The effects of arthroscopic rotator cuff repair on human sexual activity

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Purpose
To assess the effect of arthroscopic rotator cuff repair on sexual function, desire, and satisfaction, in addition to the shoulder function.
Methods
We did arthroscopic rotator cuff repair for 55 sexually active married individuals with rotator cuff tears. Shoulder and sexual function were assessed using: 1- the Constant-Murley score (CMS), 2- two visual analog scales (VAS) questionnaires, one to evaluate pain level during daily activities and the second to assess the pain level only during sexual activity, 3- Change in Sexual Functioning Questionnaire (CSFQ), 4- Sexual Desire Inventory (SDI) Questionnaire, 5- the Index of Sexual Satisfaction (ISS) Questionnaire, and 6- the study-specific short questionnaires. Assessment parameters were done before surgery and at 1 month (1M), 3 months (3M), 6 months (6M), 12 months (12M), 18 months (18M), and 24 months (24M) after surgery.
Results
Only 49 subjects were included in the final analysis (6 were excluded from the last follow-up). 77% of the study subjects found that their sexual life was affected by their shoulder condition, with 65% reporting that this was due to increased pain.75% needed to adjust their sexual position to accommodate their shoulder problem. 55% found that below the partner position is the most comfortable position during the sexual act. Additionally, we found a significant improvement over time in the CMS score, two VAS questionnaires, CSFQ, and ISS.
Conclusion
Arthroscopic rotator cuff repair improved shoulder function, pain level, sexual function, satisfaction, and mobility during sexual engagements. it did not affect the level of sexual desire.

Keywords:
repair and sexual position, rotator cuff, sexual function, shoulder arthroscopy

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Introduction

Sexual activity is an essential part of our life, and sexual satisfaction affects the quality of it [1,2]. A sexual dysfunction is believed to be strongly associated with emotional and physical dissatisfaction and even depression [3–5].

Sexual intercourse is recognized as a form of physical activity which involves physical movement and puts the body joints under stress [1,3,6].

Rotator cuff tear is a common condition affecting patients' performance and quality of life [7]. Unlike hip and knee surgery, the effect of rotator cuff tear and its repair on sexual life is seldom reported in the literature.

Because sexual performance is essential to patient outcomes, patients' satisfaction after surgery is affected by defects in sexual performance [3,5,7].

