Author's response to reviews

Title: Inertial sensor real-time feedback enhances the learning of cervical spine manipulation: a prospective study

Authors:

   Antonio I Cuesta-Vargas (acuesta.var@gmail.com)
   Jonathan M Williams (jwilliams@bournemouth.ac.uk)

Version: 2 Date: 6 January 2014

Author's response to reviews: see over
At BMC Medical Education,

Dear Editor,

We resubmit the manuscript entitled: “Inertial sensor real-time feedback enhances the learning of cervical spine manipulation: a prospective study”, for your consideration for publication in this prestigious journal. The manuscript has been read and approved by all the authors, the requirements for authorship in this document have been met and each author believes that the manuscript represents honest work.

Yours sincerely,

Cuesta-Vargas, A.I., PhD.
School of Clinical Science
Faculty of Health Science
Queensland University Technology, Australia
Response to the Reviewer’s Comments

(Ms. Ref.: MS: 3454908071081289
BMC Medical Education)

Dear Editor

Please find a revision of our manuscript entitled ‘Inertial sensor real-time feedback enhances the learning of cervical spine manipulation: a prospective study’. We would like to thank the Reviewers for their thoughtful and constructive comments. We have considered all suggestions and have incorporated them into the revised manuscript. Changes to the original manuscript are highlighted (in yellow background). We believe our manuscript is stronger as a result of the modifications. An itemized point-by-point response to the Reviewers’ comments is presented below.
Reviewer's report
Title: Inertial sensor real-time feedback enhances the learning of cervical spine manipulation: a prospective study
Version: 1 Date: 2 December 2013
Reviewer: Suzanne Snodgrass

Reviewer's report:
This report presents a new method for measuring the parameters of manipulation. Few authors have used an inertial sensor, so this method is novel.
The sample size is small, however, so strong conclusions cannot be made.
- Major Compulsory Revisions
1. Need to mention there is a limitation related to the number of repetitions of manipulation that may change stiffness in the subject being manipulated and thus change the properties of what the clinician applies.

Author Answer 1: Thanks for the suggestions. We absolutely agreed with this reviewer and we have included a new sentence in the discussion section about this. However it is worth highlighting that only one manipulation was performed as outlined in the methods (procedure) and discussion section. The additional text reads: ‘…It is also important to note that due to the nature of learning manipulation, a series of practice manipulations were conducted which may alter the stiffness properties of the spine being manipulated and therefore alter the kinematic profile of the technique.’

2. Very intensive practice with instruction is used in this study- not likely to be representative of usual teaching practices.

Author Answer 2: This comment is most interesting. This style of teaching manipulation is standard for Postgraduate Students in Advanced Manual Therapy in Spain. We therefore feel it is representative.

3. Need CIs for all mean differences in results section. Also recommend adding CI error bars to the figures.
Author Answer (AA) 3: Thanks for the suggestion. We have included the standard deviation in text and error bars in figures

4. Differences were small between the before and after training measurements. This is probably because these were measured after the student had done 4 hours of previous training. I would suggest repeating the study and taking the ‘before’ measurements prior to practice with the instructor.

AA4: Thanks for the suggestion. We have included your recommendations for future studies

5. I’d also suggest that greater numbers of subjects are needed to provide conclusions on whether the inertial sensor is useful. If the authors are unable to collect more data, I would suggest this manuscript is only suitable as a technical report primarily describing how the sensor Works

AA5: This is an interesting comment. We are not in a position to collect more data and therefore wish to proceed with this submission as we feel it still has merit and offers something novel. We are happy to leave this decision to the journal editor.

6. Paragraph 4 of discussion needs revising- the grammar is such that it does not make sense.

AA6: Thanks for the corrections, we have re-written paragraph 4 of discussion, easier and clear

7. Discussion paragraph 5. You haven’t reported reliability data so you cannot state your method is reliable here.

AA7. We have removed one sentence about this statement and we have stated the reliability were measured in previous studies, one of then (Cuesta-Vargas and William 2011) with the same methodology of the present study.
- Minor Essential Revisions

1. Abstract: Need CIs for mean differences.
   
   **AA1: Done**

2. I would avoid the use of the word ‘oscillatory’ in referring to these thrust manipulations, as it often refers to Maitland mobilisations, and may confuse the reader.
   
   **AA2: Thanks we have removed this word**

3. When you first define CSM you do not need an s on the end- plural – are you continue to use it in singular form.
   
   **AA3: Thanks we have corrected it**

4. There are lots of spelling and grammar mistakes (primarily verb tense). Recommend the authors complete thorough copy-editng before publication.
   
   **AA4. Thanks for the suggestions. One co-author is a native English speaker and has reviewed the text.**

5. Need axes and categories more specifically labelled on figures; also, include CI error bars.
   
   **AA5: Done**

- Discretionary Revisions

None.

Level of interest: An article whose findings are important to those with closely related research interests

Quality of written English: Not suitable for publication unless extensively edited

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's report
Title: Inertial sensor real-time feedback enhances the learning of cervical spine manipulation: a prospective study
Version: 1 Date: 18 November 2013
Reviewer: John Triano
Reviewer's report:
Mandatory Revisions.
What is the hypothesis for this study? Are you looking for differences from side to side or sameness? Make a clean hypothesis statement, please.
The comparisons made for purpose of analysis are unclear.

Author Answer (AA): The following has now been included in the text: ‘The aim of the present study was to investigate the effect of real-time feedback on the performance of CSM. The null hypothesis was that tuition using real time feedback will not alter kinematics employed during novice CSM.’

P6, para 1,2,3 I do not understand what is meant by “The mean values before and after tuition...” etc. What does tuition have to do with the project?

AA We have used the word “tuition” to denote the teaching instruction received.

P7. If the hypothesis seeks differences, then there are too many p values to use a p< 0.05 and appropriate correction for multiple testing should be applied. If the hypotheses looks to show that there are no differences, then the statistics should be redone to reflect a search for “sameness”.

AA: This is an interesting comment. The authors are unaware of any work that states at what point too many ‘tests’ are being conducted and a correction to the alpha value is required. Indeed such adjustments have been criticised (Perneger 1998). Our aim was to investigate differences in these variables test this using stats which examine differences and report these. We feel that a Bonferroni adjustment is unwarranted and the actual magnitude of the difference (50% increase) is significant enough for the readers to judge whether a significant result has actually occurred and is not due to chance.
Figures: There are no figure legends. Standard deviations should be included, not just means in the figures

*AA: Thanks for the suggestions. We have included SD and figure legends*

Minor essential revisions.
P3, para 1, line 4: “This in term...”. Correct typo.
*AA: Thanks for the suggestions. We have corrected typo.*

P3, para 1, line 7: “methods is spares...” . Do you mean “sparse”?

*AA: Thanks for the suggestions. We have corrected the typo.*

P5, Data acquisition – What was the filter cut-off frequency?

*AA: ‘Raw data from kinematic variables were filtered using a bidirectional fourth-order, 20Hz low–pass butterworth filter to remove high frequency noise from the sample.’*

Level of interest: An article whose findings are important to those with closely related research interests
Quality of written English: Needs some language corrections before being published
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

Perenger TV. What’s wrong with Bonferroni adjustments. BMJ 1998, 316; 1236.