Author's response to reviews

Title: Intraobserver and interobserver reliability of measures of cervical sagittal rotation

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

Thank you very much for your letter of Aug 12, 2014, with regard to our manuscript entitled "Intraobserver and interobserver reliability of measures of cervical intervertebral rotation (Manuscript ID 3482374881032817)". We revised the manuscript in accordance with the reviewers’ comments, and carefully proof-read the manuscript to minimize typographical, grammatical, and bibliographical errors.

Here below is our description on revision according to the reviewers’ comments.

1. Please include a title page at the front of your manuscript file. It should contain, at minimum, the names, institutions, countries and email addresses of all authors, and the full postal address of the submitting author.

Answer:

The title page has been added at the front of the manuscript file.

2. For manuscripts with more than one author, all BMC Series journals require an Authors' Contributions section to be placed after the Competing Interests section. An ‘author’ is generally considered to be someone who has made substantive intellectual contributions to a published study. To qualify as an author one should 1) have made substantial contributions to conception and design, or acquisition of data, or analysis and interpretation of data; 2) have been involved in drafting the manuscript or revising it critically for important intellectual content; and 3) have given final approval of the version to be published. Each author should have participated

...
sufficiently in the work to take public responsibility for appropriate portions of the content.

Acquisition of funding, collection of data, or general supervision of the research group, alone,
does not justify authorship. We suggest the following format (please use initials to refer to each
author's contribution): AB carried out the molecular genetic studies, participated in the sequence
alignment and drafted the manuscript. JY carried out the immunoassays. MT participated in the
sequence alignment. ES participated in the design of the study and performed the statistical
analysis. FG conceived of the study, and participated in its design and coordination and helped to
draft the manuscript. All authors read and approved the final manuscript. Contributors who do not
meet the criteria for authorship should be listed in an acknowledgements section. Examples of
those who might be acknowledged include a person who provided purely technical help, writing
assistance, or a department chair who provided only general support.

Answer:

Authors' contributions section has been added as suggested.

3. By way of a section “Acknowledgements”, please acknowledge anyone who contributed
towards the article by making substantial contributions to conception, design, acquisition of data,
or analysis and interpretation of data, or who was involved in drafting the manuscript or revising it
critically for important intellectual content, but who does not meet the criteria for authorship.

Please also include the source(s) of funding for each author, and for the manuscript preparation.
Authors must describe the role of the funding body, if any, in design, in the collection, analysis,
and interpretation of data; in the writing of the manuscript; and in the decision to submit the
manuscript for publication. Please also acknowledge anyone who contributed materials essential
for the study. If a language editor has made significant revision of the manuscript, we recommend that you acknowledge the editor by name, where possible. The role of a scientific (medical) writer must be included in the acknowledgements section, including their source(s) of funding. We suggest wording such as ‘We thank Jane Doe who provided medical writing services on behalf of XYZ Pharmaceuticals Ltd.’ Authors should obtain permission to acknowledge from all those mentioned in the Acknowledgements section.

Answer:

Acknowledgements section has been added as suggested.

4. Please note that Research article require the following sections:

Article sections

- Background

- Methods

- Results

- Discussion (Results and Discussion may be combined) **Please add this section to your manuscript**

- Conclusions

- List of abbreviations used (if any) Please ensure that these sections are present and clearly labelled as described above. Please do check the instructions for authors on the journal website to ensure that your manuscript follows the correct structure for this journal and article type, and to ensure that you are aware of additional recommendations for formatting that will facilitate handling of your manuscript.

Answer:

Conclusions section has been added as suggested.
5. Name of ethics committee:

Please update your ethics statement to include the name of the ethics committee that approved your study.

Answer: The name of the ethics committee has been added as suggested.

Reviewer(s)' Comments to Author:

Reviewer 1

Overall, this is a clinically relevant question. The aims are well defined. The introduction / purpose is clear and the study methodology is appropriate to answer the defined questions.

Major Compulsory Revisions:

1. The authors should provide information on the accuracy and precision of the software method for measurement. Comparisons of inter and intra observer reliability should be made against the context of knowing the accuracy and precision of the method.

Answer:

Page 4, Line 5-6: Digital measurement has been internally precise compared with manual measurement. Information on the accuracy of the software method for measurement has been added in the introduction as suggested.

2. The population of subjects had more C4/5 and less C5/6 cases. This is a little unexpected, given that C5/6 is the commonest level involved. A comment regarding this in the discussion would be helpful to dispel and criticism.
Answer:

Page 10, Para 3: A comment has been added in the discussion.

3. While %'s are provided for reliability comparisons etc in the results, it would be helpful if the authors included the results of the 'absolute' measurements of angular and distance. These absolute differences should be discussed in the context of software accuracy and precision and against the definitions of instability.

