Author's response to reviews

Title: Regional differences in lumbar spinal posture and the influence of low back pain

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Version: 4 Date: 15 October 2008

Author's response to reviews: see over
13/10/2008
Dr Melissa Norton
Editor
BMC Musculoskeletal

Dear Dr Norton,

Thank you for the opportunity to submit a revised version of our manuscript entitled “Regional differences in lumbar spinal posture and the influence of low back pain” for consideration for publication in BMC Musculoskeletal. The reviewer’s comments have been addressed, as outlined in the attached response document.

Yours Sincerely,
Tim Mitchell (Corresponding Author)
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Reviewer 1 report
Title: Regional differences in lumbar spinal posture and the influence of low back pain
Version: 3 Date: 18 August 2008
Reviewer: Jaap van Dieën
Reviewer's report:

Reviewer 1. Comment 1
Results section
Page 13: line 10: remove one dot.
  •  Dot removed

Reviewer 1. Comment 2
discretionary revisions:
Abstract
I would suggest presenting more precise information in the abstract, most importantly what was the sign (and magnitude) of the difference between groups.
  •  The abstract has been adjusted according to the reviewer’s suggestion.

Level of interest: An article of importance in its field
Quality of written English: Acceptable
Statistical review: No, the manuscript does not need to be seen by a statistician.
Declaration of competing interests:
I declare that I have no competing interests
Reviewer 2 report

Title: Regional differences in lumbar spinal posture and the influence of low back pain

Version: 3 Date: 2 September 2008
Reviewer: Julie Fritz
Reviewer's report:
The authors of this manuscript have made substantial improvements to the credibility and clarity of paper in their revisions. I have only two remaining concerns:

Reviewer 2. Comment 1

Methods section

Major Compulsory Revisions:
1. The choice of ICC model and the manner in which the reliability results are presented require clarification. First, justification for the use of a model 3,1 is needed. Using a model 3 seems appropriate, but using a form 1, does not seem appropriate. Form 1 indicates a single measure was used, but it seems that for most reliability calculations in this study it was a mean of three measures that was used. Please clarify this issue and provide justification for the ICC form that was selected.

- The choice of ICC model is 3,1 as stated. Form 1 was used as the reviewer points out because it is a test of the reliability of a single measure. For all reliability analyses, each angle (e.g., LLx angle in usual sitting) was recorded three times and the reliability of these three single measures was calculated across all subjects. The mean of the three measures was not used for reliability analysis.
• **As the reliability for all measures was excellent, the means of the three trials of each angle (eg LLx angle in usual sitting) were used in analyses comparing lumbar spinal regions and LBP groups.**

• **To clarify this possible confusion between ICC calculations and taking the means of the three measures for group analyses, the order of these two paragraphs has been swapped around.**

**Reviewer 2. Comment 2**

Methods section

Major Compulsory Revisions:

2. My second concern regarding the reliability results is the apparent averaging of all ICC and SEM values computed for various measures involving the upper lumbar, lower lumbar or lumbo-thoracic regions. The authors should report the ICC and SEM values for each measurement procedure used instead of averaging the values for each spinal region. A table for these results may be the most efficient way to present these results.

• **As there are a total of 33 variables to report ICC and SEM data on (11 for LLx, 11 for ULx and 11 for TLx), the mean ICC and SEM for each region were reported, with the range (maximum and minimum) for each region also provided.**

• **The authors felt this was the most appropriate and transparent method of presenting this data without taking up undue space. However, a table of all ICC and SEM values has been provided, and can be included instead of the current method of data presentation at the editor's discretion. (see table at end of this document)**

**Reviewer 2. Comment 3**

Discussion section

Minor Essential Revisions:
1. Discussion section - page 19, The results of this study relative to the second aim of the study did not support a relationship between regional differences in lumbar postures or ROM during functional tasks and the presence/severity of LBP. In discussing the possible explanations for this lack of a relationship, the authors seem to imply that their sample likely lacked sufficient diversity of LBP postural sub-groups. An alternative explanation that seems to be suggested by the results of this study is that posture and ROM variables are not important variables for sub-grouping patients with LBP. It seems that the authors fail to consider the possibility that

- The primary conclusion in paragraph 1 page 19 is that “regional spinal angles do not differ in female nursing students with LBP when they are sub-grouped according to LBP severity”, as the only sub-grouping in this study was by LBP definition.
- As patients with LBP were not sub-grouped according to posture and ROM in this study, the alternative explanation suggested by the reviewer was not examined in this study.
- However, other published research findings cited by the authors support the alternative explanation that if these subjects were sub-grouped with a mechanism based classification system, differences in spinal angles between both LBP groups and controls may be evident.
- In other unpublished data on this group of subjects, application of a mechanism based classification system did confirm the above explanation.
- This paragraph has been reworded to clarify that these variables may not be important.

