Reviewer's report

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

Version: 4 Date: 9 October 2006

Reviewer: Theodoros B. Grivas

Reviewer's report:

General
This paper appears to be original in its concept and according to the advice of an expert colleague (Associate Professor George Karras, Laboratory of Photogrammetry, Department of Rural & Surveying Engineering, National Technical University of Athens (NTUA), GR-15780 Athens, Greece, tel. +30 210 7722685, fax: +30 210 7722677, e-mail: gkarras@central.ntua.gr) it also seems to be mathematically sound.

It brings in three basic parameters (Direction, Shift and Phase) using the AUSCAN optoelectronic system, which give new information, allowing to figure out different curves.

Although it is possible to categorize the scoliotic curve according to the proposed classification using the AUSCAN system, in the everyday clinical setting with out any laboratory facilities, apart from the regular radiographs, this classification is not easy to be utilized, and this must be highlighted in the discussion.

The title contains the word easy. The text as it stands now, does not justify the word easy. A clinician can follow with difficulty the whole concept which is based in mathematics. The mathematical terms used must be described in details in order to be easily understood by clinicians.

The “quasi-3D” curve should be better called “2.5D” curve.

The figures play a very important role in this paper, thus all the captions must be very descriptive, in order to be easily understood.

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

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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)

In Captions,
Figure 1 and the rest where the Cartesian system is used, please define with the letters x, y, z the axis of the Cartesian system, o the center of all the axes, and when spatial planes are discussed, please define the plane by using a pair of axes (for example xoy, yoz, xoz for the three planes). In this way the reader will understand more easily the description of the planes.

In Figure 2 the antero-posterior (AP) regional axis in the photograph of the small human in the figure could be represented with dotted line from the point it crosses the LL axis and beyond to the front, thus the reader will understand that this axis passes in front of the body, and not through the head.

In Figure 4 where is represented the barycentre?

In figure 5 please indicate what represents the AP spinal axis and what represents the AP regional axis. As illustrated now, the Figure 5 is confusing for the reader, at least for a clinician not familiar with graphical representations on a 3 axis system.

In the text under the title Shift, is written … in classificatory options, right-shifted (figure 7 B, D), …
In figure 7 there is no D sub picture, also in 7 A, C, etc,
There is confusion again with pictures and text. Please short it out.
Also be very explanatory with the illustrations, as to be easily understood.

Under the title Phase, is written … in Classificatory options (Table 5) …,
In the paper there is no Table 5. Please correct it.
Also, what is the diagonal of the minimum rectangle in which the Top View is inscribable? Please define what you write; otherwise the reader cannot follow the text.

The text on Phase as it stands now is very difficult to be understood by a clinician. If the aim of the author is
to present his work to doctors, it must be rewritten in a more understandable way for them. If this paper is presented to mathematicians it is probably easier for them to understand.

In Discussion it is written
… Fley differs only slightly as regards the position of the end and apex vertebrae. …
What does that mean?
Also
…. In this paper, it is impossible for us to identify the real boundaries between normality and pathology, because this very early stage of the research project does not involve the analysis of a normal population.
….
Under the titles Direction, Shift, and Phase are given some Norms. Can this be analyzed further? What does intrinsic limits of the adopted measurement methodology mean? Please define.

Discretionary Revisions (which the author can choose to ignore)

**What next?:** Accept after minor essential revisions

**Level of interest:** An article of importance in its field

**Quality of written English:** Acceptable

**Statistical review:** Yes, but I do not feel adequately qualified to assess the statistics.