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Functional Outcomes of Single Row vs Double Row Repair in Supraspinatus Tear: A Prospective Study

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ABSTRACT

Background: Rotator cuff tears, especially of the supraspinatus tendon, commonly affect adults over 40 and increase with age. Arthroscopic repair methods include single row (SR) and double row (DR) techniques; SR offers simplicity and shorter surgery, while DR provides more tendon–bone contact and improved stability. This study compares functional outcomes between SR and DR approaches.

Materials and Methods: A 12-month prospective observational study at P.D.U. Medical College, Rajkot, compared SR and DR repairs in 40 patients (aged 18–70) with confirmed supraspinatus tears. Patients were divided into two groups of 20 for SR or DR arthroscopic repair, all following standard protocols and postoperative physiotherapy. Outcomes were measured using the Constant and Oxford Shoulder Scores at 1, 3, and 6 months, with statistical significance set at $p < 0.05$.

Results: The study involved 40 patients (mean age 56 ± 1.2 years), with 16 males and 24 females. Both SR and DR repair groups showed steady improvement in shoulder function over six months, as measured by the Constant Shoulder Score, with most patients progressing from poor to good or excellent outcomes. No significant differences were found between the two techniques at any checkpoint. The Oxford Shoulder Score indicated similar results across pain, daily activities, night pain, and functional ability in both groups. Most reported mild to moderate pain with little impact on routine tasks, absence of night pain for most, and regained independence in daily activities. Specific tasks such as eating, shopping, dressing, and mobility were performed with equal ease in both groups.

Conclusion: Both single row and double row arthroscopic rotator cuff repairs resulted in significant improvement in pain and shoulder function at six months. No meaningful difference was observed between the two techniques based on Constant and Oxford Shoulder Scores. These findings suggest that either repair method can achieve comparable short-term clinical outcomes.

Keywords: *Rotator Cuff Tear, Arthroscopic Rotator Cuff Repair, Single Row Repair, Double Row Repair, Functional Outcome Assessment*

INTRODUCTION

Rotator cuff tears are a leading cause of shoulder pain and disability, especially in adults over 40 years [1]. The rotator cuff consists of four muscles, which are supraspinatus, infraspinatus, teres minor, and subscapularis, whose tendons stabilize the shoulder [2]. Supraspinatus tears are most common, affecting around 62% of men and 38% of women, with prevalence increasing to over 70% in those older than eighty [3]. These injuries can impair arm movement and, if untreated, may lead to tendon retraction, muscle atrophy, and permanent dysfunction [4]. Early diagnosis and timely surgical repair of larger tears improve outcomes and lower retear risk. Arthroscopic repair is now the preferred treatment for supraspinatus tears unresponsive to conservative care, offering minimal invasion, better visualization, and quicker recovery [5]. single row

(SR) and double row (DR) repair techniques differ in biomechanics, complexity, cost, and healing potential, with ongoing debate over which is optimal.

The SR technique, which uses a single lateral row of suture anchors, reduces operative time and cost while providing satisfactory outcomes in many cases [6]. In contrast, the DR technique employs medial and lateral anchor rows to increase tendon–bone contact. Biomechanical studies show that DR repair offers stronger initial fixation, better footprint coverage, and improved load distribution, potentially aiding biological healing.

While SR and DR repairs have different biomechanical advantages, studies show little difference in patient outcomes such as function, pain, or satisfaction for small-to-medium tears. DR repair may lower structural failure rates in larger tears, but this improvement does not always lead to better clinical results, highlighting a gap between anatomical healing and actual patient benefit.

A key rationale for the present study arises from these conflicting data, the variability in patient characteristics across clinical settings, and the limited availability of prospective comparative research. Differences in healthcare resources, surgical expertise, and patient demographics further underscore the need for context-specific evidence to guide treatment decisions. Therefore, the aim of this prospective study is to compare the functional outcomes of single row and double row arthroscopic supraspinatus repairs using standardized clinical assessment tools, thereby providing clearer insights into the relative clinical effectiveness of each technique in routine practice.

MATERIALS AND METHODS

Study Design: This study was a **prospective observational study** conducted to compare single row (SR) repair versus double row (DR) repair in the management of Supraspinatus tear.
Study Duration: The study was carried out over a period of **12 months**, with patient follow-up visits in **month 1, month 3 and month 6** post-surgery.