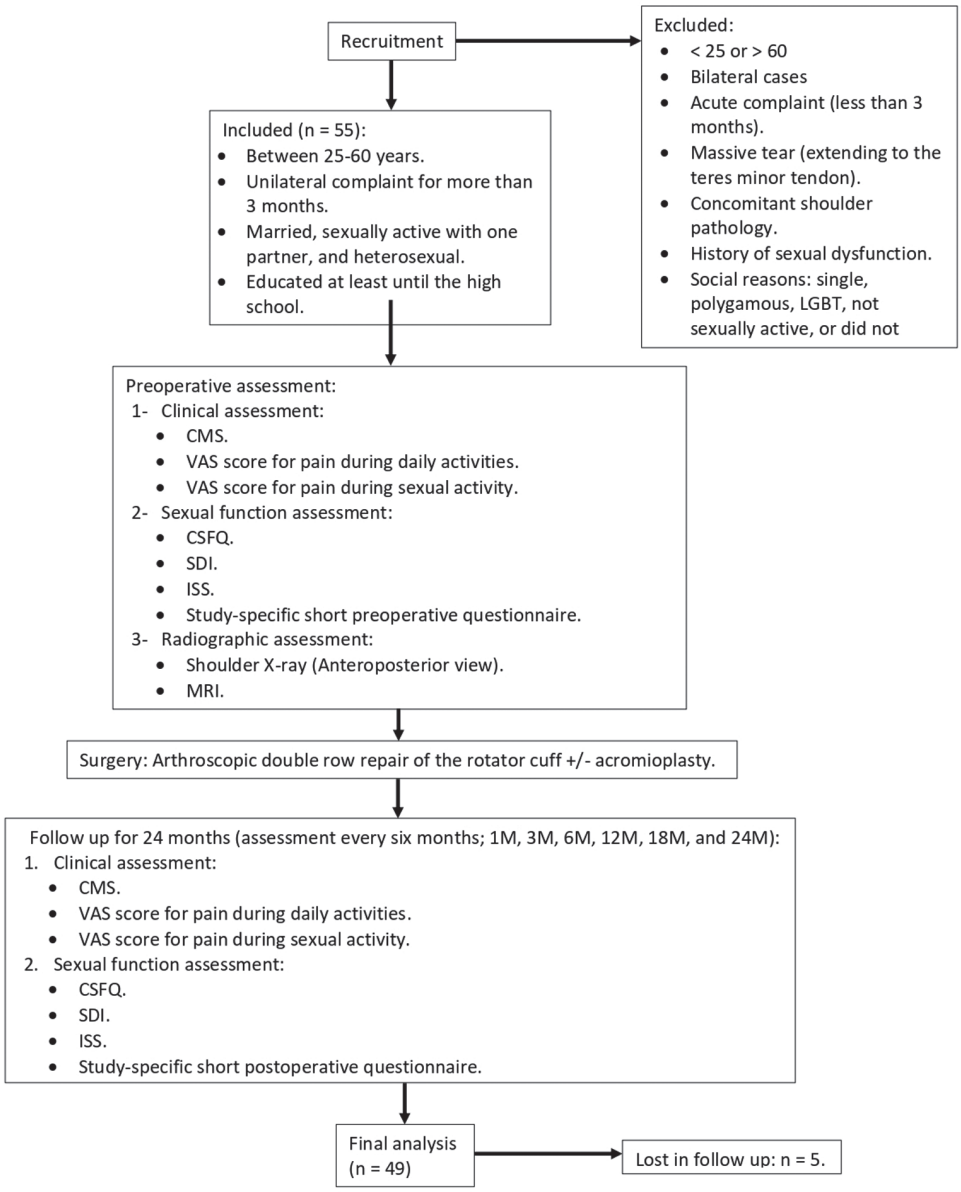
This study aims to assess the effect of arthroscopic rotator cuff repair on sexual function, desire, and satisfaction, in addition to shoulder function, using standardized assessment tools that have proven reliability and validity.

We hypothesized that arthroscopic rotator cuff repair will improve sexual life as it will decrease the pain during sexual intercourse.

Methods

After approval from the ethical committee, we conducted this prospective study at our institute between January 2014 and December 2019. (See Fig. 1) We considered patients eligible for this study if they were adults aged between 25 and 60 years with a unilateral symptomatic non-traumatic complete tear of the supraspinatus or/and infraspinatus tendons, which

Figure 1:



Study flow chart.

Table 1: Patients' demographics

Age	48.9±9.3
Sex:	
Male	29
Female	20
Laterality:	
Right	26
Left	23

was unresponsive to conservative management for at least three months. The diagnosis was confirmed by magnetic resonance imaging (MRI) (See Table 1).

Potential candidates must have been married and sexually active in a monogamous heterosexual relationship with the same partner for the study period. For a sexual encounter/engagement to be counted as one, we defined it as a dyadic (between husband and wife) sexual experience that involves vaginal penetration and orgasm. Consequently, we did not consider non-dyadic sexual encounters.

Since most of our data were collected from questionnaires, potential candidates must have completed a certain level of education (high school). The idea was to minimize the need for any assistance or interference from our team while completing the questionnaires, which would decrease the risk of bias.

We excluded subjects from the study if they were outside the age range, polygamous (more than one wife), unmarried, members of the LGBT community,

or not sexually active. They were also excluded if they had extramarital relationships, divorced during the follow-up phase, or had a history of sexual dysfunction that required medical management. However, we did not exclude male patients who used sildenafil/tadalafil to gain and maintain an erection as long as there was no pathogenic cause (arteriovenous fistula, neurogenic causes, or erectile dysfunction secondary to diabetes mellitus).

Additionally, we excluded subjects from the study at the recruitment phase if they had a history of trauma, shoulder surgery (stabilization for instability, rotator cuff repair, humeral fracture fixation, biceps tenotomy/tenodesis, humeral fracture fixation, acromioplasty), body mass index >35, psychological illness, or long-term use of pain medications. Subjects were also excluded through the preoperative assessment if the clinical examination, radiographs, or MRI revealed a massive tear (extending to the teres minor tendon) or associated shoulder pathology (adhesive capsulitis, shoulder instability, biceps tendon pathology, i.e., SLAP lesion, or tendinitis).

