Author’s response to reviews

Title: Cross-sectional area of the paraspinal muscles and its association with muscle strength among fighter pilots: A 5-year follow-up

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Version: 2 Date: 02 Oct 2018

Author’s response to reviews:

Dear Editor,

We have now revised our manuscript according to the reviewer’s and editorial’s comments. We found them justified and thus, we feel that the modifications improved the quality and clarity of the manuscript. I hope that these corrections will now fulfil your concerns and you see the revised paper worth of publishing in BMC Musculoskeletal Disorders. Below you will find detailed responses to all comments.

Sincerely,

Tuomas Honkanen, MSc.

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Reviewer #1 General Comments

This is an interesting study, assessing the longitudinal changes (5-yr follow up) in paraspinal and psoas muscle mass (by cross-sectional area, CSA) and composition in young Finnish Air Force fighter pilots. This paper contains new data in this context, clearly indicating that CSA of paraspinal muscles in young fighter pilots increased significantly during the first 5-yr period of their career. Also, authors demonstrated that the CSA of paraspinal and psoas muscles correlated positively with isometric maximal strength of leg extensor muscles and also with strength of trunk flexor and extensor muscles. No significant association between low-back pain and CSA of paraspinal or psoas muscles has been suggested in this study. The manuscript is generally well written. However, the design of this paper should be little improved before publishing. Authors should be to correct description of trunk muscle strength measurement; also Tables 2, 3 and 4 (see Specific comments).

RESPONSE: Thank you for valuable comments. In the revised version, we have responded to all your comments and modified the text according to your suggestions. We hope these modifications (see below, for Specific Comments) now fulfil your concerns.

Reviewer #1 Specific Comments

Abstract (Page 2): Please add information about subjects measured (gender, mean age at baseline).

RESPONSE: In the revised manuscript, the information about subjects (gender and mean age at the baseline) is now added to Abstract (page 2).

Methods (Page 9 line 208): Please add information about the duration of a single trial, and duration of rest interval between two maximal isometric trunk flexion and extension strength measurement trials performed.

RESPONSE: In the revised manuscript, the information about the duration of a single trial and duration of rest interval between two maximal isometric trunk flexion and extension strength measurements is now added (page 9, the end of the second paragraph).

Methods (Page 10 line 244): Please add (± SD) after standard deviations...
RESPONSE: The (± SD) is now added after standard deviations according to your suggestion.

Results (Page 12 line 288) (Table 2): Please rephrase this Table as follows: Longitudinal changes of CSA (cm²) of the paraspinal and psoas muscles (mean ± SD), and line 289: Please delete „Baseline”, „Follow-up and Pa) from this line and replace these terms on lines 290 and 291, deleting CSA (cm²).

RESPONSE: In the revised manuscript, both page 12 (line 288 and 289) corrections mentioned above have been done according to your suggestion.

Line 300: Please add abbreviations: R, right; L. Left.

RESPONSE: We have now modified the table and added the abbreviations according to your suggestion.

Page 13 line 311 (Table 3) and Page 14 (Table 4) Please rephrase the Tables as follows: Correlations (r) between. Please use r instead of CC as correlation coefficient (r is classic term) in Table 3 and Table 4.

RESPONSE: In the revised manuscript, we have modified the sentence accordingly and the correlations are referred as r instead of CC.

Discussion (Page 18 lines 440-442) Please delete sentence indicating the interarater reliability for CSA, because this is also indicated in Methods (Pages 17 to 18, lines 180-183).

RESPONSE: The sentence (mentioned above) is now deleted in the revised version of the manuscript.

Reviewer #2 General Comments

This study aims to investigate muscle CSA and composition of the psoas and paraspinal muscles among Finnish Air Force fighter pilots. The paper is interesting and could - if better motivated - be relevant and important in aviation medicine area. However, it presently lack information on why data in CSA is important and why not simply strength testing is enough. Further, reliability in their methods is discussed but nothing about its validity! Information on hypothesis (or not) is absent.
RESPONSE: Thank you for your remarks, which we found justified. Hopefully these responses will fulfil your concerns. In the revised version, we have responded to all your comments and modified the text according to your suggestions. You can find the point-by-point comments on your general and specific comments below.

The authors need to discuss why data in CSA is important and why not simply strength testing is enough (the rationale)

RESPONSE: We truly agree with your valuable comment that we need to discuss why data in CSA is important. In the revised version, we have now payed attention to discuss about the rationale. You will find this in the end of the last paragraph of the Background -section (starting with: Prevention of pilots…)

They need to discuss validity in their methods

RESPONSE: Thank you for your valuable comment. In the revised version of the manuscript the validity of MRI method is discussed in the end of the third paragraph on page 8 (starting with: The MRI measurement…)

Their sample is young; they need to discuss why increased CSA, due to flight exposure, could not be the issue in any such young sample

RESPONSE: Thank you for another valuable comment. In the revised version of the manuscript we have discussed why increased CSA is not due to flight exposure. In the end of the second paragraph of discussion (starting with: Moreover, the anti G…)

They found that CSA did not differ in healthy vs. LBP, but suggest this should be further studied. Why not discuss that muscle strength may not be important, particularly since this was found?

RESPONSE: Thank you for your constructive advice. We have now modified the discussion and the suggestion of further studies is now edited (starting with: Moreover, because the association…)

Reviewer #2 Specific Comments

- Conclusion-abstract: New findings appear around the LBP in the conclusion..
RESPONSE: In the revised manuscript, the finding around the LBP is now presented already on the results. (Last sentence of the Results -section of Abstract)

- There is a clear description on statistical analyses - very good

RESPONSE: Thank you for your comment.

- Avoid +/- symbol for standard deviation (SD) since SD is not an interval (this is a common error in journal-text). Put SD-values in brackets.

RESPONSE: We have now modified text in the methods and the results sections (including tables). The (SD) values are now in brackets and the ± -symbols are not used before numbers.

- Why do they use SD in presenting their results, use 95% Cis

RESPONSE: Thank you again for your valuable comment. The SD was chosen because the statistician we had used found it valid for presenting the results. Moreover, we found that SD was used in the previous similar articles (of the journal) and, therefore, we found it proper method for presenting the results.

- Results, third para: Do not say it is "..smaller CSA .." when it is not statistically significant.

RESPONSE: In the revised manuscript, we have deleted the sentence accordingly.