High Return-to-Yoga Rate Following Arthroscopic Rotator Cuff Repair

Tammy R. Hoffman [1], **Leonard Stokes** [1], **Yousy Martinez Sauvanell** [1], **Samer Al-Humadi** [1], **Kevin Kohut** [1], **Patrick J. Denard** [1]*

(*) Corresponding author: pjdenard@gmail.com
1. Oregon Shoulder Institute, 2780 E Barnett Rd Ste 200, Medford, OR 97504, USA

Background: Returning to sport is an essential consideration for orthopedic surgery. Currently, there is a lack of knowledge regarding returning to yoga following arthroscopic rotator cuff repair (ARCR).

Hypothesis/Purpose: To examine patients' ability to return to yoga after ARCR. Secondary outcome measures were analyzed including range of motion (ROM) and patient-reported outcomes (PROs). The hypothesis was that return to yoga would be high following ARCR.

Methods: A retrospective observational study of patients who underwent ARCR between 2014 and 2022 included those who reported yoga as their primary sport with a minimum follow-up period of 2 years. Data collected included yoga participation, return time, satisfaction, ROM (forward flexion (FF), external rotation (ER), as well as hand behind the back. Additionally, PROs (Visual Analogue Scale for pain (VAS), American Shoulder and Elbow Surgeons score (ASES), and Subjective Shoulder Value (SSV)), were compared by return-to-yoga status.

Results: Thirty patients (mean age: 62±9.5 years) met the study criteria and were evaluated at an average of 49±23 months postoperatively. Return-to-yoga rate was 26% (8/30) at 6 months, 93% (28/30) at 12 months, and 100% (30/30) at 2 years postoperatively. Compared to baseline, 43% (13/30) of patients noted that their ability to engage in yoga following ARCR improved, 40% (12/30) reported that this ability was unchanged, and 17% (5/30) reported decreased ability. All patients reported significant improvements in VAS, SSV, and ASES ($p<0.01$), and no ROM parameter demonstrated statistically significant improvement ($p<0.01$).

Conclusion: Patients who engage in yoga have over a 90% return to sport 1 year following ARCR. However, return to yoga may take approximately a year following ARCR, as only 26% of patients had returned to yoga by 6 months postoperative.

What this study adds: This study demonstrates that patients who participate in yoga can expect high rates of return to yoga following ARCR, with most patients resuming within 1 year after surgery.

How this study might affect research, practice or policy: These findings may help surgeons provide more accurate postoperative counseling and recovery expectations for yoga practitioners undergoing ARCR, while also informing future research on sport-specific rehabilitation protocols.

Study Design: Retrospective case series

Level of evidence: IV

Keywords: Sport-specific outcomes; Return to sport; Shoulder rehabilitation; Arthroscopic rotator cuff repair (ARCR); Yoga

https://doi.org/10.70885/hmsj.2026.05.003

Introduction

In many Western countries, yoga is often implemented with physical postures aimed at improving fitness, managing stress, and promoting relaxation [1], Returning to yoga after shoulder surgery is feasible and can be beneficial when approached cautiously and under the guidance of a professional. A study on patients who underwent reverse shoulder arthroplasty reported a 100% return rate to yoga among those who practiced it preoperatively, though the sample size was small [2]. Similarly, another study found high rates of return to low-impact activities such as yoga after total shoulder arthroplasty (TSA), with 85% of patients successfully resuming these activities within a year of surgery [3]. These findings suggest that yoga, particularly when it is a pre-existing part of a patient's lifestyle, can be safely resumed following shoulder arthroplasty.

Yoga often involves poses and movements that place considerable pressure on the shoulder joint [4]. Fishman et al. identified the shoulder as one of the joints most impacted during yoga [5]. Similarly, Cramer et al. found that acute injuries were frequently linked to poses involving the hands, shoulders, and headstands in a survey of 1,702 yoga participants in Germany [6]. Given the significant stress placed on the shoulders in many poses, individuals experiencing shoulder discomfort may need to adjust or modify their practice accordingly. At the same time, yoga may offer advantages in rehabilitation, including enhanced strength, flexibility, balance, and range of motion, all of which are crucial for recovery.

Data specifically addressing return to yoga following arthroscopic rotator cuff repair (ARCR) is limited, with most studies grouping yoga under broader categories of low-impact or recreational activities. This lack of detailed, activity-specific outcomes is important because of the complexity of yoga involving unique joint positions and weight-bearing demands that may pose distinct risks or limitations postoperatively. The purpose of this study was to examine return to yoga after ARCR at short-term follow-up. Secondary outcome measures were also analyzed including range of motion (ROM) and patient-reported outcomes (PROs). The hypothesis was that return to yoga would be high following ARCR.