Subjects were excluded after surgery if they were not compliant with the follow-up visits or the postoperative rehabilitation program.

Operative details

One surgical team performed surgeries for all our patients in a semi-sitting position and under general anesthesia.

The arthroscope was inserted from the posterior portal. A standard arthroscopic assessment of the glenohumeral joint was done, followed by tear localization and mobility assessment to evaluate any needed release to secure a footprint repair without tension. We usually added one anterior portal and two lateral portals and performed subacromial decompression and acromioplasty when required. We debrided the supraspinatus footprint using a shaver to enhance tendon healing after reinsertion. We used a double-rowed anchored suture bridge repair (SwiveLock C anchor; Arthrex, Naples, FL). Surgical wounds were closed simple suture technique using a monofilamentous absorbable suture material, followed by applying a pouch arm sling.

Shoulder clinical assessment

We used the Constant-Murley score (CMS) and the visual analogue scale (VAS) questionnaire for clinical and functional assessment of the shoulder. A single examiner with experience in shoulder surgery performed the clinical evaluation and calculated the CMS for all study subjects.

The patients completed two VAS questionnaires, one to assess pain level during daily activities and the second to determine the pain level only during sexual activity.

Sexual function assessment

To test sexual function in our study, we used standardized rating scales that have proved reliable and valid. We used the Change in Sexual Functioning Questionnaire (CSFQ) [8], a 14-items structured questionnaire, to assess sexual function in general. While for the assessment of sexual desire and satisfaction specifically, we used the Sexual Desire Inventory (SDI) [9] Questionnaire and the Index of Sexual Satisfaction (ISS) [10] Questionnaire, respectively. We prepared an Arabic translation of these questionnaires to be completed by our subjects.

Additionally, we used two study-specific short questionnaires to assess the effect of the subject's shoulder condition on his sexual function. Both questionnaires included five questions. The first one was completed preoperatively, while the second questionnaire was completed at one month (1 M), three months (3 M), six months (6 M), and 12 months (12 M), 18 months (18 M), and 24 months (24 M) after surgery (See Tables 2 and 3).

The CMS score, two VAS questionnaires, CSFQ, SDI, and ISS, were completed before surgery and at 1 month (1 M), 3 months (3 M), 6 months (6 M), and

Table 2: Preoperative questionnaire

Q1: Does your shoulder condition affect your sexual life?	
Yes	38
No	11
Q2: If yes to Q1, what is the most affected aspect of your sexual life?	
Decreased frequency.	3
Increased pain during sexual activity.	25
Made your preferred sexual position difficult.	4
Limited mobility during sexual activity.	6
Q3: Do you need to adjust your sexual position due to your shoulder condition?	
Yes	37
No	12
Q4: Which sexual position that you feel more comfortable with?	
On top of partner.	11
Below partner.	27
On the ipsilateral shoulder.	3
On the contralateral shoulder.	8
Q5: How frequently did you use to engage in sexual activity in a week before your shoulder condition?	
Less than once.	4
Once.	26
Twice.	12
Three times.	7
More than three times.	0

Table 3: Postoperative questionnaire

	1M	3M	6M	12M	18M	24M	
Q1: Since the operation/last visit, how frequently did you engage in sexual activity in a week?							(Ordinal data) Friedman's ANOVA
Never.	25	0	0	0	0	0	
Less than once.	19	14	8	3	2	3	
Once.	4	26	30	29	22	23	
Twice.	1	9	11	17	19	15	
Three times.	0	0	0	0	6	6	
More than three times.	0	0	0	0	0	2	
Q2: Which sexual position that you feel more comfortable with?							
On top of partner.	0	6	11	13	16	18	
Below partner.	19	29	27	25	22	22	
On the ipsilateral shoulder.	0	0	0	2	3	3	
On the contralateral shoulder.	5	14	11	9	8	6	
Q3: Since the operation/last visit, did you need to adjust your sexual position due to your shoulder condition?							(Nominal dichotomous data) Cochran's test
Yes	17	32	33	21	14	7	
No	7	17	16	28	35	42	
Q4: If yes to Q2, why did you need to adjust your sexual position?							
Pain	1	8	10	5	2	2	
Fear of complications	13	15	13	9	7	3	
Mobility limitations	3	9	10	7	5	2	
Q5: Since the operation/last visit, has the range of mobility during sexual activity changed?							(Ordinal data) Friedman's ANOVA
Better	0	1	13	22	34	32	
The same	9	12	14	19	14	16	
Worse	14	36	22	8	1	1	

12 months (12 M), 18 months (18 M), and 24 months (24 M) after surgery.