Study Population: The study was conducted at **P. D. U. Medical College, Rajkot, Gujarat**, and included patients admitted to the **Orthopaedics Department** with shoulder pain clinically and radiologically diagnosed as **Supraspinatus tears**, all of whom underwent arthroscopic repair. A **purposive sampling method** was used, enrolling all eligible patients who met the inclusion criteria during the study period.

Inclusion Criteria:

- Adults aged between 18 and 70 years of both sexes.
- Patients presenting with shoulder pain and radiologically confirmed Supraspinatus tear.

Exclusion Criteria:

- Patients who did not provide consent.
- Patients with a fracture in the same limb around the shoulder joint.
- Patients diagnosed with Acromioclavicular joint disruption, shoulder impingement syndrome, brachial plexus injury, rheumatoid arthritis, or osteoarthritis.
- Patients undergoing treatment for diabetes mellitus, hypertension, rheumatoid arthritis, long-term steroid use, shoulder impingement syndrome, or radial nerve palsy.

Sample Size: **40 patients** were enrolled, split evenly between Group 1 (SR Group) for single row rotator cuff repair and Group 2 (DR Group) for double row rotator cuff repair to treat Supraspinatus tear.
Data Collection and Procedure: All patients underwent detailed clinical and demographic assessment, along with routine preoperative investigations and radiological confirmation of supraspinatus tears. Arthroscopic single-row or double-row repair was performed following standard surgical protocols. Postoperative management and rehabilitation followed a standardised physiotherapy regimen. Functional outcomes were evaluated at scheduled follow-up visits using the Constant Shoulder Score and Oxford Shoulder Score, comparing the affected and normal sides (annexure 1).

Data Analysis: Data were recorded and analysed with MS Excel (2024) and SPSS 26.0. Continuous variables are reported as mean ± SEM; categorical variables as frequencies and percentages. Student's t-test was used for continuous variables and chi-square test for categorical variables. Statistical significance was set at $p < 0.05$.

Ethical Considerations: Ethical approval was granted by the Institutional Ethics Committee, with the study conducted per the Declaration of Helsinki. Patient data was anonymised and securely managed. All participants provided written informed consent, and surgical procedures followed institutional safety and anaesthesia standards with postoperative monitoring.

RESULTS

The study population consisted of 40 patients with a mean age of 56 ± 1.2 years, comprising 16 males (40%) and 24 females (60%). The Constant Shoulder Score was used to compare functional outcomes for SR and DR rotator cuff repairs at 1, 3,

and 6 months postoperatively (Table 1). Both groups showed poor results initially, gradual improvement by 3 months, and significantly better shoulder function at 6 months. Outcomes improved progressively and significantly over time in both groups, with no significant difference between the techniques at any interval.

Six-month functional recovery was measured using the Oxford Shoulder Score, covering pain, impact on daily activities, night discomfort, and routine tasks (Table 2). Most patients in both SR and DR groups reported mild to moderate pain, with few experiencing none or severe pain. Similarly, most had no or only mild interference with work or household tasks. Most patients reported no night-time pain, with similar results in both groups. Overall pain was generally mild with no major differences. Both surgical methods yielded comparable outcomes in daily activities like dressing and getting in or out of a car; most patients experienced minimal or no difficulty, and none were completely unable to perform these tasks. Most participants could perform daily tasks like using a knife and fork, shopping, combing hair, hanging clothes, and washing or drying underarms with little to no difficulty. Differences between specific activities were minimal and not statistically significant.

Table 1: Functional Outcome Grades by Constant Shoulder Score for Single Row (SR) and Double Row (DR) Repairs Over Time

Repair Follow-Up / Grade	1st Month SR/DR (n=40)	3rd Month SR/DR (n=40)	6th Month SR/DR (n=40)	Chi-Square Value	p Value
> 30 (Poor)	20 / 20	15 / 18	1 / 2	30.5	<0.01**
21–30 (Fair)	0 / 0	4 / 2	11 / 10	26	<0.01**
11–20 (Good)	0 / 0	1 / 0	3 / 6	14.6	0.0007**
< 11 (Excellent)	0 / 0	0 / 0	5 / 2	14	0.0009**
Total Cases	20 / 20	20 / 20	20 / 20		
p Value	1.0	0.5	0.5		

Table 2: Comparison of Oxford Shoulder Score Parameters Between Single Row (SR) and Double Row (DR) Repairs at 6th Month Follow-Up

