Author's response to reviews

Title: Infraglenoidal scapular notching in reverse total shoulder replacement: a prospective series of 60 cases and systematic review of the literature

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Author's response to reviews: see over
Dear Editors,

we are pleased to submit the revision of the following paper for your consideration:

**MS: 4379583315042340**

**Infraglenoidal scapular notching in reverse total shoulder replacement: a prospective series of 60 cases and systematic review of the literature**

We have addressed all of your comments in the revised manuscript and provide this cover letter giving a point-by-point response to the concerns.

In addition, we have highlighted all changes made when revising the manuscript to make it easier for you Editors to give a prompt decision on this manuscript.

Comments:

Each of your comments are numbered in a consecutive way in **bold letters**. Our explanations are set point-by-point according to your comments followed by the relevant **new text** of the second revision in **green**. In addition, we used “Microsoft TrackChanges” in the revised version of the blinded manuscript.
Reviewer 1:

Major compulsory revisions:

I., In the long-term follow-up patients, 12 in number – there are no Grade 2,3,4 notching. However, they have correlated positively with constant pain score.

A further analysis as to which of the twelve patients co-related positively to constant pain score would be interesting.

Percentages for these patients 62% and 38% in 12 patients do not result in a whole number. How were the percentages calculated?

Ad I: Thank you very much for this comment. It is correct that there are no Grade 2,3, and 4 notching patients in the long-term follow-up group. Nevertheless, there are patients with Grade 1 notching in patients with long-term follow-up. Grade 1 is already defined as a “small notch”. Those patients could be correlated with the mentioned scores and revealed the given results.

We did not correlate single patients with clinical scores but only the mean results of the mid-term and the long-term group. It is hard to draw definite conclusions from our results, as we only report data from 12 patients in the long-term follow-up. According to our statistical board, it is not possible to draw a conclusion from a single patient and therefore, as all patients had the same inclusion and exclusion criteria it would not reveal striking data to further analyze which of the twelve patients correlated positively.

The percentages for the patients with a long-term follow-up, which are given in the table, do not result in a whole number because there were two investigators who identified notching in the patients twice with different results but still an almost perfect agreement. Therefore, we calculated not 12 measurements for twelve patients but 48 measurements total. The percentages in the table are a sum of these measurements. This is why they might be
misleading, assuming that we are reporting only data of 12 patients and 12 X-rays instead of 48. We apologize for this circumstance and have corrected this in the revised version of the manuscript by adding a footnote to the table and a note in the text.

Ad I (Text, Results):

Radiological data in terms of infraglenoidal scapular notching which had been classified according to Nerot et al. [9] are presented in table 2. Presented percentages correspond to the sum of measurements as two investigators evaluated X-rays twice resulting in 4 measurements for each patient and not to the single patients. The reliability of the radiological evaluation was evaluated by use of a Kappa coefficient of an “almost perfect” agreement with a value > 0.86.

Ad I (Text, Table 2):

Table 2 Grade of the infraglenoidal scapular notching after implantation of an inverted total shoulder prosthesis according to Nerot et al. 16. We divided these 60 patients in 48 patients with a mid-term (MT-Fup; 24-50 months) and 12 patients with a long-term follow-up (LT-Fup; 60-96 months). Infraglenoidal scapular notching was divided in “grade 0” for “no notch”, “grade 1” for “small notch”, “grade 2” for “notch with condensation”, “grade 3” for “erosion up to the inferior screw”, and “grade 4” for “erosion over the inferior screw with extension under the base plate”. Percentages are calculated by the sum of 4 measurements after evaluation of two investigators twice.

<table>
<thead>
<tr>
<th>MT – Fup, n= 48</th>
<th>Percentage</th>
<th>Corresponding notching according to Nerot et al. 16</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Grade 0</td>
<td>65 %*</td>
<td>“no notch”</td>
</tr>
<tr>
<td>---------</td>
<td>-------</td>
<td>------------</td>
</tr>
<tr>
<td>Grade 1</td>
<td>20 %*</td>
<td>“small notch”</td>
</tr>
<tr>
<td>Grade 2</td>
<td>3 %*</td>
<td>“notch with condensation”</td>
</tr>
<tr>
<td>Grade 3</td>
<td>6 %*</td>
<td>“erosion up to the inferior screw”</td>
</tr>
<tr>
<td>Grade 4</td>
<td>6 %*</td>
<td>“erosion over the inferior screw with extension under the base plate”</td>
</tr>
</tbody>
</table>

Percentage

**LT – Fup, n= 12**

<table>
<thead>
<tr>
<th>Grade 0</th>
<th>62 %*</th>
<th>“no notch”</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grade 1</td>
<td>38 %*</td>
<td>“small notch”</td>
</tr>
<tr>
<td>Grade 2</td>
<td>0 %*</td>
<td>“notch with condensation”</td>
</tr>
<tr>
<td>Grade 3</td>
<td>0 %*</td>
<td>“erosion up to the inferior screw”</td>
</tr>
<tr>
<td>Grade 4</td>
<td>0 %*</td>
<td>“erosion over the inferior screw with extension under the base plate”</td>
</tr>
</tbody>
</table>

* These percentages are calculated using the sum of four measurements in total (twice by two examiners).

