Reviewer’s report

Title: The effects of a three-week use of lumbosacral orthoses on trunk muscle activity and their response to trunk perturbations.

Version: 1 Date: 2 April 2010

Reviewer: Jim Potvin

Reviewer’s report:

This study was well done and very clearly presented. The authors have evaluated the effects of a particular lumbosacral orthosis on spine’s anticipation and response to sudden unloading in young, healthy adults. The presentation and interpretation of the results was extremely effective and the study represents very good science addressing a relevant issue. The author delimit the constraints of the study and identify the need for further studies with longer duration use and use by subjects with LBP, for whom such devices are often targeted.

Major Compulsory Revisions:

None

Minor Essential Revisions:

p6/18: It is stated that: "The pressure measurement was repeated at the beginning of each testing session to standardize the LSO tension for all subjects". Please clarify this statement. Is it fair to assume you mean the pressure was set to 35 mmHg before each session?

p7/11: Was there a particular rationale for setting the female values to 70% of that for males?

p8/L23: Why was the source not mounted to the sacrum? Are you confident that the pelvis did not move with respect to the testing apparatus? If not, this limitation should be addressed in the Discussion.

p10/L1: It is suggested that you change the wording "longer than 150 ms" to something like: "initiated more than 150 after the stimulus". The current wording implies that you are interested in the actual duration of the response, and not the timing of its initiation.

p11/L18: With the EMG-based optimization, the gains can be different between samples, muscles, trials and conditions. For the purposes of this particular study, it is important that there was not a systematic difference in these gains between the control and LSO trials. Do you have data to confirm that there were no such systematic differences in gains, that could have masked potential differences in calculated muscle forces and, subsequently, compression forces between these conditions.
p12/L3: The two sentences, regarding the Box-Cox transformation, are redundant.

p13, last sentence: "Table 2" should be Table 3 and/or Figure 4. Also, Table 3 and Figure 4 show essentially the same information such that one could be removed.

Discretionary Revisions

p13/L8: It is not clear that the LSO was solely responsible for the increased effective trunk stiffness. There may have been some muscle contribution to this. It may be more appropriate to state that the LSO condition resulted in significantly higher stiffness values.

p16/Limitations: This study was only performed with one particular LSO. It is suggested that this be mentioned in the limitations. The authors are careful to refer to it as “the” LSO, but there is no acknowledgment that the results may have been different with another LSO design.

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.