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Peer Review File

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Reviewer A

This review article poses an interesting question regarding the relationship between postoperative shoulder stiffness and healing progression. The authors should proofread the manuscript for grammar prior to resubmission, if that is determined appropriate.

Abstract

Comment 1: L44/45 – need to add definition of stiffness

Reply 1: The reason this review has been conducted is due to a lack of a consensus agreement for the definition of stiffness. As such, we have to appraise all the articles and describe their definition of stiffness and so are unable to provide a definition of stiffness in the methodology.

Comment 2: L51 – "This protective persists…" is missing a subject / noun.

Reply 2: Apologies for this typographical error. This has been changed in the manuscript.

Changes in text: Changed to "this protective effect".

Introduction

Comment 3: Overall, the introduction would benefit from additional detail to contextualize the purpose of the review and how this review can be differentiated from the many previous review articles surrounding rotator cuff repair failures.

Reply 3: The following has been added as suggested.

Comment 4: L71/72 – this would benefit from definition of shoulder stiffness. Additionally, the "evidence" that suggests it may be important is entirely unclear.

Reply 4: As stated above, the definition of shoulder stiffness has not been established as a consensus as of yet. We have provided a citation for the evidence.

Comment 5: L73 – should state "improved healing" not "improve healing"

Reply 5: Apologies for this typographical error. This has been changed in the manuscript.

Methods

Comment 6: This section lacks important details surrounding study selection /

inclusion criteria leaving readers with no means to assess rigor and/or completeness of the review.
Reply 6: The inclusion criteria has been stated in lines 85-89. As this is a scoping review, there was no systematic criteria for inclusion of studies.

Comment 7: L81 – "of" should be replaced with "or"
Reply 7: Apologies for the typographical error. This has been changed in the manuscript.

Comment 8: L86/87 – "The timing of retear…" statement is unclear. Is this stating surrounding when patients actually retore the tendons or when they were assessed for retear?
Reply 8: This refers to when patients were assessed for retear.

Discussion
Comment 9: L99 – symbol after "GFDI" is not appearing correctly. Please correct.
Reply 9: Apologies for the typographical error. This has been changed in the manuscript.

Comment 10: L100-103 – a moderate correlation between tear size and fatty infiltration does not mean one is predictive of the other. As such, it is a stretch to state one can be used as a surrogate for the other. Additionally, the utility of using one as a predictor for the other is unclear when the goal is to determine relative risk for rotator cuff repair.
Reply 10: We agree with this and have removed this from the manuscript.

Comment 11: L108-113 – The associated between age and retear risk has been documented previously. Please include a more thorough review with additional sources.
Reply 11: Thank you. We have added additional citations as suggested.

Comment 12: L121-135 – Again, this is a well-established relationship and sources outside of your institution should be included.
Reply 12: Thank you. We have included additional high-powered studies from other institutions as well as a table of 34 studies that found tear size to be an independent predictor of retear.

Comment 13: L157 – the comma is grammatically incorrect

Reply 13: This has been changed in the manuscript.

Comment 14: L158-161 – please expand on how stiffness indicates a more robust healing process.
Reply 14: This has been added to the manuscript. Specifically "These studies demonstrate that patients with preoperative and early postoperative stiffness appear to have lower retear rates when compared to their counterparts without stiffness."

Comment 15: L168 – please indicate confidence interval associated with the statistical results. Comparing groups of n=25 stiff vs n=170 not stiff is not an even design and may mislead readers who do not pay close attention to group sizes. At 14% retear rate, only 3-4 retears would be expected in the stiff group which may not be comprised of patients with similar tear size, fatty infiltration, or age, thus skewing results.
Reply 15: The paper does not indicate confidence intervals. However, it states that the 2 groups were correctly powered (.98) to detect a significant difference.

Comment 16: L169-171 – please report group sizes for stiff and non-stiff groups.
Reply 16: This has been changed in the manuscript. Specifically, "(n=39)" and "(n=320)".

Comment 17: L172 – Please remove the word "Interestingly" or clarify why this would be an unexpected result.
Reply 17: This has been removed from the manuscript.

Comment 18: L177-183 – The statement detailing increases to bursal thickness, vascularity, and posterior capsular thickness seems to be the only supporting evidence suggesting shoulder stiffness is related to healing response, which is the basis for this entire review paper. As written, there is insufficient evidence to support the relationship between the increased inflammatory response / tissue thickness and shoulder stiffness. The authors should quantify / correlate the amount of patient stiffness with retear rate as a means of showing their relation, or they should present the data that helps support this claim. The two studies mentioned in L164-174 may not be adequately powered to isolate and assess the impact of stiffness apart from other risk factors (i.e., tear size, fatty atrophy, and patient age), thus more evidence to prove the relationship between patient stiffness and retear rate should be presented.
Reply 18: The study by McNamara et al also demonstrates that postoperative stiffness is related to reduced retear rate. This in turn may suggest that increase stiffness is related to a healing response. Further research in this area is required, hence the importance of a scoping review detailing the evidence currently available in this area

of study.

