**Author's response to reviews**

**Title:** Will the age of peak ultra-marathon performance increase with increasing race duration?

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**Author's response to reviews:**

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BMC Sports Science, Medicine and Rehabilitation  
Editor  
Prof. Stuart Goodall

Dear Prof. Goodall

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Will the age of peak ultra-marathon performance increase with increasing race duration?

We thank you for your e-mail from August 20, 2014.

Find below the answers to the questions raised by the reviewers.

All changes are marked in red in the revised manuscript.

We hope the revised manuscript will be suitable for publication in BMC Sports Science, Medicine and Rehabilitation.
Yours sincerely,

Beat Knechtle

Enclosure: Manuscript via central website

EDITORIAL REQUIREMENTS:

*Acknowledgements: We strongly encourage you to include an Acknowledgements section between the Authors? contributions section and Reference list. Please acknowledge anyone who contributed towards the study by making substantial contributions to conception, design, acquisition of data, or analysis and interpretation of data, or who was involved in drafting the manuscript or revising it critically for important intellectual content, but who does not meet the criteria for authorship. Please also include their source(s) of funding. Please also acknowledge anyone who contributed materials essential for the study.

Authors should obtain permission to acknowledge from all those mentioned in the Acknowledgements. Please list the source(s) of funding for the study, for each author, and for the manuscript preparation in the acknowledgements section. Authors must describe the role of the funding body, if any, in study design; in the collection, analysis, and interpretation of data; in the writing of the manuscript; and in the decision to submit the manuscript for publication.

Answer: We have no acknowledgements

*We note that the figures have been included in the manuscript file. Please upload the figures as separate figure files using the "upload" form on the submission system only, and delete the figure from the manuscript file. The figure file should not include the title (e.g. Figure 1... etc.) or the figure number. The legend and title should be part of the manuscript file, given after the reference list. Please ensure that the order in which your figures are cited is the same as the order in which they are provided. Every figure must be cited in the text, using Arabic numerals. Please do not use ranges when listing figures. For more information, see the instructions for authors: http://www.biomedcentral.com/info/ifora/figures

Answer: Figures are now uploaded separately

Reviewer's report

Title: Will the age of peak ultra-marathon performance increase with increasing race duration?

Version: 1

Date: 14 July 2014

Reviewer: Jonathon Senefeld
Reviewer's report:

Comments to Authors

This study accessed public data to describe how age- and sex-related performance of the ultra-marathon changed in duration-limited races from 6 hours to 10 days. The central purpose of this study was to test the hypothesis that the age of peak ultra-marathon performance would increase with longer duration races. Although the authors have a straightforward central question, the approach of the manuscript encompasses a breadth of data that is disconnected from the stated purpose of the manuscript. Overall, the manuscript is not systematic in developing the question or demonstrating the results; however, this is a result of superfluous text and can be rectified. Below, there are several comments intended to improve the quality and impact of the manuscript. The comments are written by section for clarity.

Discretionary Revisions:

General comments:

1) Examining the age of ultra-marathon runners in years across the history of an event in years requires careful wording in order to maintain clarity of the text, it may be helpful to ascribe the phrase “years” to a person’s age and “years of competition” to the history of an event.

Answer: We agree with the expert reviewer and changed throughout the manuscript as suggested.

Background:

2) The last sentence in paragraph 2 is unclear. Consider adding a phrase to the effect of “no changes across years of competition” for clarity.

Answer: We agree with the expert reviewer and changed as suggested

Tables and Figures

3) It may be useful to highlight the significant P-values in tables by using bold font.

Answer: We agree with the expert reviewer and added a * to the significant p-values and inserted ‘* = significantly different’ in the table caption

4) Consider removal of figure 2 or figure 3- both figures represent quite similar messages.

Answer: We agree with the expert reviewer and deleted figure 3

Minor Essential Revisions:

General comments:

5) Consider revision of sentences that use the same word with different suffixes. (E.g. performance increase with increasing race duration)
Answer: We agree with the expert reviewer and changed throughout the manuscript.

6) The authors conclude that the age of ~40-50 years seems to be optimal for ultra-marathon performance (e.g., abstract and discussion); however, in the last paragraph of the results the authors demonstrate the ages of the fastest men and women began at 35 years for race durations observed in this study. Given this is, in part, the answer to the question proposed in the title, it seems misleading to suggest that optimal performance is between 40-50 years.

Answer: We fully agree with the expert reviewer and the comparison of the ages of the ten fastest women and men ever shows differences between the sexes. We therefore change the conclusion in the abstract to ‘For the fastest women ever in time-limited race between 1975 and 2012, the lowest age was in 10 d (~37 yrs) and highest in 48 hrs (~46 yrs). For men, the ten fastest in 6 hrs (~35 yrs) and 12 hrs (~37 yrs) were younger than the ten fastest in 72 hrs (~48 yrs), 6 d (~48 yrs) and 10 d (~48 yrs). The differences in the age of peak performance between the sexes for the different race durations need further investigations’

Background:

7) In paragraph 3, there is a brief discussion regarding the change in the age of the annual fastest swimmers of the Manhattan Island Marathon swim across several years of competition which distracts from the main purpose of the introduction and paper. Please remove this text.

Answer: We agree with the expert reviewer and deleted that text.

