Reviewer's report

**Title:** SEAS (Scientific Exercises Approach to Scoliosis): a modern and effective evidence based approach to physiotherapic specific scoliosis exercises

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**Reviewer:** Marian H. Wade

**Reviewer's report:**

Because the authors at long last included references with this manuscript, this reviewer was finally able to make an independent assessment of the authors’ claims regarding the scientific evidence that supposedly supports widespread use of the SEAS method during all phases of conservative scoliosis treatment. What I uncovered was a grave disappointment. In reviewing each statement the authors make with regard to the purported results of the published studies, the only fact that becomes clear, repeatedly, is the falsehood of the authors’ claims. Misleading statements abound from the first sentence, in which a few cited articles become "many," articles that were put forth by one or more of the authors themselves become "found," and modest findings become "essential results." The claims that the SEAS exercises "are efficient in halting the progression of curves and reducing the rate of brace prescriptions" are not only demonstrably false; if published, they would constitute dangerous dissemination of false hope and misinformation to patients in the care of members of our community. Without exception, every statement the authors make in this section can be shown to be false when contrasted with the results delineated in the actual published articles. For example (here, the editors and authors must excuse me if I am unable to cite articles numerically according to the reference page provided, as it is clear that the numbers assigned to the articles do not coincide with the topics discussed in the paper): 1) With regard to the claim about halting curve progression: a careful reading of the J Rehabil Med 2008 article reveals that the rate of curve progression in the SEAS group (11.8%) was statistically indistinguishable from the rate of progression reported in the "Usual Physiotherapy" group (13.9%). As has been borne out by many other studies of exercise treatment of scoliosis, claims can honestly be made about an amelioration of curvatures that is observed more in the treatment groups than would be expected to occur spontaneously, but this claim should never be confused with the very different claim of preventing progression. (The authors can also make limited claims as to the directions or trends in the data, but they must state that the findings did not reach statistical significance where indicated.) To be on sturdy ground regarding the type of treatment known from scientific studies to actually prevent progression, one would need to turn to the prescription of braces -- yet here, the authors misleadingly (and, in the opinion of this reviewer, criminally) suggest that SEAS exercises can be employed to reduce the rate of brace prescriptions. In actuality, the authors themselves admit, in the context of the same article, that the outcome measure of reduced brace prescriptions is problematic, because...
instead of being grounded objectively in predetermined clinical criteria, such as rate of progression or Cobb angle, it is only based on such subjective individual factors as physician or patient fears or preferences. The authors' claim of a "statistically significant difference in the failure of treatment between those treated with SEAS exercises and those who followed different exercise programs" is specifically refuted in the results section of the Scoliosis journal April 2009 paper, which clearly states, with regard to the findings, that "the Chi-square test failed because some groups were too small." The claim the SEAS group having "better results" than the control group is also misleading: in the Scoliosis April 2009 article, it was actually the OTH, or "other exercises" group, that was the only subgroup (i.e., not the SEAS group) to be found on a statistically significant basis to be different in outcome from a control group. This is the same article from which the authors claim that SEAS had "efficacy in reducing the loss of correction connected" to brace weaning, where again, no significant effect was actually found, and where the group involved with "usual" physiotherapy exercise trumped the SEAS group. Finally, from the carefully worded claim by the authors that the SEAS exercises effect "the ability to control the progression of evolutive curvature in the adult patient," it is deceptively unclear that the study they refer to has an N of one subject! So, in answer to some of the questions posed: the Results in Scientific Literature section of the paper is NOT well reasoned, is NOT relatively balanced, and DOES, MOST DEFINITELY make plain where the authors' opinions might not represent the field as a whole (or, I should add, the best interests of the patients treated by professionals in the field). In addition, despite the certificate from a proofreading and editing agency that the authors included as an attachment, the standard of writing of the paper as a whole is still not acceptable, because it is long-winded, wordy, and often awkwardly phrased in English.

Major Compulsory Revisions: 1) The entire "Results in the scientific literature" section must either be changed drastically, to reflect the much more modest truth that can ethically be gleaned from the cited studies (i.e., the SEAS exercises are better at inducing an amelioration in scoliotic curvatures than would be expected to occur spontaneously), or otherwise excised completely from the manuscript. Any claims regarding the SEAS ability to reasonably (i.e., based on scientific findings) be substituted for brace prescription must be expunged from the article as a matter of ethical principle. I can see publishing this paper ONLY if all the false claims regarding the scientific underpinnings of the SEAS method are taken out, and if the paper is presented simply as a clinical method, without the unwarranted claims. Minor Essential Revisions: All references to scientific literature must be numbered correctly. Pronouns should be standardized; I recommend using "she," since most AIS patients are girls. References to "exercises" in the article currently refer to both autocorrections and to activities of daily living that serve as distractions; in order to avoid confusion, the latter should be referred to as "activities" instead of as exercises. The part concerning the first question, regarding being relaxed vs. active, is contradictory as written and confusing; this needs clarification. The entire paper needs to be more concise and better organized.
Discretionary revisions: It could be made clearer where the "Scientific" from "SEAS" comes from, in terms of motor learning theory, etc. Not to be confused with scientific findings regarding SEAS efficacies!

Level of interest: An article whose findings are important to those with closely related research interests

Quality of written English: Not suitable for publication unless extensively edited

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.