Blinding

The clinical examiner, who was responsible for the CMS assessment, was not a surgical team member. The surgical team was not involved in any data gathering or clinical examination used in the final analysis. The patients independently completed the VAS, CSFQ, SDI, and ISS questionnaires, which were received by the record keeper and kept for the final analysis. Neither the clinical examiner nor the surgical team had access to the data until the final analysis.

Sample size

The sample size was calculated using the G*Power 3.1.9.2 software. We conducted an a priori test to achieve a statistical power ($1 - \beta$) of 90%, where alpha is 0.05. We predicted a 10-point increase in the CSFQ score with a standard deviation of 17 points. Forty patients had to be included in our study. Our goal was to include 55 subjects to compensate for the expected data loss during the study course.

Statistics

For statistical analysis, we used the SPSS software (version 23.0; IBM, Armonk, NY).

We calculated the mean, range, and standard deviation for numerical data, while frequencies were calculated for nominal and ordinal variables.

We tested numerical data for normality using the Kolmogorov-Smirnov test. We conducted a repeated measures analysis of covariance (ANCOVA) to test for a statistically significant difference in the change of numerical variables during the follow-up while controlling for age, sex, and laterality as possible confounders. If the results of the ANCOVA test showed a significant difference with an insignificant effect of the suspected confounders, pairwise comparisons were conducted to know when this difference occurred and to calculate the mean difference in addition to the 95% confidence interval.

Our test subjects completed two VAS questionnaires, one to assess pain level during daily activities and the other to assess pain level during sexual activity. We used the independent sample *t*-test to detect any statistically significant difference and to measure the 95% confidence interval of the mean difference between the daily activities VAS and sexual activity VAS scores,

When ordinal data was tested on more than one occasion, we used Friedman's analysis of variance

(ANOVA) to test for statistical significance. If the changes were statistically significant, we used Wilcoxon's test as a post hoc test to detect where these changes happened.

When nominal data was tested on more than one occasion, we used the Cochran test to test for statistical significance. If the changes were statistically significant, we used the McNemar test as a post hoc test to detect where these changes happened.

We evaluated statistical significance by the 2-tailed significance (*P* value) and the 95% confidence interval. The null hypothesis was rejected if the *P* value of < 0.05 and the 95% confidence interval were narrow and did not include the zero value. In the case of post hoc multiple comparison testing, a Bonferroni correction of the *P* value was considered.

We considered changes in the CMS as clinically significant if it was above a minimal clinical important difference (MCID) of 10.4 points [11].

Results

We recruited 55 patients for this study; only 49 were included in the final analysis. Six patients were excluded from the final analysis (two cases changed their minds during the follow-up stage, three were excluded due to the lack of compliance during follow-up visits, and one patient got a divorce after eight months from the operation). Ninety-one percent (45 of49) of our test subjects had at least one sexual act each week.

By the final follow-up at 24 months, all our study subjects had achieved the minimal clinically important difference (MCID) for the CMS score.