Results:

8) The second paragraph of the results regarding the number of events across the years of analysis does not add to the message of the manuscript. Consider removing this paragraph and figure 1.

Answer: We agree with the expert reviewer and deleted the paragraph and the figure.

9) In paragraph 4 of the results, the first sentence is vague. Revise and include, in detail, the distribution that is being referenced.

Answer: We agree with the expert reviewer and changed that section to ‘Figure 4 presents the distribution if athletes ranked in specific age groups. In 6 hours to 48 hours, the highest number of athletes was recorded in age group 45-49 years for both women and men. For longer races, the distribution was different. In 72 hours, the highest number of women was recorded in age group 45-49 years and the highest number of men in age group 50-54 years. In 6 days, the highest number of athletes was in age group 45-49 years for women and 40-44 years for men. For 10 days, the number of recorded athletes was highest in the age group 40-44 years for women and 35-39 years for men’

10) In paragraph 7 (of the results), please include that this text is referring to the first fastest women and men; otherwise this text seems contradictory to the following paragraph regarding the top 10 women and men.
Answer: We agree with the expert reviewer and changed as requested.

Discussion:
11) The first section of the discussion “increase in events and finishers” is not considered in the three points referencing the ‘important findings’ of the manuscript and this data distracts from the intent of the manuscript. Removal of this text would improve clarity of the discussion.
Answer: We agree with the expert reviewer and deleted that text

Major Compulsory Revisions:

Background:
12) General comment regarding the background section- this section could be stated more concisely. Information regarding changes in performance across different years of competition and specific distances of triathlons that are simply a factor of the Olympic distance (e.g., triple) is superfluous. Please modify.
Answer: We agree with the expert reviewer and deleted that text

Methods:
13) Although it is explicitly written that in the text are given as mean ± SD, there seems to be no reference to the presentation of data in the figures and tables in the manuscript text or legends. Please include.
Answer: We agree with the expert reviewer and added ‘Results are presented as mean ± SD’ for the table captions

Results:
14) Paragraph 5 and the next several paragraphs begin with a sentence that should appear as a legend for the respective figures, rather than the introduction to a paragraph.
Answer: We agree with the expert reviewer and changed as requested.

Discussion:
15) The 5th paragraph of the discussion comparing findings from the 12- and 24-hour races in Switzerland with previous results from Hoffman and Wegelin should be revised. This paragraph compares age of peak performances in a set of races (12- and 24-hour) with the average age of all participants from a different race. The comparison being made is not clear. Please clarify or remove text.
Answer: We agree with the expert reviewer and deleted that section

16) The text regarding the physiology of aging and determinants of aerobic performance is a nice addition to the discussion; however, the authors do not clearly link this text to the discussion. Please clearly link this text to the discussion; I think this discussion is valuable. Particularly because ‘a loss of muscle fibers begins at the age of ~50’ this corresponds to the upper limit of the age of peak performances in ultra-marathons demonstrated in this manuscript.
Answer: We agree with the expert reviewer and deleted that section.

Tables and Figures
17) The central question and title of the paper- “will the age of peak ultra-marathon performance increase with increasing race duration?”- is not represented well in the figures. The title and purpose allude to a graphical comparison of race duration and age of the best performers- which is not present. Please include a graph to this effect.

Answer: We agree with the expert reviewer and deleted the actual figure 9 and replaced it by a better figure showing the comparisons between the different race durations for age and running speed of the ten fastest ever.

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

Quality of written English: Acceptable.

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.

Reviewer’s report
Title: Will the age of peak ultra-marathon performance increase with increasing race duration?
Version: 1
Date: 16 August 2014
Reviewer: Tom W Bauer
Reviewer’s report:
Major Revisions:
I recommend the authors check their use of Km and miles. For example, the work of Hoffman is described as 161 mile ultra-marathons, but in fact Hoffman studies 100 mile ultra-marathons (about 161 Km). I find at least 3 of these errors in the Discussion.

Answer: We agree with the expert reviewer and changed as suggested.

Discretionary Revisions:
In this manuscript the authors have used data of timed ultra-running events to
investigate the hypothesis that the age of peak ultra-marathon performance increases with increasing race distance. The results showed maximum performance in the early 40’s for both men and women at most distances. The analysis of data and the figures seem sound and will be of interest to some readers. The authors may wish to consider the following comments:

1. Some of the text devoted to the results could be condensed since the data is well-displayed in the figures.

Answer: We agree with the expert reviewer and condensed the results as suggested.

2. Importantly, the authors studies time-limited ultramarathons, races that are usually run on tracks or on track-like setting. The results may not apply to distance limited races, such as 50-mile and especially 100-mile ultra-marathons that are often on trails with significantly more elevation gain and loss than time-limited event. The top finishers in difficult 100-mile trail ultramarathons are now frequently in their 20’s.

Answer: We agree with the expert reviewer and inserted this aspect in the limitations and inserted some appropriate races as references.

3. The manuscript is relatively long. It could easily be reduced in length by deleting the text in the Discussion that simply repeats the Results. Similarly, the rather long text that speculates on the reasons for decreasing performance over age 50 seems out of place.

Answer: We agree with the expert reviewer and reduced the discussion to the essential.

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

Quality of written English: Acceptable

Statistical review: Yes, but I do not feel adequately qualified to assess the statistics.

Declaration of competing interests: I declare that I have no competing interests.