Reviewer’s report

Title: High-impact exercise in adulthood and vertebral dimensions in midlife - the Northern Finland Birth Cohort 1966 Study

Version: 0 Date: 16 Jul 2017

Reviewer: Feitong Wu

Reviewer's report:

This is a well-written paper, but I have a few comments regarding the analyses and interpretation of findings.

1. Statistical analysis, although authors stated sex-specific analyses were performed due to difference in outcome and exposure, a further analysis of the interaction between sex and physical activity is needed to actually provide statistical evidence.

2. Statistical analysis, it is not clear how the confounders were selected.

3. Statistical analysis, normality was not checked for CSA, and there was no information about descriptive analyses.

4. Why did not you adjust for BMI at age 31?

5. Can you provide reference for why "sports with <30 participants were excluded……"? also, you did analyse Gymnastics though only 29 men were participants at age 31.

6. How did you deal with missing data?

7. Page 14, line 29-39, authors speculated that the negative association between gymnastics and CSA could be explained by that a lower intensity exercise could be misclassified into gymnastics. does that mean a lower intensity exercise could have a detrimental effect on CSA?

8. What is the clinical meaning of the effect size, for example, the beta coefficient of 4.2 for combined physical activity in women?

9. Figure 3, it is quite tricky for the opposite association between physical activity at year 31 and 46 with CSA in men. did you check the association between physical activity at year 31 and 46? a weak and negative correlation?

10. The model might be very complex when you included all individual sports at both time points. I understand this was to exclude the confounding effect, but did you try adjusting for the impact score instead, which represents the overall high impact exercise and simplifies the model. only a suggestion.
Are the methods appropriate and well described?
If not, please specify what is required in your comments to the authors.

No

Does the work include the necessary controls?
If not, please specify which controls are required in your comments to the authors.

Yes

Are the conclusions drawn adequately supported by the data shown?
If not, please explain in your comments to the authors.

Yes

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If an additional statistical review is recommended, please specify what aspects require further assessment in your comments to the editors.

I am able to assess the statistics

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