Answer:

Page 6, Para 3; Page 8, Para 3: 'Absolute' measurements of sagittal rotation were added and discussed as suggested.

Reviewer 2

This manuscript provide useful new data on the reliability of manual measurements of intervertebral motion. The manuscript as written is unclear in several areas. Revisions could substantially improve the manuscript. Several specific points are listed below and should be addressed:

1) In the background section, the first sentence about accuracy is correct. The second sentence might be changed to something like: “A reliable measurement should be both accurate and precise, with precision defined by agreement between different observers and agreement for an observer who repeats the measurement several times.”

Answer:
Page 3, Line 5-8: The second sentence has been changed as suggested.

2) The remainder of the manuscript should be changed to be consistent with accepted definitions of accuracy and precision. The word “accuracy” should not be used when it is precision that is being assessed.

Answer:

The word “precision” has been used in the remainder of the manuscript as suggested.

3) In the background section, page 2, references should be cited for the statement “The steps used for the analysis of sagittal translation are well described.”

Answer:

Page 3, Line 15: The reference has been cited for the statement “The steps used for the analysis of sagittal translation are well described.”

4) It is not clear how the section in the background regarding face validity and content validity relates to the question the author’s address in this manuscript. These topics are not addressed in the author’s study.

Answer:

This section has been deleted as suggested.

5) In the Measurement procedure section, please provide details for the software used. Please also state what levels were measured – just the degenerated level or all levels?
Page 4, Line 13: The degenerated levels were measured in our study.

6) Please provide details on surgeon training and years in practice.

Page 5, Line 1-2: Details on surgeon training and years in practice have been added as suggested.

7) The last paragraph in the Measurement Procedure section is unclear. That entire paragraph could be removed, and simply refer to Figure 1 at the end of the sentence in the preceding paragraph that ends with “Method 1; Method 2; and Method 3.”

The last paragraph has been deleted as suggested.

8) The authors should reference papers by Harrison et al that addressed a similar question with respect to alignment in a single x-ray: [1]

Page 5, Line 13: The reference has been added as suggested.

9) If the authors have access to software that calculates Bland-Altman statistics, a Bland-Altman analysis can provide data that are easier for a clinician to interpret, since it would inform readers as to the limits of agreement between readers. See a recent paper by Yeager et al.

Answer:
Intra- and interobserver statistics were compiled based on the methods of Shrout-Fleiss, because ICCs were allowed for a broader comparison with other results.

10) The 1st sentence in the Results states that four measurement techniques were tested whereas only three are described.

Answer:
Page 6, Line 10: It’s an error. It has been corrected as suggested.

11) In the results, the authors describe percent of measurements within 2 deg of the original measurement, but that statistic is not described in the methods. Note also that a 2 deg threshold is very high. Most computer-assisted methods have errors closer to 0.5 deg.

Answer:
Page 7, Para 2: Percent of measurements within 0.5 deg of the original measurement were analyzed as suggested.

12) The instability criteria of greater than 11 deg was original intended to be used on a single static X-ray (e.g., one neutral-lateral X-ray), and a specific label was classified as unstable if the disc angle at that level was more than 11 deg different than the disc angle at adjacent levels. The manuscript implies that levels were classified as unstable if there was > 11 deg intervertebral rotation between flexion and extension. Note that most of the asymptomatic population has > 11 deg of intervertebral motion at most levels.

Answer:
Radiographic criteria of cervical instability are sagittal plane rotation and/or angulation. Sagittal rotation (>20º) and/or sagittal angulation (>11º) were considered unstable (White AA, III, Panjabi MM: The problem of clinical instability in the human spine: a systematic approach. In Clinical Biomechanics of the Spine. 2nd edition. Edited by White AA, III and Panjabi MM. Philadelphia: J.B. Lippincott; 1990:277-378). All data were analyzed according to above definition.

13) In the results section, the authors state that method 2 was the most consistent method, whereas the discussion begins by stating it is the most variable and least reliable.

Answer:
Page 8, Para 3: Method 2 was the most consistent method. The discussion has been corrected.

14) In the discussion, the authors should qualify the claim of being the first to examine reliability of intervertebral motion measurements from lateral cervical flexion extension x-rays. Multiple publications report on accuracy and reproducibility of computer-assisted measurements for intervertebral motion measurements in spine. The manuscript addresses the reliability of manual line-drawing methods.

Answer:
The sentence ‘To our knowledge, this is the first study to examine reliability of intervertebral motion measurements from lateral cervical flexion extension has been deleted.

Once again, we greatly appreciate both your help and that of the referees concerning the improvements to this paper. We believe that the manuscript has been improved satisfactorily and hope it will be accepted for publication in BMC Musculoskeletal Disorders.
Best wishes,
Lei-Sheng Jiang
Xiao-Dong Chen