Author’s response to reviews

Title: Effectiveness of Schroth exercises during bracing in adolescent idiopathic scoliosis: results from a preliminary study - SOSORT Award 2017 Winner

Authors:

Kenny Kwan (kyhkwan@hku.hk)
Aldous Cheng (aldousccs@yahoo.com.hk)
Hui Yu Koh (huiyu.koh@gmail.com)
Alice Chiu (chiuyy@ha.org.hk)
Kenneth Cheung (cheungmc@hku.hk)

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Author’s response to reviews:

Theodoros B. Grivas, MD PhD,
Editor,
Scoliosis and Spinal Disorders.

Dear Dr Grivas,

The authors would like to thank you and the reviewers for reading our manuscript and the valuable comments to improve it. We believe this study is worthy of publication to improve our understanding on the use of scoliosis specific exercises, and add to the growing evidence in the literature of its value in the conservative treatment of adolescent idiopathic scoliosis.

We hope you and the reviewers will find our revised manuscript acceptable and worthy of publication. We look forward to your favourable reply.
Please find the revision as detailed below:

Reviewer #1

Comment 1:
I enjoyed reading a manuscript regarding Schroth training adding to brace treatment.

Response 1:
The authors would like to thank the reviewer for the time and comments.

Comment 2:
According to the SRS brace study standardizing criteria, Risser sign should be 0-2 and Cobb angle should be 25-40.

Response 2:
The statement in has been changed accordingly. However, during this study and in our usual clinical practice, Risser sign and the Distal Radius Ulna Classification were both taken into account when deciding to commence bracing. Hence, a proportion of these patients had a Risser sign of 3, but were deemed immature by the DRU scale. We have clarified the inclusion criteria and changed to the following:

“skeletal immaturity (defined on the Risser scale[12] as 0-2 inclusively or R6 U5 score or below on the Distal Radius Ulna Classification[13]), a Cobb angle for the largest curve of 25 to 40 degrees[14]”

Comment 3:
Were the experimental group followed until their skeletal maturity? Follow-up period of the two groups were too much different.

Response 3:
At the time of analysis, all patients had a follow-up of at least 12 months in the experimental group. However, the control group was a historical cohort only matched for their baseline characteristics but not follow-up period, these patients may have completed bracing already. We acknowledge this was a limitation of the nature of this study. However, the authors felt that this was a reasonable comparison, as the only difference in intervention between the two groups was the addition of Schroth training.

We have added the following paragraph in the Discussion section to highlight this limitation:

“However, there was a difference in the follow-up period between the two groups. At the time of analysis, all patients in the experimental group had a minimum of 12 month follow-up, but some patients in the historical cohort had already completed treatment. Nonetheless, we felt this cohort provided a reasonable control since the only difference in intervention between the groups was the addition of Schroth training.”

Comment 4:

Outcomes of non-compliant patients seem to be worse than the historical control. Were they non-compliant for the brace treatment as well?

The authors thank the reviewer for pointing this out as a potential confounding factor. We analysed our database and added the following to the Results and Discussion sections of the manuscript:

Results section

“Brace compliance was rated as good in 70.8% in the experimental group and 79.2% in the historical cohort group. In the experimental group, 66.9% of patients who were compliant to the Schroth exercises had good bracing compliance, whereas only 63.6% of those who were non-compliant to the exercises had good bracing compliance.”

Discussion section

“However, the outcomes of non-compliant patients were slight worse than the historical cohort, which might partly due to a worse compliance to brace treatment in this group.”
“Thirdly, although brace compliance between the two groups was comparable, sub-analysis based on exercise compliance found difference in brace compliance between the groups and historical control. Hence, these results should be interpreted with caution.”

Reviewer #2

Comment 1:

In Europe, the tradition was to never prescribe a brace without physiotherapy associated. Thanks to the authors for adding the evidence to the experience.

Response 1:

The authors thank the reviewer for the information and time to review our manuscript.

Comment 2:

My first comment concerns terminology. The SOSORT board chose the acronym PSSE (Physiotherapy Scoliosis Specific Exercises) in preference to SSE to emphasize that these exercises are part of a global medical rehabilitation program and are carried out in the medical and non-sporting field for example. It would be desirable to use the same terminology.

Response 2:

The authors agree with the reviewer to follow a uniform terminology, and have changed all the acronyms from SSE to PSSE.

Comment 3:

My second point concerns the Schroth method. The exercises of Schroth were already practiced in Europe 200 years ago. The current Schroth standard has evolved a lot since you quoted Lehnert Schroth's book (8) and I think it would be interesting to illustrate the exercises by figures adapted to a specific type of scoliosis.
Response 3:
The authors agree with the reviewer. We have therefore included a figure to illustrate the types of exercises to a specific curve type in our experimental group for illustration. Please see Figure 2.

Comment 4:
SRS criteria for bracing are primary curve angles 25 degrees - 40 degrees. You may explain why you changed that criterion to 25 to 50 degrees.

Response 4:
This is similar to the concern of Reviewer 1 (Comment 2), and we have responded as above.

Comment 5:
Can you also illustrate with a figure the brace you use?

Response 5:
The authors thank the reviewer for this suggestion, and an example of our rigid underam orthosis is added as Figure 1.

Comment 6:
The follow up of the two groups is very different and varies from single to double. Often the initial good results of conservative treatment decrease over time. It would be desirable for the evidence of the results to be evaluated in both groups at the same time after fitting the brace.

Response 6:
This is similar to the concern of Reviewer 1 (Comment 3) and we have responded as above.

Comment 7:
The percentage of thoracic scoliosis is significantly higher in the control group (33.3% vs 20.8%), but these curvatures are often more rigid than the thoracolumbar and lumbar curves.

Response 7:
The authors thank the reviewer for pointing this out. Every effort has been taken to make the two groups compatible in terms of age, gender and curve magnitude, but we do agree that the curve types may also contribute to a difference in outcomes, and is a limitation of our study.

Comment 8:

Although many papers support a correlation between correction during treatment and outcome, it should be cautious in interpreting angular and cosmetic results during treatment.

Response 8:

The authors agree with this statement, and hence radiographic measurements, angle of trunk rotation, and SRS-22 were reported as separate outcomes.

We hope you will find the above responses and revisions acceptable, and look forward to hearing from you.

Yours sincerely,

Kenny Kwan

On behalf of all authors