Reviewer’s report

Title: RESULTS OF ULTRASOUND-ASSISTED BRACE CASTING FOR ADOLESCENT IDIOPATHIC SCOLIOSIS

Version: 0 Date: 01 Feb 2017

Reviewer: M S Wong

Reviewer's report:

In general, this manuscript has been well prepared and the following suggestions are for further improvements.

Page 5

Paragraph 1 "Background" Line 5

Regarding the long term effects of untreated AIS curves, the authors only addressed the back pain. Pulmonary dysfunction and other complications should be mentioned as well.

Paragraph 1 "Background" Line 9-15

Prognostic model of brace treatment outcome is an outstanding model to show the combined effect of brace usage in terms of quantity and quality. However the results of that study were all extracted from a single center and the quality of brace design in that unique clinic might be consistent; it would be promising to increase the number of orthotic centers to facilitate the generalization of the results.

Page 6

Paragraph 1 Line 4

"Radiographs are not used during brace design and construction to minimize radiation exposure …" It is suggested to replace verb (taken) with (used) as still the pre-brace X-ray is considered as a reference for orthotist to design the brace accordingly, but as authors mentioned no further X-ray will be taken during the construction procedure.
Orthotists in this study were aligned with the same scoliosis program to provide similar brace design for this study participants. As authors previously mentioned (Page 5, Paragraph 1 Line 18 "The in-brace correction may be affected by the brace design and spinal flexibility."); how did the investigators control the parameter of "flexibility" in control and experimental groups?

Providence frame is originally designed to apply the forces to trunk to move the spine toward the midline or beyond the midline. What was the routine practice of orthotists in that clinic?

More elaboration on CAD/CAM scanning of the hardened plaster cast after removal can better clarify the application procedure.

Application of a custom Providence standing frame for the intervention group compared to supine Providence frame in the control group raises the question regarding the implementation of two totally different approaches. Neglecting the effect of gravitational forces in brace design of control group might be one of the reasons for different results and necessity of further adjustments as mentioned by authors in the result section.

"The procedure of [altering bolster location and pressure] were repeated until the orthotist attained the best simulated in-brace correction configuration." Shall the authors explain on number of arrangement altering and the definition of "best simulated in-brace configuration"? Did they consider the same amount of target threshold of in-brace correction in follow-up clinic (50%) for the simulated US in-brace measurement, as well?
What is the justification for selection of these specific pressure levels for air bags (60-75 and 90 mmHg) among wide-range of available quantities?

Page 9

Paragraph 2 "First Follow-up Clinic" Line 3
The target threshold of in-brace Cobb correction of 50% may not be applicable to some cases with more rigid curves.

Page 10

Paragraph 2 Line 3
Typo for P-value as it is mentioned "0.0.22".

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