Level of interest: An article of limited interest
Quality of written English: Acceptable
Statistical review: No, the manuscript does not need to be seen by a statistician.
Declaration of competing interests:
I declare that I have no competing interests

Reviewer 3 report

Title: Regional differences in lumbar spinal posture and the influence of low back pain

Version: 3 Date: 19 August 2008
Reviewer: Martin Descarreaux
Reviewer's report:
The authors have addressed all the major reviewers’ comments and have extensively revised their manuscript. One of the main issue [classification of low back pain subjects] have been clarified in the methods (page 7) and discussion (page 20) sections of the manuscript. The addition of the BMI analysis, as suggested by reviewer 2 is very interesting and has improved the significance of this manuscript. I feel it is now ready for publication.

**Level of interest:** An article of importance in its field

**Quality of written English:** Acceptable

**Statistical review:** Yes, and I have assessed the statistics in my report.

**Declaration of competing interests:**
I declare that I have no competing interests’
Table. Spinal angle inter-trial reliability of kinematic measures

<table>
<thead>
<tr>
<th>Posture</th>
<th>LLx ICC (95% CI)</th>
<th>LLx SEM</th>
<th>ULx ICC (95% CI)</th>
<th>ULx SEM</th>
<th>TLx ICC (95% CI)</th>
<th>TLx SEM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Usual sitting</td>
<td>0.926 (0.91-0.94)</td>
<td>2.52°</td>
<td>0.949 (0.94-0.96)</td>
<td>2.00°</td>
<td>0.961 (0.95-0.97)</td>
<td>2.93°</td>
</tr>
<tr>
<td>Slump sitting</td>
<td>0.939 (0.92-0.95)</td>
<td>2.30°</td>
<td>0.869 (0.84-0.90)</td>
<td>2.75°</td>
<td>0.989 (0.98-0.99)</td>
<td>1.29°</td>
</tr>
<tr>
<td>Usual standing</td>
<td>0.953 (0.94-0.96)</td>
<td>2.17°</td>
<td>0.953 (0.94-0.97)</td>
<td>2.04°</td>
<td>0.957 (0.94-0.97)</td>
<td>2.02°</td>
</tr>
<tr>
<td>Sway standing</td>
<td>0.982 (0.98-0.99)</td>
<td>1.80°</td>
<td>0.972 (0.96-0.98)</td>
<td>1.99°</td>
<td>0.960 (0.95-0.97)</td>
<td>2.31°</td>
</tr>
<tr>
<td>Backward bending</td>
<td>0.984 (0.98-0.99)</td>
<td>2.54°</td>
<td>0.979 (0.97-0.98)</td>
<td>2.27°</td>
<td>0.973 (0.97-0.98)</td>
<td>2.91°</td>
</tr>
<tr>
<td>Forward bending</td>
<td>0.995 (0.99-1.00)</td>
<td>0.52°</td>
<td>0.993 (0.99-1.00)</td>
<td>0.50°</td>
<td>0.995 (0.99-1.00)</td>
<td>0.64°</td>
</tr>
<tr>
<td>Lift box</td>
<td>0.955 (0.94-0.97)</td>
<td>1.83°</td>
<td>0.926 (0.91-0.94)</td>
<td>2.29°</td>
<td>0.926 (0.91-0.94)</td>
<td>3.75°</td>
</tr>
<tr>
<td>Pick up pen</td>
<td>Single measure</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pillow transfer</td>
<td>0.927 (0.91-0.94)</td>
<td>2.49°</td>
<td>0.877 (0.85-0.90)</td>
<td>3.06°</td>
<td>0.872 (0.84-0.90)</td>
<td>4.68°</td>
</tr>
<tr>
<td>Box transfer</td>
<td>0.959 (0.95-0.97)</td>
<td>1.89°</td>
<td>0.940 (0.92-0.95)</td>
<td>2.17°</td>
<td>0.924 (0.90-0.94)</td>
<td>3.43°</td>
</tr>
<tr>
<td>Squat</td>
<td>Single measure</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

LLx = Lower lumbar, ULx = Upper lumbar, TLx = Total lumbar.