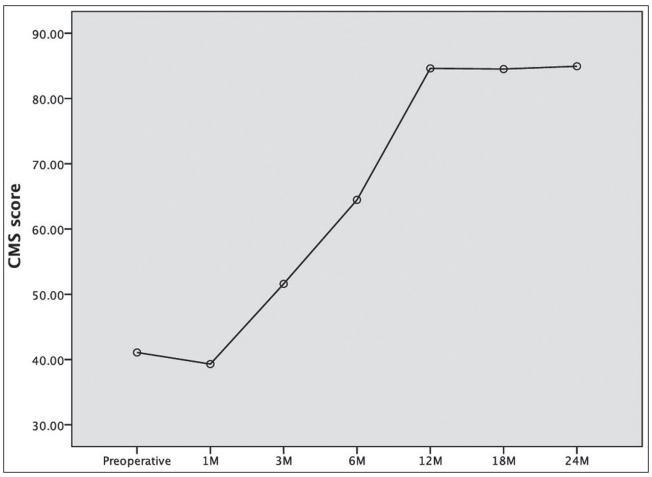
Before surgery, 77% (38 of 49) thought that their shoulder condition had affected their sexual life somehow, and 65% (25 of 38) reported that this was due to increased pain during sexual activity. Seventy-five percent of our subjects (37 of 49) said they needed to adjust their sexual position to accommodate their shoulder problem. At the same time, 55% (25 of 49) found it more comfortable to be below their partner during the sexual act. (See Table 2)

The ANCOVA test showed a significant improvement throughout the follow-up in the CMS score, two VAS questionnaires, CSFQ, and ISS, *P* <0.05. Meanwhile, there was no statistically significant effect of the age, sex, or laterality as possible confounders, *P*<0.05. The 95% confidence intervals of the mean differences were narrow and did not include the zero value. (See Figs. 2–6).

The ANCOVA pairwise comparisons showed that improvements in the two VAS scores and ISS were significant during the follow-up phase until 18 months of follow-up, *P*<0.05, and the 95% confidence intervals of the mean differences were narrow and did not include the zero value. There was no statistically significant improvement after the 18-month follow-up. *P*>0.05, and the 95% confidence intervals of the mean differences were wide and contained the zero value (See Figs. 3, 4, 6).

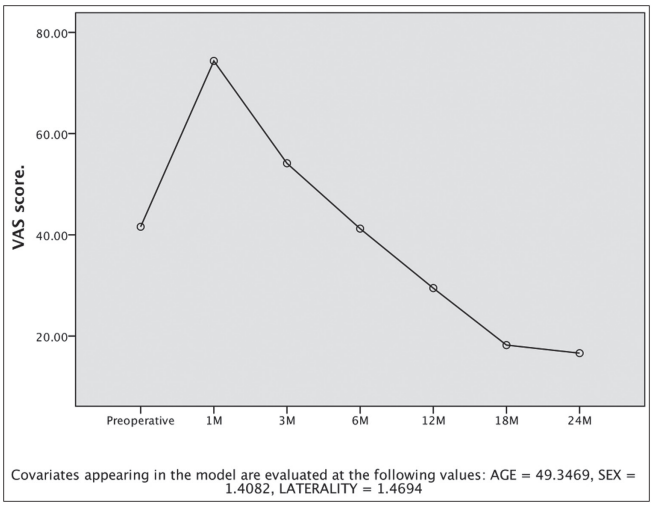
Additionally, the ANCOVA pairwise comparisons showed significant improvements in the CMS score

Figure 2:



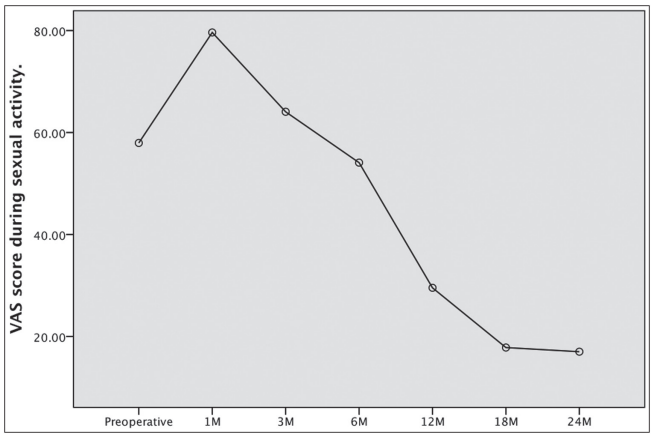
Changes in the Constant Murley Score (CMS) over the follow-up phase: Pre (Preoperative), 1 M (1 month postoperative), 3 M (3 months postoperative, 6 M (6 months postoperative), 12 M (12 months postoperative), 18 M (18 months postoperative), 24 M (24 months postoperative)

Figure 3:



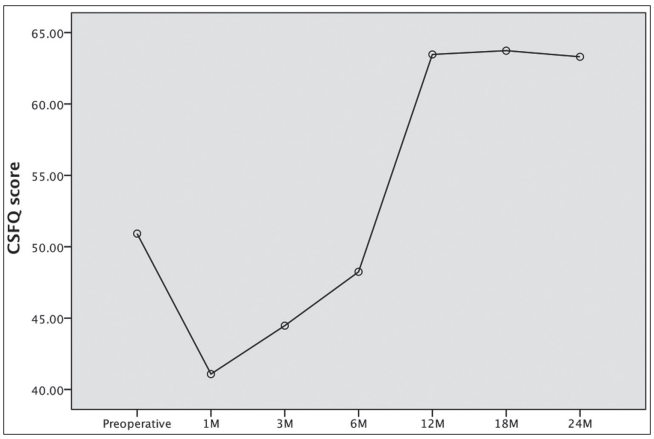
Changes in the Visual Analogue Score (VAS) of the daily activity over the follow-up phase: Pre (Preoperative), 1 M (1 month postoperative), 3 M (3 months postoperative, 6 M (6 months postoperative), 12 M (12 months postoperative), 18 M (18 months postoperative), 24 M (24 months postoperative).

Figure 4:



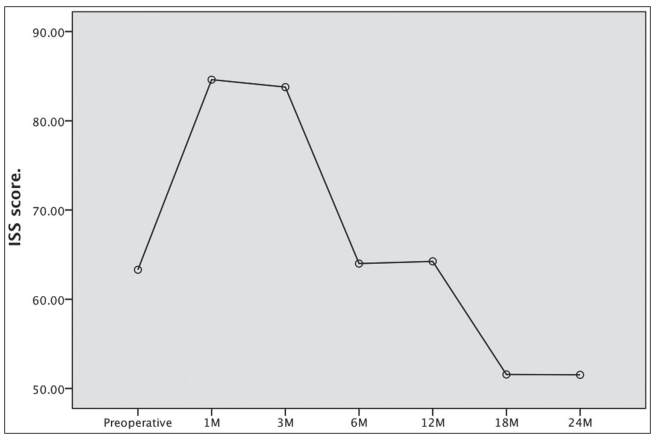
Changes in the Visual Analogue Score (VAS) during sexual activities over the follow-up phase: Pre (Preoperative), 1 M (1 month postoperative), 3 M (3 months postoperative, 6 M (6 months postoperative), 12 M (12 months postoperative), 18 M (18 months postoperative), 24 M (24 months postoperative).

Figure 5:



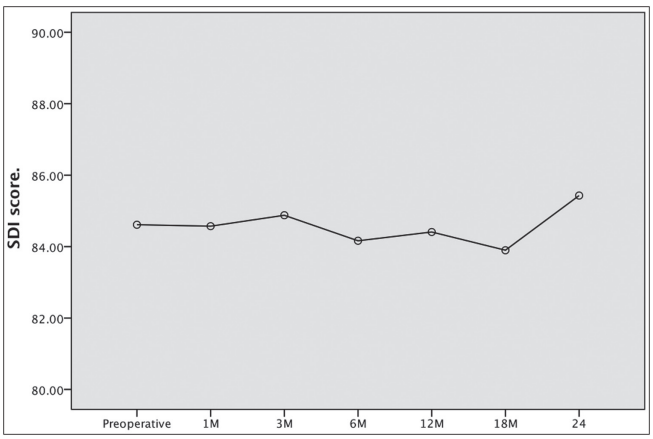
Changes in the Change in Sexual Functioning Questionnaire (CSFQ) over the follow-up phase: Pre (Preoperative), 1 M (1 month postoperative), 3 M (3 months postoperative, 6 M (6 months postoperative), 12 M (12 months postoperative), 18 M (18 months postoperative), 24 M (24 months postoperative).

Figure 6:



Changes in the Sexual Satisfaction (ISS) over the follow-up phase: Pre (Preoperative), 1 M (1 month postoperative), 3 M (3 months postoperative, 6 M (6 months postoperative), 12 M (12 months postoperative), 18 M (18 months postoperative), 24 M (24 months postoperative).

