Response to Reviewer Comments
Prosthetic Design of Reverse Shoulder Arthroplasty Contributes to Scapular Notching and Instability
26350
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Reviewer 1

Low level evidence, but does offer clinically relevant information for surgeons performing reverse shoulder arthroplasty.

Q1: In the introduction, please elaborate on why notching is clinically relevant since notching rates is one of your primary outcomes.

Response: Scapular notching has been shown to correlate with worse clinical results (Walch, JBJS 2004). Also, scapular notching has been associated with reduced shoulder motion, abnormal polyethylene wear, and potential glenoid implant loosening. According to Walker et al, "Scapular notching is not a benign situation resulting in pain, decreased shoulder scores, reduced range of motion (especially adduction), abnormal polyethylene wear, and potential glenoid implant loosening." (Walker et al. *Clin Orthop Relat Res.* 2011;469:2440–2451)

Text: (lines 65-8) Scapular notching is a concern because of its potential effect on long-term loosening of the prosthesis and on clinical results[16]. Reported rates of inferior scapular notching for a Grammont-type prosthesis range from 13%–67%[12, 15-18].

Q2: Please explain glenoid grading system and notching grading system.

Response: The glenoid bone configuration was according to Walch, which is mentioned in lines 99-100. The Walch classification is as follows:

A1: slight central erosion
A2: marked central erosions
B1: mild biconcave
B2: severe biconcave
C: dysplastic

This classification system is widely used and referenced in the manuscript.

The scapular notching was graded according to the 4-grade classification system of Sirveaux et al (*J Bone Joint Surg Br*. 2004;86(3):388-395), as follows:

Grade 1: limited to scapular pillar
Grade 2: in contact with inferior screw of baseplate
Grade 3: beyond the inferior screw
Grade 4: extends under baseplate approaching central peg

Text: (lines 140-44)The presence of notching was evaluated by 2 observers who reached agreement upon the degree of notching using the system of Sirveaux et al. Grade 1 was notching limited to the scapular pillar; grade 2 was notching in contact with the inferior screw of the baseplate; grade 3 was notching beyond the inferior screw; and grade 4 was notching that extends under the baseplate approaching the central peg.

Q3: Finally, you had a thorough discussion of the study limitations, but did not mention that the senior author started with the Grammont-type prosthesis and then switched to the lateral-based prosthesis. This is a source of bias that could have allowed for improved outcomes in the lateral-based group and should be mentioned.

Response: We have added to the text that the learning curve might have been a factor in the results and thus a source of bias.

Text: (lines 288-99) Also, variables not studied here such as body mass index, Charlson Comorbidity Index, or other measures of patient health might influence the results. The surgery was performed by 1 surgeon in a referral practice, which may not be generalizable to other surgical practices. Also, the surgeon changed arthroplasty systems, and the learning curve might have affected the results. Wierks et al suggested that the learning curve for a new operation is approximately 10 cases, but Kempton et al suggested it might be as high as 40 cases.

Reviewer 2

RTSA It is a topical issue and increasingly popular. Your paper confirms the existing practice and concurs with available evidence. Please can you provide following clarifications:

Q1: You have excluded 131 cases from 196, quite a big number. In particular, 57 cases were excluded due to failed arthroplasty. That's almost as big a group as you have included in your analysis. Were these cases excluded because, in your opinion, none of these cases failed due to notching or dislocation? What was the breakup of these cases according to your design group?

Response: In the current study we included only the primary cases performed for cuff tear arthropathy osteoarthritis with cuff tears or intact glenoids with severe bone loss. As mentioned in the text, the other patients were excluded because they had surgery for various other diagnoses such as fracture and fracture malunion, rheumatoid arthritis, avascular necrosis, dislocation arthroplasty, psoriatic arthritis, and hemophilic arthropathy. Also, 57 patients were revision cases (e.g., for failed HA, TSA for infection, wear). This has been clarified in the methods.

Text: (lines 90-3) We included only patients undergoing their first RTSA with the diagnosis of rotator cuff tear arthropathy, osteoarthritis with a rotator cuff tear, or osteoarthritis with glenoid bone loss. Of those 196 RTSAs, 131 were excluded for the following reasons: 57, which were revised with a diagnosis of failed arthroplasty (based on clinical history, physical examination, and supporting radiographic studies); 37 for fractures and malunion; 17 for rheumatoid arthritis; 7 for inadequate follow-up data; 5 for avascular necrosis; 5 for dislocation arthroplasty; 2 for psoriatic arthritis; and 1 for hemophilic arthropathy.