Materials and Methods

Study Design

A retrospective review was performed on a prospectively maintained database, querying all patients who underwent primary ARCR by a single surgeon (P.J.D.) between 2014 and 2022. The inclusion criteria were patients who underwent a primary ARCR, (2) patients who reported yoga as their primary sporting activity prior to ARCR, and (3) a minimum follow-up duration of 2 years. Exclusion criteria included history of fracture or nerve injury, incomplete follow-up, or refusal to participate in the study.

The study population included both women and men across a range of adult age groups who had undergone arthroscopic rotator cuff repair at our institution. Demographic variables collected for this study included age and sex. Data on race/ethnicity, socioeconomic indicators, and access-to-care variables were not collected and are therefore not available for analysis. Participant recruitment and follow-up were conducted via email contact, which may preferentially include patients with stable contact information, reliable internet access, and ongoing engagement with the healthcare system. As a result, certain groups may be under-represented, including individuals with limited technology access or greater social or economic barriers. These factors limit our ability to fully assess equity and representation within the study cohort and should be considered when interpreting generalizability.

Surgeries Performed

A breakdown of surgeries performed is outlined in **Table 1**.

Yoga Questionnaire

Patients were contacted via email to assess participation in yoga. If a patient did not fill out the survey after 3 contact attempts, they were considered lost to follow-up. A questionnaire was designed to assess patients' pre- and postoperative athletic activity and ability to participate in yoga (**Appendix A**). Questions were close-ended multiple-choice questions that required each subject to respond before proceeding to the next item. Incorporated into the survey, patients were asked to specify: (1) their participation status both pre- and postoperatively; (2) their capacity to resume yoga with the same level of intensity, frequency, and duration postoperatively; and (3) the timeline of their postoperative return to yoga. Additionally, there were questions on sport-specific considerations, such as yoga type and specific poses performed by each patient.

Study Variables

Preoperative diagnoses, age, sex, body mass index (BMI), and length of follow-up were collected. Active ROM and PROs were documented at baseline and postoperatively. ROM measurements were recorded by the performing surgeon (P.J.D) or a physician assistant at the initial and a 2-year clinic visit. These included forward flexion (FF), external rotation (ER) at the side, and hand behind the back, which was numerically scaled based on the nearest spinal level achieved with the thumb (i.e., T10=10, T12=12, L2=14, L4=16, S1=18, hip=20). Pre- and postoperative PROs, including American Shoulder and Elbow Surgeons score (ASES), Visual Analog Scale for pain (VAS), and Subjective Shoulder Value (SSV) were collected from electronic medical records or the emailed questionnaire if not available from the 2-year clinic visit.

Statistical Analysis

Categorical and continuous variables were identified for analysis. Categorical variables were reported as fractions and percentages, whereas continuous variables were reported as means and standard deviations. Questionnaire responses were displayed descriptively for all patients. Paired *t*-test was used to assess clinical improvement for all patients. Additionally, Chi-square analysis was utilized to determine if there were any statistical differences in the return rates at 3, 6, 12, and 24 months. For each test, a p-value threshold of <0.05 was used to denote statistical significance.

Table 1. Baseline demographics for all patients (BMI, body mass index), and a breakdown of the surgeries performed.

Demographic	
Dominant shoulder (right, %)	28 (93%)
Age at surgery (years (mean, SD))	62±9.5
Follow-up (months (mean, SD))	49±23
BMI (mean, SD)	27±5
Male (n, %)	17 (57%)
Procedure	Number of Cases
ARCR	30
Acromioplasty	24
Biceps Tenodesisl	10
Capsular Release	4
Coracoplasty	9
Distal Clavicle Excision	3
Loose Body Remova	1
Hardware Removal	1
Pectoralis Major Tendon Repair	1

ARCR: Arthroscopic rotator cuff repair

Table 2. Comparison of Functional and Patient Reported Outcomes.

