Reviewer’s report

Title:A shallow chest correlates with the aortic position in the normal spine: Features resembling those observed in structural scoliosis

Version:15 Date:12 August 2014

Reviewer:Richard Burwell

Reviewer’s report:

Minor Essential Revisions

The authors have addressed all the points raised in my Third Review, mostly satisfactorily.

1. The title now reflects the findings and discussion of this paper and an earlier paper by the authors (Reference 7).

2. In the text, the “shallow” chest is also referred to as a “flat” chest. Better to be consistent and use the word adopted in the title namely, “shallow”,

3. The 18 patients with right and left convex curves should be declared along with their levels in the Methods section. Was there anything unusual about the shallow chest or aortic position compared with patients having right curves?

4. In accordance with distortions of the normal spine, in using the word “confirmed” rather than “reported”, in the Abstract, page 2, line 4, the word “reported” should be replaced with “confirmed” – as no done in the body of the text.

5. In accordance with the anterior thoracic dimension and the lack of significant correlation with the Cobb angle and ribcage rotation angle of:
   a) the patients of Reference 7 with non-congenital in right thoracic scoliosis, and
   b) the paper under review,
   in the Background, page 4, para 2, line 4, the term “severity of thoracic curvature” should be deleted.

6. In connection with the “left aortic shift”, the authors respond:

“We think that the influence of right vertebral rotation, if any, is relatively minor, especially with regard to effects on the left side measurements using the rib head as a baseline measured the left-posterior direction. We agree with the reviewer that there may be a partial influence from the “right shift of the vertebra”, but we think that the main cause of the aortic position is the aortic left shift.”

The evidence does not allow a resolution of this controversy. This controversy should be declared by the authors.
Figure 3 is similar to Figure 5 of Reference 7 for preoperative non-congenital spines. It would help the readers’ understanding by being referred to this Figure of Reference 7.

7. In the Conclusions (repeating the Discussion page 10, para 1, last 4 lines), it is written:

“The findings support the hypothesis that a flat chest and aortic left shift are causal factors for AIS.”

The paper under review relates to the “normal” spines with Cobb angles of 10 degrees or less. In my opinion a more justified conclusion, would be:

“The findings support the interpretation that a shallow chest and aortic left shift are associated with the initiation process of small thoracic curvatures and possibly also of right thoracic AIS. These factors may not be causal for right thoracic AIS.”

At present, this is a “safer” interpretation because the shallow chest may result from hypokyphosis/thoracic lordosis, and the left aortic shift from being mostly relative to the rib head on the curve concavity. for a right thoracic AIS is rotating to the right with the apical vertebra.

In general, the factors determining scoliosis curve progression may be different from those initiating the curve. We speculated on this thirty years ago introducing the concepts of “Erect functional curves” and a “Scoliogenic lesion” Burwell RG et al. Anthropometric studies of normal and scoliotic children. In Jacobs R (Ed.) Pathogenesis of idiopathic scoliosis. Chicago, Illinois, USA, Scoliosis Research Society, 1984 pp 27-44).

8. In stating “correlations” where appropriate it should be declared that they are a “significant correlation” or “significantly correlated”, not just “correlation” or “correlated.

9. In the Results section, the symbol for Spearman rank correlation coefficient is not \( r \) but \( \rho \), usually represented by the Greek letter.

10. In the Results section, after the plus/minus signs, are the figures standard deviations or standard errors?

11. In the Legend to Figure 5, last line, the Spearman rank correlation coefficient is missing.

12. In Reference 6, second line, “teh” should read “the”.

1. Is the question posed by the authors new and well defined? Yes
2. Are the methods appropriate and well described, and are sufficient details provided to replicate the work? Yes
3. Are the data sound and well controlled? Yes
4. Does the manuscript adhere to the relevant standards for reporting and data deposition? Mostly.
5. Are the discussion and conclusions well balanced and adequately supported by the data? Mostly.
6. Do the title and abstract accurately convey what has been found? Mostly
7. Is the writing acceptable? Yes

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 declare that I have no competing interests'