Repair Type / Parameter	SR (n=20)	DR (n=20)	p Value
Worst pain from shoulder (None/Mild/Moderate/Severe/Unbearable)	1 / 11 / 6 / 0 / 2	2 / 10 / 7 / 0 / 1	0.50
Interference due to pain (Not at all/A little/Moderate/Greatly/Totally)	7 / 8 / 3 / 2 / 0	5 / 10 / 3 / 2 / 0	0.50
Pain at night (No nights/1–2/Some/Most/Every)	15 / 3 / 1 / 0 / 1	10 / 5 / 2 / 1 / 2	1.00
Describe the pain (None/Very mild/Mild/Moderate/Severe)	2 / 1 / 11 / 5 / 1	3 / 1 / 14 / 2 / 0	0.79
Trouble dressing/Functional Difficulty (No/Little/Moderate/Extreme/Impossible)	7 / 8 / 3 / 2 / 0	10 / 5 / 4 / 1 / 0	0.50
Getting in/out of car or transport (No/Little/Moderate/Extreme/Impossible)	6 / 10 / 3 / 1 / 0	8 / 5 / 5 / 2 / 0	0.50
Use of knife and fork (Easy/Little/Moderate/Extreme/Impossible)	14 / 5 / 1 / 0 / 0	16 / 3 / 0 / 1 / 0	0.50
Household shopping (Easy/Little/Moderate/Extreme/Impossible)	13 / 5 / 2 / 0 / 0	10 / 6 / 4 / 0 / 0	1.00
Carrying tray (Easy/Little/Moderate/Extreme/Impossible)	15 / 2 / 3 / 0 / 0	13 / 5 / 1 / 1 / 0	0.75
Combing hair (Easy/Little/Moderate/Extreme/Impossible)	3 / 8 / 5 / 3 / 1	4 / 6 / 6 / 3 / 1	0.60
Hanging clothes (Easy/Little/Moderate/Extreme/Impossible)	5 / 9 / 4 / 2 / 0	4 / 7 / 6 / 1 / 2	0.61
Wash and dry under arms (Easy/Little/Moderate/Extreme/Impossible)	11 / 5 / 3 / 0 / 1	9 / 6 / 5 / 0 / 0	0.28

DISCUSSION

Rotator cuff tears, especially those of the supraspinatus tendon, commonly cause shoulder pain and dysfunction. While arthroscopic techniques have improved, there is ongoing debate over whether single row (SR) or double row (DR) repair yields better results. This prospective study compares functional outcomes of SR and DR repairs for supraspinatus tears using standardized clinical assessments.

The average age of participants was 56 ± 1.2 years, aligning with typical ages for degenerative rotator cuff pathology. Similar mean ages were found in studies by Nicholas et al. (2016) [7] and Yamamoto et al. (2010) [8], at 62 ± 7 and 57.9

years, respectively. Of the 40 patients, 60% were female and 40% male (ratio 3:2), indicating a female predominance. This may reflect higher susceptibility or healthcare-seeking behaviour among women, consistent with findings from Yamamoto et al. (2010) [8].

Functional outcomes, assessed using the Constant Shoulder Score, showed steady improvement for both SR and DR rotator cuff repairs at 1, 3, and 6 months postoperatively. At 1 month, all 40 patients scored as poor (>30). By 3 months, 33 remained poor, 6 were fair (21–30), and 1 was good (11–20). At 6 months, only 3 were still poor; 21 were fair, 9 were good, and 7 achieved excellent (<11). Chi-square analysis confirmed significant improvement over time ($p < 0.01$). Both SR and DR groups improved similarly. At 3 months, SR had 4 fair and 1 good outcome; DR had 2 fair. At 6 months, SR had 5 excellent and 11 fair; DR had 2 excellent, 10 fair, and 6 good outcomes. No statistically significant differences existed between techniques at any time point ($p = 1.0, 0.5, 0.5$). These findings agree with previous research by Lapner et al. (2012) [9] and Carbonel et al. (2012) [10], which also reported no long-term differences in Constant scores between the methods. Gu et al. (2023) [11] confirmed this through a meta-analysis, showing no statistical difference across trials. However, Jadhav et al. (2019) [12] noted ongoing functional improvement after single row repairs, with 44% of patients reaching excellent scores at one year, indicating recovery may continue past early postoperative stages.