	Preop (mean, SD)	Postop (mean, SD)	Improvement (mean, 95% CL)	p
ROM				
FF	136° ±33°	145° ±23°	11° (3-26°)	0.13
ER	53°±19°	52° ±18°	3° (5-11°)	0.43
Hand Behind the Back (spinal level)	L4 ±3	L2 ±3	0.5 (1-2)	0.54
PROs				
VAS	5.5 ±2.0	1.5 ±2.0	4.0 (2.9-5.0)	<0.01
SSV	32 ±17	80 ±27	32 (20-44)	<0.01
ASES	50 ±13	88 ±13	52 (43-62)	<0.01

ROM, range of motion; FF, forward flexion; ER, external rotation; PROs, patient reported outcomes; VAS, Visual Analog Scale for pain; SSV, Subjective Shoulder Value; ASES, American Shoulder and Elbow Surgeons score. Hand behind the back conversions: T10=10, T12=12, L2=14, L4=16, S1=18, hip=20.

Ethics Approval

This study was determined to be exempt from Institutional Review Board (IRB) oversight by the Southern Oregon Institutional Review Board under 45 CFR 46.104(d)(2), with limited IRB review conducted to confirm minimal risk to participants.

Results

A total of 1,999 shoulder arthroscopy procedures were performed by the senior author during the study period. After applying inclusion and exclusion criteria, 200 patients were eligible for screening. Among eligible patients, 30 reported yoga as a primary preoperative sport or activity, responded to outreach, and were included in the analysis. Baseline demographics and surgical data are represented in **Table 1**. Pre- and postoperative PROs and ROM are displayed for all patients in **Table 2**. PROs improved significantly for all patients, and no ROM parameter demonstrated statistically significant improvement following ARCR.

Yoga Outcomes

Thirty patients reported being consistently interested in yoga prior to surgery *(Supplementary material: Appendix A)*. Preoperatively, restorative, vinyasa, and hatha were the most practiced forms of yoga (33%, 17%, and 17%, respectively). Standing poses, forward bends, and twists were the most frequent pose types performed prior to arthroscopy (practiced by 100%, 97%, and 73%, respectively) with backbends, inversions, and arm balances being practiced by 57%, 33%, and 33% of the total patient population, respectively.

Eight patients (26%, 8/30) reported being able to return to yoga within 6 months. By 12 months postoperatively, 93% (28/30) were able to return to their sport, and all 30 patients (100%, 30/30) returned at the 2-year mark. Return-to-sport rates increased significantly between 3 and 6 months ($p<0.01$) and between 6 and 12 months ($p<0.01$), but no significant difference was observed between 12 and 24 months ($p=0.49$). Twenty-two patients (73%, 22/30) reported being mostly to completely satisfied with their yoga performance following ARCR, with only two patients reporting no satisfaction (7%, 2/30). Return rates, satisfaction, and improvement, as well as chi-squared analysis of return rates at 3, 6, 12, and 24 months are outlined in **Table 3**.

Over half of all patients (70%, 21/30) reported returning to their yoga practice at a frequency of at least 1-2 times per week following ARCR, whereas 20% (6/30) reported participation at less than once a week. Eighty-three percent (25/30) of patients noted that their ability to engage in yoga following their shoulder arthroscopy either remained the same or improved, whereas 17% (5/30) reported decreased ability. Postoperatively, restorative, vinyasa, and hatha remained the most practiced type of yoga (practiced by 50%, 17%, and 17%, respectively). Standing poses, forward bends, and twists remained the most frequent pose types performed following ARCR (practiced by 97%, 97%, and 73%, respectively), with backbends, inversions, and arm balances being performed by 40%, 27%, and 12%, respectively.

Discussion

The most important finding was that return to yoga following ARCR was high, with 100% of patients resuming participation by the 2-year postoperative point. Additionally, 73% reported being satisfied with their performance, and only 7% reporting dissatisfaction. Return-to-sport rates progressed increasingly between the 3, 6, and 12 month timepoints. There was no significance observed between 12 and 24 months, demonstrating that most patients had returned to yoga by the 12-month postoperative point. Therefore, our hypothesis that return to yoga would be high following ARCR was confirmed, although the timeline to return was longer than anticipated with relatively low participation at 6 months postoperatively.

Returning to sport after orthopedic surgery is a multifaceted process influenced by the type of surgery, rehabilitation protocols, and individual patient factors including age, baseline fitness, and goals. Shoulder arthroscopy, often performed for conditions like labral tears, rotator cuff injuries, or impingement syndromes, requires careful rehabilitation to restore strength, stability, and range of motion [7]. Evidence suggests that most athletes can return to sport within 4–6 months post-operatively, though return to pre-injury performance levels may take longer and is not guaranteed [8]. Additionally, psychological readiness and fear of reinjury are significant predictors of return-to-sport outcomes across all types of orthopedic procedures [9]. Thus, personalized rehabilitation programs that incorporate physical recovery, functional milestones, and mental preparedness are critical to optimizing outcomes for athletes and active individuals alike.

