Author's response to reviews

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

Authors:

Stefano Negrini (stefano.negrini@isico.it)
Alberto Negrini (alberto.negrini@isico.it)
Santambrogio Giorgio Cesare (santambrogio@biomed.polimi.it)
Atanasio Salvatore (satanasio@dongnocchi.it)

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Author's response to reviews: see over
To Manuel Rigo

We are really sorry. We immediately discovered that the first submission was wrong due to our inability in using the Biomed Central electronic submitting system, as well as to some last-minute corrections not fully completed. We immediately submitted other versions, but presumably this notice did not reach you. We hope that this will be fixed with the corrections we are submitting now.

We thank you a lot for the hard work you were submitted reviewing these three papers together, but we couldn’t avoid this, because it is a complete framework that required a multiple submission.

**Major compulsory revisions**

We are really sorry: the problem has now been solved. We do not intend the paper for bioengineers, but for clinicians and, if needed, we would like to solve all problems to let physicians and allied professionals fully understand it. With this intent, according to the suggestions of the other reviewer T.B. Grivas, we changed all the captions. Now the captions all together should allow to understand per se the contents of the paper, so to let the reader clinician to understand more easily the results of the study.

**Discretionary revisions**

1. You are totally right: we changed it.
2. Right: we pasted most of conclusion in the discussion section
3. Your point is a very good point and we will answer to it thoroughly here. Moreover we added some sentences throughout the paper on this topic, because of its high importance.

   **Why the AUSCAN System?** The problem is that we needed to start from a complex and not every-day clinical usage system such as the AUSCAN System because we needed to have a three-dimensional representation of many curves to look at and to develop an insight (such as this one) to be translated in the next future on everyday practice from a clinician point of view. In fact we are already working on x-rays and clinical exam to obtain the same results. It is stated in the text that we will have a paper on this as soon as possible. This aspect has been introduced also in the conclusion to better clarify this crucial point raised by both reviewers.

   **Why 3-DEMO (3d Easy Morphological)?** We do understand that the explanations in this text are sometimes not easy, but believe me, they are much more understandable with the figures in the right place (sorry again!): according to the suggestion of the other reviewer, we also tried to explain more the mathematical terms. The only point not modifiable was in the method section where the engineer development of the paper is explained. We also introduced new figures with the aim of better explaining the possible difficult points. If you need more explanations in the text, please tell us. In any case the word “Easy” refers to the final classification that should be understandable to clinicians, and so usable, while all actually existing 3-D classifications are not. We think that the concepts of Direction and Shift ARE easy, while Phase it is graphically, but also theoretically, once understood.

   **Is Scoliosis the right place for it?** Yes it is. In the paper there are a few aspects of relevance for bioengineers, but most of them are relevant for clinicians, and the 3-DEMO Classification is born only for physicians, and not for bioengineers that could find it too “simple-mind”. The 3-DEMO is not for research, but for clinical everyday usage. Obviously this “trilogy” is the first step, the second will come with another evaluation obtained through radiographs and clinical exam, the third will be validity with treatments.

Finally: thank you very much, because we increased the quality of the paper thank to your efforts.
To Theodoros B. Grivas

We thank you and your colleague Prof. Garras for the hard work you were submitted reviewing these three papers together, but we couldn’t avoid this, because it is a complete framework that required a multiple submission.

**General**

We totally agree that the AUSCAN System is not for the everyday clinical setting. As told to the other reviewer, Manuel Rigo, the problem is that we needed to start from a complex and not every-day clinical usage system such as the AUSCAN System because we needed to have a three-dimensional representation of many curves to look at and to develop an insight (such as this one) to be translated in the next future on everyday practice from a clinician point of view. In fact we are already working on x-rays and clinical exam to obtain the same results. It is stated in the text that we will have a paper on this as soon as possible. This aspect has been introduced also in the conclusion to better clarify this crucial point raised by both reviewers.

Descriptions of mathematical terms: we have done it as much as possible. The only point not modifiable was in the method section where the engineer development of the paper is explained. We also introduced new figures with the aim of better explaining the possible difficult points. If you need more explanations in the text, please tell us. In any case the word “Easy” refers to the final classification that should be understandable to clinicians, and so usable, while all actually existing 3-D classifications are not. We think that the concepts of Direction and Shift ARE easy, while Phase it is graphically, but also theoretically, once understood. Nevertheless some difficulties are not avoidable for clinicians, but we still believe that the paper would be “simplistic” for engineers, while it is “difficult” for clinicians.

The term Quasi-3D has been introduced according to Stoke (Stokes IA: Three-dimensional terminology of spinal deformity. A report presented to the Scoliosis Research Society by the Scoliosis Research Society Working Group on 3-D terminology of spinal deformity. Spine 1994, 19(2):236-248). I guess why you proposed this change, but the actual terminology require 3D.

We changed all the captions according to your suggestion. Now the captions all together should allow to understand per se the contents of the paper, so to let the reader clinician to understand more easily the results of the study.

**Minor essential revisions**

1. Fig.1. Cartesian system defined, caption changed and reference system explained in the figure.
2. Fig.2. Changed in figure 3 to allow the reader better understand first the normal spine. Cartesian system defined, caption changed and z axis introduced in the small photograph. Also in Figure 3 (now 2) the Cartesian system has been defined, the caption changed and the reference system explained.
3. Fig.4. Barycenter explained.
4. Fig.5. Done, as well as explained better in previous Figures.
5. Fig.7: sorry. More explanations introduced.
6. Tab.5: sorry again! Corrected. Moreover, introduced a new figure to explain the concept of minimum rectangle in which the Top View is inscribable. We also added new figures to explain the text.
7. Discussion point 1: explained through a new Figure.
8. Discussion point 2: eliminated: it referred to the low number of people in the normal sample. But all the last part of the paper had to be changed according to the other reviewer.
9. Discussion point 3: norms have been explained (the limits had already been explained in the methods section, but it was better to add an explanation here). Moreover, all normative data are explained in the numerical results section of each parameter Direction, Shift and Phase.

Finally: thank you very much, because we increased the quality of the paper thank to your efforts.