts and percentages.

**Table II: Associations between PE and six-month PSS records.**

| Variables    | Mean PSS (SD) | Standardised coefficients (95% CI) | p-values |
|--------------|---------------|------------------------------------|----------|
| Pain         | 13.40 (9.81)  | 0.020 (-0.626, 0.691)              | 0.922    |
| Function     | 40.29 (13.92) | 0.250 (-0.147, 1.287)              | 0.116    |
| Satisfaction | 6.85 (2.05)   | 0.443 (0.017, 0.280)               | 0.028    |
| Total        | 60.55 (14.06) | 0.350 (-0.082, 1.583)              | 0.076    |

PSS, SD, CI, standardised coefficients (95% CI), and p-values were evaluated using a multiple linear regression model after adjusting for confounders.

Demographic and clinical characteristics—including age, gender, BMI, labour intensity, smoking status, dominant arm, comorbidities, preoperative opioid use, diagnosis, duration of symptoms, fatty infiltration, concomitant pathologies, and repair technique—were collected from the registry database. Continuous data were tested for normality using the Shapiro-Wilk test. To perform univariate analysis between the PSS records and the above variables, a two-sample t-test was used for dichotomous variable and a Kruskal-Wallis test for ordinal variables. A multiple linear regression model was fitted in a stepwise method to determine potential confounding factors. The associations between the PE scores and the PSS subscale and total scores were evaluated when adjusting for confounders in this regression model. Statistical significance was set as  $p < 0.05$ . All statistical analyses were conducted using the SPSS Statistic for Windows version 27. Continuous variables were expressed as mean and standard deviation (SD), and categorical variables were expressed as counts and percentages.

The study included 55 patients with a mean age of  $61.7 \pm 8.5$  years, comprising 29 (52.7%) females and 26 (47.3%) males. The demographic and clinical characteristics of this selected population are presented in Table I. In the entire cohort, approximately 70% of patients suffered partial to medium RCTs. The mean duration of symptoms was  $11.18 \pm 5.91$  months. Single-row, double-row, and suture bridge ARCR techniques were performed for 15 (27.3%), 18 (32.7%), and 22 (40.0%) patients, respectively. The mean PE score was  $21.07 \pm 6.12$  points. The mean scores of PSS pain, function, and satisfaction subscales were  $13.40 \pm 9.81$ ,  $40.29 \pm 13.92$ , and  $6.85 \pm 2.05$  points, respectively. The mean score of the PSS scale was  $60.55 \pm 14.06$  points.

In the univariate analysis, significant correlations were found between age, gender, intensity of labour, duration of symptoms, fatty infiltration, PE, and PSS (satisfaction score). These variables were subsequently taken into a multiple linear regression model, which yielded an adjusted  $R^2$  value of 0.365. After adjusting for confounders, the model revealed that the PE were significantly associated with the postoperative satisfaction score (standardised/beta coefficients 0.443, 95% CI [0.017, 0.280];  $p = 0.02$ ). However, no significant associations were detected between the PE scores and PSS pain, function, and total scores (Table II).

The highlight of the current study demonstrated that higher PE is positively associated with higher postoperative satisfaction in patients undergoing ARCR at six months of follow-up. Patient expectation before rotator cuff surgery is identified as an independent variable and can be used to predict patient-reported satisfaction.

Patient expectation and satisfaction vary widely across patient characteristics. It was reported that large RCTs, subscapularis tears, workers' compensation cases, lower education levels, and preoperative disability could produce poor expectations and satisfaction. Patients who are married, employed, and of older age at the time of surgery tended to have higher PE and postoperative satisfaction. Results of this study are consistent with previous reports.<sup>3,6</sup> However, in patients undergoing shoulder surgeries, it remains compelling whether there is a significant positive correlation between PE and postoperative satisfaction. Kaveeshwar *et al.* surveyed 216 patients who underwent shoulder surgery at a single institution and concluded that higher PE predicted better outcomes, as assessed using the surgical satisfaction questionnaire (SSQ-8).<sup>4</sup> To the best of the authors' knowledge, this is the first study investigating the association

between PE and postoperative satisfaction for ARCR Surgery. In this study, the modified MODEMS questionnaire and the PSS (pain, function, satisfaction subscale scores, and total score) were used to assess PE and post-surgical satisfaction in a quantified fashion, respectively. A multiple linear regression model was fitted to control confounding factors, and it showed a significant positive association between PE values and postoperative satisfaction (greater PE scores predicted higher satisfaction). It has been substantiated that PE may serve as a predictor of postoperative satisfaction for patients receiving ARCR.

The correlation between PE and postoperative functional recovery remains obscure. Henn *et al.* investigated 125 patients undergoing rotator cuff repair and found that greater PE is correlated with better postoperative performance on the Simple Shoulder Test (SST), the Disabilities of the Arm, Shoulder and Hand (DASH) questionnaire, the Visual Analogue Scale (VAS), and the SF-36. Higher expectations were also associated with greater improvement from baseline scores on the DASH and SF-36.<sup>1</sup> Kaveeshwar *et al.* carried out a cohort study and concluded that greater PE were significantly associated with better two-year scores on several measures, including the American Shoulder and Elbow Surgeons (ASES) score, the Shoulder Numeric Pain Scale (NPS), the Marx Shoulder Activity Rating Scale (MARS), SSQ8, and the Patient-Reported Outcome Measurement Information System (PROMIS) domains of physical function, fatigue, pain interference, fatigue, and social satisfaction.<sup>4</sup> In the present study, the shoulder function and pain relief at six-month follow-up were not substantially affected by PE. This is mainly due to the divergence in functional assessment instruments from the previous studies.

The aetiology of the expectation-satisfaction relationship is multifaceted. Firstly, an elevated PE indicates adequate caution against early tendon lesions, potentially leading to prompt intervention and postoperative rehabilitation. This could lead to better functional recovery and enhanced satisfaction. Secondly, higher PE is more frequently observed in younger patients. Thus, the potential for tendon healing in this population is relatively higher than in older individuals. In conclusion, PE is positively associated with postoperative satisfaction in patients undergoing ARCR. PE can be used to predict post-surgical satisfaction. Nevertheless, the study has certain limitations. The sample size analysed in this study remains relatively small, owing to its retrospective nature and potential biases. Moreover, the study lacks multifaceted functional measurements, such as the ASES score and DASH questionnaire. Lastly, despite adjusting for several confounders in the multivariable analyses, there is still a

need for more thorough identification of predictive factors in future studies.

#### **ETHICAL APPROVAL:**

Ethical approval was obtained from the Ethical Committee of the Chongqing Orthopaedic Hospital of Traditional Chinese Medicine (Approval No: GKYYIRB2024002).

#### **PATIENTS' CONSENT:**

Informed consent was obtained from all patients included in the study.

#### **COMPETING INTEREST:**

The authors declared no conflict of interest.

#### **AUTHORS' CONTRIBUTION:**

QJ: Formal analysis, data collection, writing, and review of the original draft.

YL: Data collection and writing of the original draft.

ZZ: Resources, supervision, drafting, and review of the manuscript.

YC, YD: Conceptualisation, methodology, drafting, and revising of the manuscript.

All authors approved the final version of the manuscript to be published.

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