Reviewer’s report

Title: Three-dimensional easy morphological (3-DEMO) classification of scoliosis. Part I

Version: 4 Date: 20 October 2006

Reviewer: Manuel Rigo

Reviewer’s report:

General

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

The number of the figures when comparing text and figure number does not coincide. I think all the figures where numbered one to eight from the last to the first, but it seems that there is also some mixture. For example I understood that the numbered as figure 2 is in fact number seven because you can find in the text a reference to this figure (Figure 7A,B,C,D,E). The numbered figure 2 is the only figure with this five options. But also figures cited in the text as 8A and 8B are probably figures numbered later as 4B and 4C, however I am not sure about it. Thus all the paper is very confusing. May be it is easy for a clinician after some direct explanations from the bioengineer using the right figures but it has been very hard for me to understand anything with no such a direct explanations and with all the figures mixed.

Before I make a decision about acceptation or rejection I need to read the paper correctly submitted in order to confirm my first impression based on what I have understood.

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

Discretionary Revisions (which the author can choose to ignore)

On the other hand, some comments to the authors in order to improve the paper:

1. I found a discrepancy between the terminology used by the authors and that recommended by the SRS Working Group on 3-D Terminology of Spinal Deformity reported by Stokes (reference number 6 in the references list). Stokes et al defined four axis system for individual vertebrae (local axes), curve regions (regional axes), the spine (spinal axes), and the whole body (global axes). These in turn define the principal planes of vertebrae, curve regions, the spine, and the body. The center of both the global and the spinal axes system is located in the center of the superior end plate of S1 and their axial axis goes the first one vertical (global) and the second one to the center of C7 or T1 (spinal). Regional axes system has the center in the vertebral body center of the lower end vertebra of a particular spine region. Its axial axis goes cranially to the vertebral body center of the upper end vertebra of such a particular spine region (for example the anatomical thoracic region has its axes system centered in T12 and the axial axis goes to T1, another example, a scoliotic curve defined by two end vertebrae located at T5 and T11 has its axes system centered in T11 and the axial axis goes to T5). The authors of this paper use the terminology global and regional for two axes system which may be should be defined as global and spinal (rather than regional) according to the SRS terminology.

2. The conclusions section is too long. The example comparing two curves classified the same according to King and Lenke classifications but showing different morphological characteristics in the 3-DEMO correspond more to the discussion section. Also, it is cited in the text a figure nine which is not afterwards listed.

3. This is a very interesting paper giving three values named ‘direction’, ‘shift’ and ‘phase’ which can be helpful for clinical evaluation and therapy strategies and programs. However, I have the feeling that these values could be first explained in a more easy way for clinicians and second obtained from different tools (less complexes) than the AUSCAN. Some explanations seems to be ‘not easy’, in opposition with the claimed 3DEMO for a publication like ‘scoliosis’. On the other hand the AUSCAN is not a tool for daily practice (cost and time consuming) so, even the information offered by this paper is very interesting from
the theoretical or intellectual point of view and to my opinion it should be published (I really enjoyed to read some sections from this paper), I am not sure that scoliosis is the right place for it.

4. In any case I recommend re-submit and see.

**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.