Reviewer's report

**Title:** Real Time Noninvasive Assessment of External Trunk Geometry during Surgical Correction of Adolescent Idiopathic Scoliosis.

**Version:** 3  **Date:** 7 January 2009

**Reviewer:** Marc Asher

**Reviewer's report:**

Major Compulsory Revisions

The orientation of the first four indices is not immediately clear to me. I'm referring to the following three areas in the manuscript.

1) Page 3, last paragraph, second sentence; beginning --Indices include--.
2) Page 7, Section 2.4, next to last sentence; beginning -A positive linear value.
3) And finally to Figure 2 B.

Indices 1 and 2 seem to me to be reversed on the drawing. If I am interpreting the orientations correctly, Index 1 is shoulder orientation in the transverse plane, Index 2 shoulder orientation in the coronal plane, Index 3 balance in the sagittal plane and Index 4 balance in the coronal plane. However, this interpretation doesn't fit with the x-ray images. For example, C7 in Patient 1 (Figure 1) is clearly offset to the left in the coronal plane. This would be a positive displacement along the Y axis. However, in Table 3 it is negative, a rather large - 19.97 mm. If I'm wrong and Index 3 is medial lateral offset, the number in Table 2 (-1.29 mm) still doesn't make sense. Adding the x-rays helped me see the need to much better describe how the indices are being measured.

Page 7, Section 3, Results, First Sentence. The phrase both stages of surgery can be confused with the interoperative stages during and after; and doesn't seem to apply to the pre and post operative standing radiographs. Wording could be changed to --primary Cobb angle measured on standing pre and post operative standing posterior-anterior radiographs.--

Table 2 uses wording --during and after--. page 7, Section 3, Line 4 begins --before and after --. Based on your edit of Figure 7 this should be --during and after--.

Page 7, Section 3, Sentence 5 seems to be the beginning of the presentation of actual differences between the landmarks during and after the correction. However, the transition of thought from Table 2 to Table 3 isn't clear in the text. Suggest adding a sentence after sentence 4 beginning with ---Table 3 presents the measurements during and after surgical correction of the scoliosis.--

Figure 6. In caption the wording --before instrumentation-- is used. For consistency consider --during and after instrumentation.--
Figure 7. This appears to be the absolute difference. If that is correct I think the word Absolute should be added to both the Figure and to the caption.

Figure 7. The measurement shown is degrees but two of the indices shown are in mm. This needs to be clarified. Also, I question the value of presenting the data this manner. It would be much more helpful to present it in relation to the goal/normal, ie. no rotation and no displacement.

Table 2. Title has before and after surgical correction rather than during and after.

Discretionary Revisions/Comment

Table 3. Only about half of the indices were improved. Yet the Cobb correction was 66% (mean 56.6 to 19 degrees). This causes me to wonder about the importance of at least some of the indices being measured. For instance, positioning on the operative frame would likely have a major effect on at least anterior-posterior balance. Just a hopefully helpful thought.

**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 have conflict of interest having participated in the research and development of spinal implants and receive royalties related to this. Any other conflicts ended over eight years ago.