A comparative analysis of Oxford Shoulder Score parameters at 6 months shows that SR and DR rotator cuff repairs provide similar outcomes. Pain severity, interference from pain, night pain frequency, and pain descriptions were comparable in both groups, with no significant differences noted (all $p \geq 0.50$). These results indicate equivalent pain relief for both techniques at 6 months. The pain-related results of this study are consistent with earlier research. Ponugoti et al. (2021) [13] and Gutierrez et al. (2025) [14] found no significant differences in postoperative pain between single row and double row repairs, despite the latter having better structural healing. Storti et al. (2022) [15] also showed similar long-term pain outcomes for both techniques. Chen et al. (2019) [16] reported higher early pain for double row repairs, but outcomes were comparable at mid-term. Yadav et al. (2025) [17] demonstrated substantial pain relief from single row repair, suggesting double row constructs are not essential for small or medium tears.

Functional tasks like dressing showed minimal impairment for both SR and DR groups, with similar numbers reporting little or no difficulty ($p=0.50$). Getting in and out of transport yielded comparable results. Routine activities, such as using cutlery, shopping, carrying trays, combing hair, hanging clothes, and washing under arms, were largely restored in both groups. No significant differences were found in tasks requiring overhead or rotational movements (p values 0.28–0.61). Overall, daily functional performance was similarly regained after both SR and DR repairs, consistent with existing evidence. Prasathaporn et al. (2011) [18] found no significant functional score differences between single and double row repair techniques. Imam et al. (2020) [19] observed similar Oxford Shoulder Scores postoperatively for tears under 3 cm, indicating both techniques restore daily activity equally. Lapner et al. (2012) [9], Gutierrez et al. (2025) [14], and Gu et al. (2023) [11] all reported comparable functional outcomes for small tears regardless of technique. Miškulin et al. (2015) [20] and Imam & Abdelkafy (2016) [21] showed excellent long-term recovery and significant improvement in Oxford Shoulder Score for single and double row repairs, respectively, supporting robust functional recovery with either method.

Overall, the study cohort reflected the typical age and gender distribution seen in degenerative supraspinatus tears. Both repair techniques demonstrated substantial functional improvement, with the Constant Shoulder Score showing progressive recovery over six months and no significant differences between single row and double row groups. Oxford Shoulder Score pain parameters and functional task performance also showed comparable outcomes at six months, indicating similar pain relief and restoration of daily activity across techniques. Collectively, these findings suggest that while patients experience meaningful postoperative recovery, the choice of repair method does not significantly alter early functional or pain-related outcomes.

CONCLUSION

This study demonstrates that single row and double row arthroscopic rotator cuff repair techniques provide similar early clinical outcomes. Although both groups showed significant postoperative improvement, neither technique exhibited superiority in terms of pain reduction, functional restoration, or ability to perform daily activities at six months. Given the comparable performance of both methods, surgical selection may be best guided by tear characteristics, intraoperative considerations, and surgeon expertise rather than anticipated differences in short-term recovery. Further long-term follow-up studies may help clarify whether these similarities persist over time.

REFERENCES:

1. Kuhn JE. Prevalence, Natural History, and Nonoperative Treatment of Rotator Cuff Disease. Oper Tech Sports Med 2023;31:150978. https://doi.org/10.1016/J.OTSM.2023.150978.
2. Akhtar A, Richards J, Monga P. The biomechanics of the rotator cuff in health and disease – A narrative review. J Clin Orthop Trauma 2021;18:150. https://doi.org/10.1016/J.JCOT.2021.04.019.
3. Zhao J, Luo M, Liang G, Wu M, Pan J, Zeng LF, et al. Risk Factors for Supraspinatus Tears: A Meta-analysis of Observational Studies. Orthop J Sports Med 2021;9. https://doi.org/10.1177/23259671211042826;ISSUE:ISSUE:DOI.