Table 3. Rates of return, satisfaction, and improvement reported by ARCR patients, as well as chi-squared analysis of return rates at 3, 6, 12, and 24 months

Rate of Return	n (%)
Less than 3 months	1 (3%)
3-6 months	7 (23%)
6-9 months	15 (50%)
9-12 months	5 (17%)
More than 12 months	2 (7%)
Satisfaction	
Very dissatisfied	1 (3%)
Dissatisfied	1 (3%)
Neutral	6 (20%)
Satisfied	7 (23%)
Very satisfied	15 (50%)
Improvement	
Worsened	5 (17%)
Stayed the same	12 (40%)
Improved	13 (43%)
Chi-Squared Analysis	
Comparison	p-value
3 months vs 6 months	<0.01
6 months vs 12 months	<0.01
12 months vs 24 months	0.49

Sports can be classified based on the level of stress they place on the shoulder joint, typically grouped into low, moderate, and high demand categories. Activities such as golf, Pilates, and yoga generally fall under the low to moderate demand category because they involve minimal repetitive overhead movements or heavy lifting. In contrast, sports like baseball, softball, rock climbing, tennis, and volleyball are considered high-demand due to frequent overhead actions and greater load on the shoulder [10][11]. Athletes participating in high-demand sports often face more challenges returning to their previous level of performance after shoulder surgery, which may be influenced by postoperative discomfort, surgical complications, or decreased motivation [10][11][12]. Promisingly, individuals engaged in lower-demand sports tend to have a higher rate of return to activity following recovery [13][14].

Although the sample size in the current study is small, 93% of patients were able to return to yoga by the 1-year postoperative point. Furthermore, only 7% reported being dissatisfied with their yoga performance following ARCR. Though not directly related to shoulder surgery, preoperative stretching of shoulder muscles has been shown to be safe and effective in reducing postoperative pain and functional restrictions in patients undergoing mastectomy [15]. Additionally, preoperative shoulder strength, particularly abduction strength, predicts superior postoperative outcomes and greater improvement in shoulder strength, ROM, and outcome scores after primary reverse total shoulder arthroplasty [16]. These findings suggest that incorporating targeted stretching and strengthening exercises into preoperative routines may optimize surgical outcomes and expedite return to daily activities. It is possible that yoga as a sport influenced by increased stretching, encourages retention or restoration of shoulder motion following ARCR. Further study is required, but it is possible that yoga may even be considered as a form of rehab for regaining motion following shoulder arthroscopy.

Limitations

There are several limitations to the current study. Due to the small sample size, a multivariate analysis considering the effects of age, sex, laterality, hand dominance, or preoperative diagnosis was not performed. Second, due to the retrospective nature of the study and the notable loss to follow-up despite three contact attempts, there is risk for introducing selection bias. Third, the questionnaire's nature limited the capacity for inferential statistics, leading to the presentation of results in a descriptive manner, akin to previous studies. Fourth, there is risk for recall bias as the implementation of the questionnaire relies on patient's recollections of their preoperative sport involvement. Fifth, the lack of standardization of questionnaires across studies complicates the comparison of results. Sixth, the generalizability of these findings may be limited due to the surgeries being performed by a single high-volume surgeon at a single institution and given that all surgeries were ARCRs, the results may not be generalizable to other types of arthroscopic surgery. Additionally, due to the current study including a patient population spanning 12 years, potential changes in surgical technique and differences in postoperative physiotherapy were not accounted for. Lastly, there is an increased risk of a type 2 error due to the small sample size used. Additional comparison studies with more extended follow-up periods are needed to reach more definitive conclusions.

Conclusion

Patients who engage in yoga have over a 90% return to sport 1 year following ARCR. However, return to yoga may take approximately a year following ARCR, as only 26% of patients had returned to yoga by 6 months postoperative.

Open access statement

This is an open-access article distributed under the terms of the Creative Commons Attribution Licence for Commercial and Non-Commercial Purposes (**CC BY 4.0**, see **https://creativecommons.org/licenses/by/4.0/**), which allows free use, distribution, adaptation, and commercial use of a work, provided proper credit is given to the creator.

Funding

None

Conflict of interest statement

Patrick J. Denard is a consultant for and recipient of research support and royalties from Arthrex, and a paid speaker for Pacira. The other authors declare that they have no competing interests regarding the publication of this manuscript.