II., The short-term follow up patients were 48 in number and grade 2,3,4 notching percentages were 3,6,6 respectively. Was there a different surgical technique or a modification used in these 48 patients?

Ad II: This is a crucial question. No, we did not use a different surgical approach or technique in these patients. We did not use a different type of mobilization or postoperative treatment either. All patients of this study were treated the same way with respect to the stated inclusion and exclusion criteria.
Ad II (Text, Patients and Methods):

All patients included in the present study were operated by one single surgeon with the Delta reverse ball-and-socket prosthesis (DePuy France, Saint Priest CEDEX, France) between February 2002 and June 2007 without changes of the procedure.

We excluded patients with acute fractures, trauma or revision arthroplasty from this analysis. These exclusion and inclusion criteria were equal for all patients of this study.

All procedures were done according to the technique described by Werner et al. [10] by one single surgeon [19] with the Delta components without changes of this procedure in the included patients.

At the beginning of the 7th week, patients moved their shoulder in all directions with light weights of a maximum of 12 pounds. After the 11th week, patients were admitted unrestricted activity in all directions and to participate in sports with no high impact on the glenohumeral joint, such as running or cycling. This rehabilitation was equal for all patients.

Ad II (Text, Discussion):

However, the study strength has to be emphasised that we present a relatively large number of patients who all had been operated using the same technique and had the same postoperative and rehabilitation care. All patients had been clinically and radiologically analysed in terms of their notching and we evaluated our measurements by an inter- and intraobserver reproducibility.
III., It’s the H2, which makes me uncomfortable, long-term follow-up patients have increased pain with a minimal notching. Then comes the question, is the notching the cause of worsening constant scores?

Ad III: This is an important comment. We do not conclusively know, whether the notching causes these worsening of the constant scores or it is despite statistical analysis still just a coincidence. Unfortunately there is no other study in the literature providing data of patients with a long-term follow-up correlated with clinical outcome with bigger numbers. We have addressed this in the revised version of the manuscript.

Ad III (Text, Limitations of the Discussion):

In terms of the second study hypothesis patients with a long-term follow-up over 60 months were reported to have a significant positive correlation of the Constant pain score, and active anteversion and active external rotation with infraglenoidal notching. We have to address, that we do not believe that the relatively small number of patients with this follow-up (n=12) can conclusively answer this question and bigger numbers are needed in future investigations.

Minor essential revisions:

IV., In the methods section - no mention of the specific statistical tests used for assessing the significance for pre-operative and post-operative scores.

Ad IV: According to your suggestion we have mentioned these specific statistical tests, which were used for assessing the preoperative and postoperative scores.
The SPSS version 13.0 for Windows (SPSS Inc., Chicago, IL, USA) was used for statistical analysis which was performed with 2-tailed, independent t tests for normally distributed data and Mann-Whitney U tests for nonparametric data in the case of the preoperative and postoperative clinical scores. A $P$-value of less than 0.05 was considered to be significant.

V., The tables should be moved from the manuscript text to later part with the figures – see author instructions.

Ad V: We have moved the tables from the manuscript text to later part with figures according to your suggestion.

VI., Quality of written English: Needs some language corrections before being published.

Ad VI: We have reworded and shortened some parts, words, and phrases of this manuscript without changing significant content. We hope that the language is acceptable and suitable for the journal now. These changes are not of significant content and therefore not addressed in this CoverLetter but only shown by TrackChanges in the manuscript.

VII., Statistical review: Yes, but I do not feel adequately qualified to assess the statistics.

Ad VII: We have had assistance from statistical professionals in this study.

Reviewer 2:
Overall, an excellent paper. Well written and well designed study that addresses a topic of importance in the field of shoulder arthroplasty. I think this should be accepted in its present form.

Ad VIII: Thank you very much. It is a great pleasure to know someone appreciate your research. *BMC musculoskeletal disorders* is a leading journal in the field of musculoskeletal surgery and certainly a great honor for us orthopedic surgeons.

With respect to these changes and comments, we sincerely hope that you will accept our manuscript for publication in *BMC musculoskeletal disorders* and we are looking forward to submitting our future work.

With kind regards,

the authors.