Figure 7:



Changes in the Sexual Desire Inventory (SDI) over the follow-up phase: Pre (Preoperative), 1 M (1 month postoperative), 3 M (3 months postoperative, 6 M (6 months postoperative), 12 M (12 months postoperative), 18 M (18 months postoperative), 24 M (24 months postoperative).

and CSFQ the during the follow-up phases until 12 months, $P<0.05$, and the 95% confidence intervals of the mean differences were narrow and did not include the zero value. There was no statistically significant improvement after the 12-month follow-up, $P>0.05$, and the 95% confidence intervals of the mean differences were wide and contained the zero value (See Figs. 1, 5).

However, the changes in the SDI score from the preoperative stage and through different follow-up stages were non-significant; $P>0.05$ and the 95% confidence intervals of the mean differences were wide and contained the zero value. (See Fig. 7).

The independent sample *t*-test showed a statistically significant difference between the two VAS scores in the preoperative phase ($P<0.001$), at 1 m ($P=0.036$), 3 m ($P<0.001$), and 6 m ($P<0.001$). There was no statistically significant difference at the 12 m ($P=0.932$), 18 m ($P=0.692$), and 24 m ($P=0.662$) of follow up.

For ordinal data analysis, Friedman's ANOVA showed a statistically significant improvement in subjects' responses to Q1 (Since the operation/last visit, how frequent did you engage in sexual activity in a week?) and Q5 (Since the operation/previous visit, has the range of mobility during sexual activity changed?) during the follow-up stage, $P< 0.001$ (See Table 3).

A post hoc Wilcoxon's test showed that changes in subjects' response to Q1 were significant throughout the follow-up stage, $P<0.005$ (P value after Bonferroni correction) except for the changes from 3 m to 6 m ($P=0.008$), 12 m to 18 m ($P=0.014$) and 18 m to 24 m ($P=0.91$). For subjects' response for Q5, changes were significant throughout the follow-up stage, $P<0.005$, except for the changes from 1 m to 3 m ($P=0.096$), and 18 m to 24 m ($P=0.157$).

For nominal dichotomous data analysis, Cochran's test showed a statistically significant improvement in subjects' response to Q3 (Since the operation/last visit, did you need to change your sexual position due to your shoulder condition?) during the follow-up stage, $P< 0.001$ (See Table 3).

A post hoc McNemar's test showed that changes in subjects' response to Q3 were significant throughout the follow-up stage, $P<0.005$ (P value after Bonferroni correction) except for the changes from 1 m to 3 m ($P=0.063$), 3 m to 6 m ($P=1.0$), 12 m to 18 m ($P=0.016$) and 18 m to 24 m ($P=0.143$) (See Table 3).

Although being below the partner during sexual encounters remained to be the position of choice among our test subjects at the final follow-up by 44% (22 of 49), more subjects reported that they were able to position themselves above their partner with the progress of time as the percentage went up from 22% (11 of 49) preoperatively to 36% (18 of 49) at the final follow up (See Table 3).

Most of our test subjects reported that the fear of complications was the most common reason to adjust their position during sexual encounters (See Table 3).

Discussion

We assessed the sexual function using scoring systems with proven reliability and validity in addition to the study-specific questionnaires rather than relying solely on the study-specific questionnaires.

In this study, shoulder function, represented by the CMS, and sexual function, defined by CSFQ, improved throughout the follow-up phase. After 1 year of follow-up, a plateau phase was reached, after which improvements in the shoulder and sexual function were not significant.

We noticed improvements in pain, represented by the two VAS questionnaires, and sexual satisfaction, represented by the ISS score. This improvement continued until 18 months of follow-up, and there were no significant improvements afterward. However, the sexual desire, represented by the SDI score, remained unchanged during the follow-up phase.

Rotator cuff tear has affected the sexual life of 77% (38 of 49) of our test subjects; this result could be compared to the study done by Nugent *et al.* [7], who retrospectively surveyed 119 patients six months after arthroscopic rotator cuff repair using a 20 question specifically tailored electronic query that was sent to patients via email. Sixty-five percent of the sexually active participants (57 of 88) reported that their shoulder condition affected the quality and frequency of their sexual activity; 79% of these subjects said their sexual activity became much easier after the operation.