References

1. Burley, M. Hatha Yoga: Its Context, Theory and Practice. Motilal Banarsidass; 2000. ISBN-10: 8120817052.
2. Hoffman TR, Galasso LA, Noble MB, Ardebol J, Denard PJ. Return to yoga following anatomic or reverse shoulder arthroplasty. JSES International. 2025;9(4):1210-1214. DOI: 10.1016/j.jseint.2025.01.013.
3. Mannava S, Horan MP, Frangiamore SJ, Hussain ZB, Fritz EM, Godin JA, Pogorzelski J, Millett PJ. Return to Recreational Sporting Activities Following Total Shoulder Arthroplasty. Orthop J Sports Med. 2018;6(7). DOI: 10.1177/2325967118782672.
4. Iyengar BKS. Light on Yoga: Yoga Dipika. Unwin Paperbacks; 1976. ISBN-10: 0041490347.
5. Fishman LM, Saltonstall E, Genis S. Yoga therapy in practice; understanding and preventing yoga injuries. Int J Yoga Ther. 2009;19:123–128. DOI:10.17761/ijyt.19.1.922087896t1h2180.
6. Cramer H, Quinker D, Schumann D, Wardle J, Dobos G, Lauche R. Adverse effects of yoga: A National Cross-sectional survey. BMC Complementary and Alternative Medicine. 2019;19(1). DOI: 10.1186/s12906-019-2612-7.
7. Cvetanovich GL, Gowd AK, Liu JN, Nwachukwu BU, Cabarcas BC, Cole BJ, Forsythe B, Romeo AA, Verma NN. Establishing clinically significant outcome after arthroscopic rotator cuff repair. Journal of Shoulder and Elbow Surgery. 2019;28(5), 939–948. DOI: 10.1016/j.jse.2018.10.013.
8. Hu B, Hong J, Zhu H, Yan S, Wu H. Arthroscopic bankart repair versus conservative treatment for first-time traumatic anterior shoulder dislocation: A systematic review and meta-analysis. European Journal of Medical Research. 2023;28(1). DOI: 10.1186/s40001-023-01160-0.
9. Ardern, CL, Taylor, NF, Feller, JA, Webster, KE. A systematic review of the psychological factors associated with returning to sport following injury. British Journal of Sports Medicine. 2016;47(17), 1120–1126. DOI: 10.1136/bjsports-2012-091203.
10. Geyer S, Siebler J, Eggers F, Münch LN, Berthold DP, Imhoff AB, et al. Influence of sportive activity on functional and radiographic outcomes following reverse total shoulder arthroplasty: a comparative study. Arch Orthop Trauma Surg. 2023;143(4):1809-1816. DOI: 10.1007/s00402-022-04344-1.
11. Tangtiphaiboontana J, Mara KC, Jensen AR, Camp CL, Morrey ME, Sanchez-Sotelo J. Return to Sports After Primary Reverse Shoulder Arthroplasty: Outcomes at Mean 4-Year Follow-up. Orthop J Sports Med. 2021;9(6):232596712110123. DOI: 10.1177/23259671211012393.
12. Johnson CC, Johnson DJ, Liu JN, Dines JS, Dines DM, Gulotta LV. Return to sports after shoulder arthroplasty. World J Orthop. 2016;7(9):519-26. DOI: 10.5312/wjo.v7.i9.51.
13. Galvin JW, Slevin JM, Nowak MJ, Yu HH, Turner EK, Waterman BR, et al. A High Rate of Return to Running Is Seen After Both Arthroscopic and Open Shoulder Surgery. Arthrosc Sports Med Rehabil. 2023;5(5):100770. DOI: 10.1016/j.asmr.2023.100770.

14. Küffer J, Taha ME, Hoffmeyer P, Cunningham G. Return to sport after shoulder arthroplasty: a systematic review. EFORT Open Rev. 2021;6(9):771-778. DOI: 10.1302/2058-5241.6.200147.

15. Fatima T, Shakoor A, Ilyas M, Safdar M, Majeed S. Effectiveness of preoperative stretchings on postoperative shoulder function in patients undergoing mastectomy. J Pak Med Assoc. 2022;72(4):625-628. DOI: 10.47391/JPMA.0475.

16. Hao KA; Wright TW; Schoch BS. Wright JO, Dean EW, Struk AM, King JJ. Association Between Preoperative Shoulder Strength and Clinical Outcomes After Primary Reverse Total Shoulder Arthroplasty. J Am Acad Orthop Surg. 2022 May 1;30(9):e730-e740. DOI: 10.5435/JAAOS-D-21-00945.