Reviewer's report

Title: A review of the trunk surface metrics used as Scoliosis and other deformities evaluation indices

Version: 4 Date: 9 May 2010

Reviewer: Tomasz Kotwicki

Reviewer's report:

In general, the reviewer is enthusiastic about this paper because there is a real need to make some order in parameters for surface trunk measurement. Actually, one can observe a Babel tower of various parameters proposed by researchers to describe surface deformity of the human trunk. It can be noticed some helplessness of scientific societies (including SRS, IRSSD and SOSORT) in creating a common language for surface topography and in establishing standard parameters (as the Cobb angle serves in radiography). Congratulations for this valuable initiative and hope the paper may be a background to proceed further.

Minor revisions:

1. The reviewer always recommended the use of the scoliometer at three levels of the spine. However, not the same levels as indicated by the authors. In fact, the levels should follow the regular distribution of scoliotic curvatures, as described by Lenke et al. (JBJS): (1) proximal thoracic level relates to upper thoracic curvatures usually extended from Th1 to Th5, the measurement is done at Th3-Th4, (2) main thoracic level relates to main thoracic curvature, usually Th5-Th12, the measurement is done at Th8-Th9, and (3) thoracolumbar/lumbar level for either Th-L or L curvatures; for the Th-L the measurement is done at Th12-L1, for most cases of lumbar curvature the measurement is done at L2-L3. The authors’ recommended level Th4-Th8 contains two different curves which should be avoided, as the ATR/ATI measurements are done at maximum trunk deformity.

2. Page 16. The Hump Sum introduced by Suzuki for assessment of the transverse plane is not listed even if the related paper by Inami is cited.

3. Moreover, this reviewer proposed a parameter to quantify the transverse plane deformity, called Sum of Rotation (SR). SR can be automatically measured from raster stereographic images. The technique is as follows. At each level of the thoracic and lumbar spine (17 levels) a horizontal line is drawn and two points are designed at each horizontal line, both symmetrical to the spinous process, the distance in between is equal the distance between posterior superior iliac spines. Then the difference in the depth of each pair of points is calculated in degrees, giving segmental rotation. Adding all segmental rotations results in Sum of Rotation. The full description is given in the paper attached.

4. The concept by Goldberg et al. is not mentioned, although it is an interesting
trial to introduce new look into evaluation of surface deformity. The reference for Goldberg can be found in the attached paper by Kotwicki on Evaluation of scoliosis (position 73 in the references).

5. Page 17. The reason why the authors recommend linear measurements over angular measurements is not clear. It is generally accepted that angular measurements are not dependent on the size of the object measured while the linear measurements are.

6. A comment on the list of exigencies for surface indices. The reviewer would be happy if the existing worldwide equipments for surface topography could produce the same indices. There is a risk to search for completely new parameters, as it may create more chaos than order. Various equipments (hardware) already existing at the market and their capacities should be considered.

7. In the reviewer’s opinion it lacks a general comment that the Cobb angle should not be considered a gold standard for making validation of the surface indices, because radiography and surface topography do not measure the same thing.

8. The legend for figure 14 does not correspond to the image.

9. Please provide description and avoid laconic “indices after [3]” as for the figure 16 and 17.

10. The figure 10 and 29 are the same.

11. Figure 8 and Figure 40 should be presented together as the two parts to describe the POTSI index.

**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.