Regarding sexual position, 75% (37 of 49) reported that they needed to adjust their position during sexual encounters, with being below the partner being more comfortable in 55% (25 of 49). Again, this was similar to Nugent *et al.* study, where 40% of their test subjects comfortably engaged in sexual activity while being below their partner.

Only 48% (24 of 49) were sexually active in the first month postoperatively, while all test subjects were sexually active at the three-month follow-up visit. This result was similar to Nugent *et al.* results, who noticed that 72% of their study group resumed sexual activity by six weeks.

As far as we know, our study is the first to prospectively assess sexual function following arthroscopic rotator cuff repair for two years using standardized scoring systems with proven validity and reliability.

Limitations

Our study had some limitations; the study design did not include a control group, so the study lacked the element of comparison. Although we considered age and sex as confounders, we believe that males and females have different types of physical activity during sexual engagement and would respond differently to surgery, an aspect that should be investigated thoroughly. We had only included subjects within a specific age group; as a result, our assumption cannot be applied to patients outside this age group. We did not investigate the effect of sexual positions on the outcome of our patients; we believe that further research is needed to assess the impact of different sexual positions on sexual function, satisfaction, and pain after rotator cuff repair. Additionally, most of the data were collected using questionnaires that depend on the subjects' subjective feelings, which might have increased the risk of bias.

Conclusion

Arthroscopic rotator cuff repair improved shoulder function, pain level, sexual function, satisfaction, and improved mobility during sexual engagements. However, it did not affect the level of sexual desire after two years of follow-up.

Acknowledgements

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Nil.

Conflicts of interest

Each author certifies that no commercial associations that might pose a conflict of interest in connection with the submitted article.

References

1 Oliva-Lozano JM, Alacid F, López-Miñarro PA, Muyor JM. What are the physical demands of sexual intercourse? a systematic review of the literature. Arch Sex Behav 2022; 51:1397–1417. doi:10.1007/s10508-021-02246-8

2 Grover S Assessment Scales for Sexual Disorders: A Review. 2020. doi:10.1177/2631831820919581

3 Nunley RM, Nam D, Bashyal RK, Parvizi J, Della Valle CJ, Hamilton WG, *et al*. The impact of total joint arthroplasty on sexual function in young, active patients. J Arthroplasty 2015; 30:335–340. doi:10.1016/j.arth.2014.09.029

4 Meiri R, Rosenbaum TY, Kalichman L. Sexual function before and after total hip replacement. Sex Med 2014; 2:159–167. doi:10.1002/sm2.35

5 Harmsen RTE, Haanstra TM, Den Oudsten BL, Putter H, Elzevier HW, Gademan MGJ, *et al*. A high proportion of patients have unfulfilled sexual expectations after TKA: a prospective study. Clin Orthop Relat Res 2020; 478:2004–2016. doi:10.1097/CORR.0000000000001003

6 Yue BWD, Xing B. Quality of sexual life after total hip arthroplasty in male patients with osteonecrosis of femoral head. 2014. doi:10.1007/s00590-014-1432-1

7 Nugent RE, Cheesman QT, Bradian AK, Austin LS. Improvements in sexual function following arthroscopic rotator cuff repair. J Shoulder Elb Surg 2020;30:1–6. doi:10.1016/j.jse.2020.06.017

8 Ther C-JSM, Keller A. Reliability and Construct validity of the. 2006;(January):43-52. doi:10.1080/00926230500232909

9 Spector IP, Carey MP, Steinberg L. The sexual desire inventory: Development, factor structure, and The Sexual Desire Inventory: Development, Factor Structure, and Evidence of Reliability. 2013:37-41.

10 Hudson WW, Harrison DF, Crosscup PC. A short-form scale to measure sexual discord in dyadic relationships. 2012:37-41.

11 Louwerens JKG, van den Bekerom MPJ, van Royen BJ, Eygendaal D, van Noort A, Sierevelt IN. Quantifying the minimal and substantial clinical benefit of the Constant-Murley score and the Disabilities of the Arm, Shoulder and Hand score in patients with calcific tendinitis of the rotator cuff. JSES Int 2020; 4:606–611. doi:10.1016/j.jseint.2020.05.001