Reviewer's report

Title: Reliability of lumbar spinal palpation, range of motion and determination of position

Version: 1 Date: 7 May 2007

Reviewer: Veronique Feipel

Reviewer's report:

General

The subject of the present study is interesting: it assesses issues related to the clinical use of instrumented assessment of spinal function. However, several points would benefit from more detailed explanations and clarifications.

A few general comments:

1. The authors should provide a unit for standard deviations.

2. The use of several significant digits (for instance page 5, lines 3-4 and tables) should be justified with regard to their pertinence (clinical significance and error limits of measures).

Major Compulsory Revisions (that the author must respond to before a decision on publication can be reached)

3. The study presented by the authors uses the CA-6000 SMA with a fixation system developed by the authors since 1995. Although the reviewer agrees that the original fixation system for the lumbar spine is far from ideal, the new system has not gained clear recognition from other researchers. It is thus difficult to accept the statement (page 4, lines 7-9) that the new fixation system has provided clinicians and researchers with the opportunity to measure spinal movement reliably and validly with 6 degrees of freedom.

4. Page 5, lines 18-19: the authors used the palpation of the iliac crest to locate the L4-L5 interspace. This technique has been questioned in the literature (see for instance: Chakraverty et al, J. Anat. (2007) 210, pp232–236). Thus, although this palpation method was shown to be reliable in the present study, it might not be valid.

5. The protocol used in the study assesses inter-rater reliability of spinal palpation, range of motion and neutral position determination. It also assesses within-subject variation of motion ranges, as well as intra-rater variation in CA-6000 fixation on constant landmarks. Why was palpation not repeated during the second session to assess intra-rater reliability of palpation and, consequently, of measures? This would have been useful in the perspective of determining the reliability range of the proposed tests for clinical use.

6. Why was neutral position determination not repeated during the second session?

7. Static lumbar position was defined as the three components of upright posture. From table 5, it appears that this position consists of ~25° extension, and almost neutral rotation and lateral bending. The reference (0°) used for this definition should be mentioned. If the reference was the zeroed linkage position on its calibration rod, the absolute values do not have a biomechanical meaning (the variation after motion or between sessions still do). It would be useful to clarify this issue. Rather, the differences in position after motion quantify upright repositioning error, which is an interesting aspect.

8. In the material and methods section, 22 volunteers are mentioned as participants. The first line of the results section only mentions 19. Why?

9. The results of palpation agreement are indeed excellent, if there was no difference (less than 2 mm) for 16 out of 19 subjects. This is not in agreement with previous studies on spinal palpation accuracy and reliability (see, for instance: Harlick et al. Man. Ther. (2007) 12 (1), pp. 56-62, as well as the study by
Downey cited in the manuscript). However, agreement criteria are not clearly defined in the present study, so that the level of agreement is difficult to estimate by the reader. The sentence on page 9, line 5 should be clarified as well.

10. Page 12, lines 1-4: the study of Feipel et al mentioned in the manuscript used the standard fixation system indeed. However, repositioning errors were measured in upright posture, and not sitting on a rocker board. The rocker board was used for other tests.

11. The discussion should assess several other aspects, such as the reliability of separate motions, flexion, extension, right or left lateral bending and rotation (or the justification of not assessing these aspects), a comparison of the results of the present study with those of other reliability studies.

12. The SD mentioned in tables 1 and 2 are very small, are these average intra-subject SD over the three repetitions? This should be mentioned. If these are the sample SD, this point needs to be discussed, as inter-subject variability has been reported to be much in all previous studies.

13. Table 3. The intra-rater ICC should be reconsidered in the light of comment 3.

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Minor Essential Revisions (such as missing labels on figures, or the wrong use of a term, which the author can be trusted to correct)

14. Page 6, lines 18-19: the explanation between brackets is already provided earlier (page 5, line 14).

15. A legend for figure 1 should be provided.

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Discretionary Revisions (which the author can choose to ignore)

16. The instrument was zeroed several times during the protocol, before starting sampling each type of motion. It would be interesting to explain why this multiple zeroing is necessary.

What next?: Unable to decide on acceptance or rejection until the authors have responded to the major compulsory revisions

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

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