Comment 19: L211-213 – the authors should state whether the p-values reported were for a univariate or multivariate analysis. The current information does not allow the reader to ascertain whether these comparisons accounted for other risk factors (meaning that there is no way to confirm the "not stiff" group was significantly older or had greater initial tear sizes).
Reply 19: This has been changed in the manuscript. Specifically "on multivariate analysis"

Comment 20: L220-226 – these statements seem to contradict each other. One statement suggests there was significant difference at 5 years and the next stated no significant difference after 6-months.
Reply 20: There was a significant difference at 5 years. The difference was also significant at 6 months, and there was no difference between 6 months and 5 years.

Comment 21: L245 – 258 – this paragraph suggests that stiffness is most likely linked to patient pain as compared to healing response. This undermines the entire narrative suggesting stiffness can predict retears; whereas it really is related to tear size which is correlated with retear rate.
Reply 21: Given that the relationship between stiffness and other factors is incomplete understood, this paragraph provides an alternative relationship that requires further research.

Conclusion
Comment 22: L279-281 – I believe the conclusion stating that there is circumstantial evidence is associated with more intact repairs is a more accurate representation of the data presented within this review as compared to what was presented in the discussion section. The presentation of the data within the discussion section should be reformatted to state the effect of patient age and tear size on retear rate, instead of stating / suggesting that stiffness is an independent predictor of retears. Please remove the statements regarding "more vigorous healing response" as there is not sufficient data presented to substantiate that claim. If additional data can be presented to substantiate that claim, it is ok to leave it.
Reply 22: A recent study from our institution that has been accepted in JBJS demonstrates that stiffness is an independent predictor of retears. This paper has been now cited.

Comment 23:L281-283 – Again, this statement is entirely inappropriate. There is not

adequate data linking stiffness to actual healing. The data and studies presented suggest that stiffness is related to patient pain, which is frequently increased in patients with smaller tears, which are in turn easier to heal.
Reply 23: The paper by McNamara et al. demonstrates that there was a lower retear rate in the stiff group as opposed to the non-stiff group.

Comment 24:L283-285 – Did the authors intend to state "It is possible that postoperative stiffness…" instead of "tear size"?
Reply 24: No, this statement suggests that the reason smaller tears are associated with pain and stiffness is because they have a more vigorous healing response.

Reviewer B

Comment 25: The authors is a critically review of the literature regarding the independent predictors of retear in rotator cuff repair patients.
The authors made an interesting and well-structured review that brings clear messages from a very large and sometimes controversial literature.
This deserves to be published.
Reply 25: Thank you.

Reviewer C

The manuscript entitled "Stiffness and Arthroscopic Rotator Cuff Repair: A Literature Review" critically reviewed the predictors of retears in rotator cuff repair patients. The manuscript is well written with a good discussion of the important predictors of rotator cuff retears. The outcomes of the review suggest that tear size is an important and independent predictor of higher retear rates, and that stiffness (preoperative or postoperative) is associated with lower retear rates and better healing in the long term. However, the manuscript can be improved by providing some more methodological details.

Specific comments:
Comment 26: 1. Line 51-52: incomplete sentence.
Reply 26: This has been amended as per above.

Comment 27: 2. Line 71-72: provide a reference that shows postoperative stiffness may be an important factor associated with improved healing.
Reply 27: This has been amended as per above.

Comment 28: 3. Methods: please provide more details like the average age of patients, Goutallier scores, tear size, and inclusion and exclusion criteria of studies and patients.
Reply 28: We have stated the inclusion and exclusion criteria in lines 85-86. As this is not a systematic review, we have not included this information.

Comment 29: 4. Line 103-105: Provide references for “multiple studies”.
Reply 29: This statement has been removed in line with a response to previous comment.

Comment 30: 5. Line 113: What is OR?
Reply 30: Odds ratio

Comment 31: 6. Line 132: In figure 1, please explain what each subplot (A, B, C, D) represents in the caption.
Reply 31: This has been added to the caption.

Comment 32: 7. Line 169: In figure 2, it is not clear which bar represents the group with preoperative stiffness and which bar represents the group without preoperative stiffness.
Reply 32: The group on the left is the group with preoperative stiffness for both the 6 months and 2 year graph.

Comment 33: 8. Line 279-281: You raise a very important point here about age. It would be helpful if you include this information about “younger patients” in the discussion as well.
Reply 33: The effect of age on rotator cuff retear is detailed in lines 108-113.