Author's response to reviews

Title: Surgical and conservative treatment of patients with congenital scoliosis: A search for long-term results

Authors:

Angelos Kaspiris (angkaspiris@hotmail.com)
Theodoros B Grivas (grivastb@vodafone.net.gr)
Hans-Rudolf Weiss (hr.weiss@skoliose-dr-weiss.com)
Deborah Turnbull (Deborahturnbull@nhs.net)

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To reviewer 3

Dear Professor Konstantinos Soultanis,

We would like to thank you that you accept revising our paper with title: “Surgical and conservative treatment of patients with congenital scoliosis: A search for long term results”. I enclose you a recent submission of the above mentioned paper. Furthermore, the corrections in our manuscript according to your suggestions are as follows:

1. Page 3, line 1: “late complications” has been replaced by “early and late complications are also described”.

2. Page 15, line 8: the phrase “in the posterior 2 and 3” has been corrected in “posterior two thirds”.

3. Page 12, line 10: We pinpoint the fact that the study of Thompson et al is referring to surgically treated patients “Thompson et al reviewed thirty patients after surgical intervention of which 16 male and 14 female”. Details about the surgery is given at the table 1.

4. Page 15, 16: the terms VEPTR (Vertical Expandable Prosthetic Titanium Rib), VC (Vital Capacity), SIR (Scoliosis International Rehabilitation) and ATR (Angle of Trunk Rotation) are clarified in the text according to your advice. Moreover, we analyse the terms FVC (Forced Vital Capacity), FEV (Forced Expiratory Volume), TLC (Total Lung Capacity) and VC at page 11, line 14 as well.

5. The “Physiotherapy” as a treatment has been omitted from the figure legends.

6. We accept that the presentation of the figures is a little confusing. They have been revised many times by the authors according to others reviewers suggestions. The inconsistency between the block of figures and their legends has been corrected according your guides. We cite the figures and their captions respectively, as follows:
Figure 1. Progression after early operation for severe hemivertebra at the age of 6 years.

After surgical intervention at the age of 6 years, there was a significant progression of scoliosis (60 to 90 degrees) and kyphosis as well at the last follow-up at the age of 11 years, the patient still being premenarchial.

Figure 2. No progression in a patient with 26° thoracic and 21° lumbar and failure of formation from the age of 10 (premenarchial) to the age of 14 (2 years postmenarchial). No cosmetic difference at the age of 10 (left Formetric® surface scan), at the age of 12 (right Formetric® surface scan) and at the age of 14 years at Risser 3-4 (clinical pictures on the right), when treatment and observation stopped. Although the clinical pictures and scans cannot be compared well, when looking at the outline of the figures no change in lateral deviation is visible.

Figure 3. No progression in a patient with nearly 26° thoracic and 21° lumbar and failure of formation from the age of 10 (premenarchial) to the age of 14 (2 years postmenarchial). At 10 years, a girl with congenital scoliosis had 26° thoracic and 20° lumbar as can be seen on the left (the same as she had at the age of 8), at 12 years (middle) she had 22 /25° and at the end of treatment at the age of 14 (right) she had 22° thoracic and 20° lumbar. She has been treated conservatively; however even without treatment, she would have overcome the pubertal growth spurt without significant progression.
Figure 4. Congenital scoliosis due to failure of formation with a follow-up of 13 years to Risser 4 under conservative treatment.
Patient with failure of formation and curve 52 degrees at the lumbar spine at the age of 18 months. The patient had not cosmetic complaints. A small lumbar hump is visible but the patient, finally, does not appear any signs of decompensation.

Figure 5. Congenital scoliosis due to failure of formation with a follow-up of 13 years to Risser 4 under conservative treatment with a brace.
Patient with failure of formation and curve 52 degrees at the lumbar spine at the age of 18 months when brace treatment started. The three rows of x-rays show the complete radiological follow-up:
- During the first five years of treatment (first row), the curve has been successfully reduced from 52° (first row left) to 46° (first row middle) at the age of 3.6 years to 40° (first row right) at the age of seven.

- Between the age seven to 11 (second row of x-rays) there is no real difference in the follow-up x-rays and the in-brace x-ray (second row on the right) at the age of 11 shows no big correction.

- At 13 years progression back to 50° appeared (third row on the left) and the new brace showed only little in-brace correction (third row middle left). The last brace was made at the age of nearly 16 years at Risser 4, when the curve had progressed to 58° after loss of compliance (third row on the middle right). In-brace x-ray showed no real correction in the mature boy (third row on the right).

Figure 6. Patient with failure of segmentation without decompensation due to conservative treatment
This 18 years old girl presented at the age of 10, with progressive congenital scoliosis with rib synostosis due to failure of segmentation. The patient has denied surgery. During the last follow – up, the clinical appearance demonstrates that a severe decompensation as had to be expected has been prevented. The radiograph demonstrates a curve of 72°. VC was 650 ml, 19% of the predicted value.
Figure 7. Patient with failure of segmentation with clinical and radiological improvement due to conservative treatment
This 15 years old boy presented at the age of 9, with congenital scoliosis with rib synostosis due to failure of segmentation, before entering the pubertal growth spurt. During his last follow – up, his clinical appearance demonstrates a severe deformity. The radiographs demonstrate a scoliotic curve of 59 degrees with Risser sign 4. VC was 1.640 ml, 33% of the predicted value.

We appreciated your guidance very much and speaking on behalf of all the authors, we would like to express our grateful for your valuable co-operation.

I am looking forward to hearing from you soon.

With respect

Dr Angelos Kaspiris MD, MPhil