

Peer Review File

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Reviewer Comments

General Comments

In this paper, Cong, et al. measure cardiorespiratory function in adolescent idiopathic scoliosis subjects and correlate these findings with quality of life as measured by the SRS-22 questionnaire. The methodology and measures are clear, the paper is well written, the findings are novel and add to our understanding of how AIS impacts patient lives. I don't have any substantial concerns but I do have several recommendations to improve the manuscript.

Introduction

Comment 1: There is a reference that is not numbered in line 62. A recent report from Thomen et al in PLOSOne (<https://doi.org/10.1371/journal.pone.0240265>) quantified gas surface exchange area in scoliosis subjects compared to controls. That would appear relevant to this study.

Reply: This reference has been cited in Line 59.

Changes in the text: Line 59

Methods

Comment 2: Was the written informed consent from the participants or from parents/guardians?

Reply: Written informed consent was obtained from all the individual participants or their guardians.

Changes in the text: Line 80

Comment 3: Was this clinical trial registered?

Reply: This was a retrospective study and was not registered.

Changes in the text: none.

Comment 4: I'm unclear if there are specific measures for hyper-kyphosis and hyperlordosis. If so, providing those parameters might be useful.

Reply: Thank you very much for your comments. Both hyper-kyphosis and hyperlordosis were defined according to the Cobbe angle of kyphosis calculated with a radiograph. Hyper-kyphosis is defined as the Cobb angle of kyphosis, calculated from a lateral radiograph using T4 and T12 as landmarks, is 40° or more. Hyper lordosis is defined as the Cobb angle of kyphosis, calculated from a lateral radiograph using L1 and S1 as landmarks, is more than 60°.

Changes in the text: Lines 83-85.

Comment 5: Unnumbered reference in line 88

Reply: We apologize for the mistake. Reference has been cited.

Changes in the text: Line 89.

Comment 6: Was the questionnaire completed after the exercise test? If not, moving this description before the exercise test might make this more clear.

Reply: Thank you very much for your comments. The questionnaire was completed after the exercise test.

Changes in the text: Line 101.

Results

Comment 7: Line 134, I am not sure what oxygen pulse means.

Reply: Oxygen pulse refers to the ratio of oxygen uptake to heart rate, reflecting the amount of oxygen extracted per heart beat. Oxygen pulse at peak oxygen uptake was shown.

Changes in the text: Line 97, Table 1.

Comment 8: A schematic describing the different steps and measurements of the exercise test would be helpful.

Reply: Thank you very much for your comments. The requested schematic has been added as new Figure 1.

Changes in the text: New Figure 1.

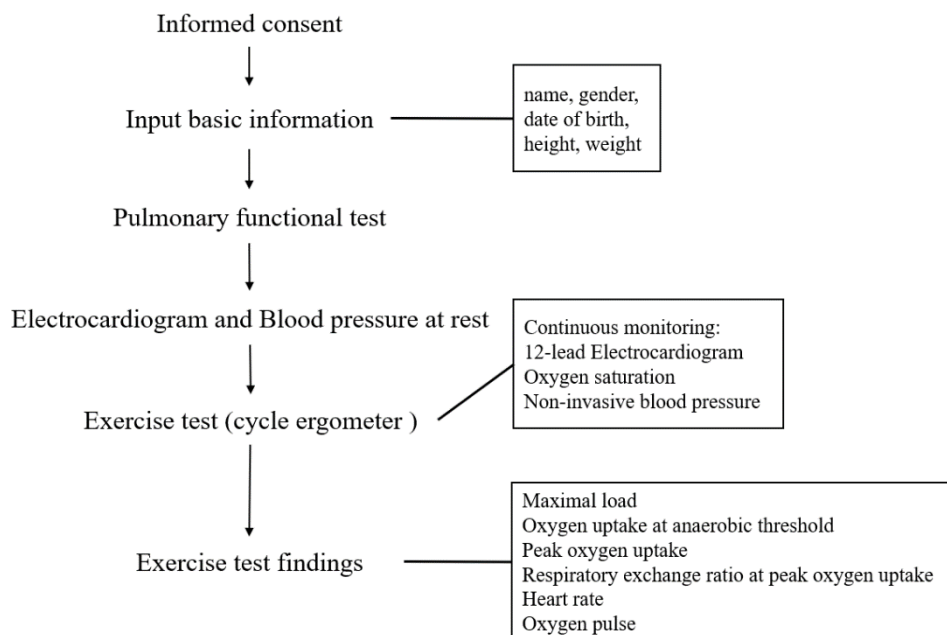


Figure 1 Flowchart of the exercise test.

Comment 9: It would be good to provide the correlative data in males in addition to females, even if not significant.

Reply: Thank you very much for your comments. The requested information has been added in Table 3.

Changes in the text: Table 3.

Comment 10: Did degree of spinal curvature correlate with cardiorespiratory parameters? If not, a simple line in the text would suffice as other variables might make this correlation insignificant, but one might hypothesize that worsened curvature correlated with worsened cardiorespiratory function.

Reply: Thank you very much for your comments. They were not correlated. We added this information in the Results section

Changes in the text: Lines 136-137

Discussion

Comment 11: I would add a sentence at the end of discussion summarizing how your major finding has addressed the described gap in knowledge.

Reply: Thank you very much for your comments. The requested sentence has been added.

Changes in the text: Lines 240-241.

Comment 12: Some sort of statement acknowledging the co-variant nature of mental health, physical conditioning, pain, and greater degrees of spine curvature is warranted. The authors state that exercise will improve quality of life, but perhaps pain or poorer mental health would need to be addressed first.

Reply: Thank you very much for your comments. We have added some information in the Discussion section.

Changes in the text: Lines 220-223.