4. May T, Garmel GM. Rotator Cuff Injury. StatPearls, StatPearls Publishing; 2023.
5. Altamimi TA, Alkathami AA, Al-Awn RMM, Alkhaldi MHE, Alhudaithi MHM, Alqahtani AA, et al. A Narrative Review of Rotator Cuff Tear Management: Surgery Versus Conservative Treatment. Cureus 2024;16:e74988. https://doi.org/10.7759/CUREUS.74988.
6. Khoriati A achraf, Antonios T, Gulihar A, Singh B. Single Vs Double row repair in rotator cuff tears – A review and analysis of current evidence. J Clin Orthop Trauma 2019;10:236. https://doi.org/10.1016/J.JCOT.2019.01.027.
7. Nicholas SJ, Lee SJ, Mullaney MJ, Tyler TF, Fukunaga T, Johnson CD, et al. Functional Outcomes After Double-Row Versus Single-Row Rotator Cuff Repair: A Prospective Randomized Trial. Orthop J Sports Med 2016;4. https://doi.org/10.1177/2325967116667398.
8. Yamamoto A, Takagishi K, Osawa T, Yanagawa T, Nakajima D, Shitara H, et al. Prevalence and risk factors of a rotator cuff tear in the general population. J Shoulder Elbow Surg 2010;19:116–20. https://doi.org/10.1016/j.jse.2009.04.006.
9. Lapner PLC, Sabri E, Rakhra K, McRae S, Leiter J, Bell K, et al. A multicenter randomized controlled trial comparing single-row with double-row fixation in arthroscopic rotator cuff repair. J Bone Joint Surg Am 2012;94:1249–57. https://doi.org/10.2106/JBJS.K.00999.
10. Carbonel I, Martinez AA, Calvo A, Ripalda J, Herrera A. Single-row versus double-row arthroscopic repair in the treatment of rotator cuff tears: a prospective randomized clinical study. Int Orthop 2012;36:1877. https://doi.org/10.1007/S00264-012-1559-9.
11. Gu Z, Wu S, Yang Y, Ren T, Zhang KW. Comparison of Arthroscopic Single-row and Double-row Repair for Rotator Cuff Injuries With Different Tear Sizes: A Systematic Review and Meta-analysis. Orthop J Sports Med 2023;11:23259671231180856. https://doi.org/10.1177/23259671231180854.
12. Jadhav DrPD, Kalyan DrHK, Shanthakumar DrS, Arya DrS, V DrH, SP DrAK. Functional outcome following arthroscopic rotator cuff repair with single row technique using bio absorbable anchors: Prospective study. International Journal of Orthopaedics Sciences 2019;5:334–8. https://doi.org/10.22271/ORTHO.2019.V5.I2G.43.
13. Ponugoti N, Raghu A, Colaco HB, Magill H. A comparison of simple and complex single-row versus transosseous-equivalent double-row repair techniques for full-thickness rotator cuff tears: a systematic review and meta-analysis. JSES Int 2021;6:70. https://doi.org/10.1016/J.JSEINT.2021.09.007.
14. Gutierrez EAP, Mendoza AA, Galaviz Morales JP, Arambula Torres LE, Portillo Ortiz NK, Nafarrate EB. Comparative analysis of single-row vs. double-row technique for rotator cuff repair: a systematic review and statistical analysis. JSES Reviews, Reports, and Techniques 2025;5:857–64. https://doi.org/10.1016/J.XRRT.2025.05.017.
15. Storti TM, Ribeiro TDS, Faria RSS, Simionatto JE, Simionatto C, Paniago AF. Arthroscopic Repair of Rotator Cuff Injury: An Analysis of Function, Muscular Strength and Pain Between Single Row and Double Row Techniques. Rev Bras Ortop (Sao Paulo) 2022;57:472. https://doi.org/10.1055/S-0041-1735943.
16. Chen Y, Li H, Qiao Y, Ge Y, Li Y, Hua Y, et al. Double-row rotator cuff repairs lead to more intensive pain during the early postoperative period but have a lower risk of residual pain than single-row repairs. Knee Surgery Sports Traumatology Arthroscopy 2019;27:3180–7. https://doi.org/10.1007/S00167-019-05346-0.
17. Yadav J, Mishra A, Lal AK, Khan A, Jaipuriar S, Singh S. Functional Outcome of Arthroscopic Single-row Rotator Cuff Repair Using the PENN Shoulder Score – A Prospective Cohort Study. J Orthop Case Rep 2025;15:350–8. https://doi.org/10.13107/JOCR.2025.V15.I11.6400.
18. Prasathaporn N, Kuptniratsaikul S, Kongrukgreatiyos K. Single-row repair versus double-row repair of full-thickness rotator cuff tears. Arthroscopy - Journal of Arthroscopic and Related Surgery 2011;27:978–85. https://doi.org/10.1016/j.arthro.2011.01.014.
19. Imam M, Sallam A, Ernstbrunner L, Boyce G, Bardakos N, Abdelkafy A, et al. Three-year functional outcome of transosseous-equivalent double-row vs. single-row repair of small and large rotator cuff tears: a double-blinded randomized controlled trial. J Shoulder Elbow Surg 2020;29:2015–26. https://doi.org/10.1016/J.JSE.2020.05.005.