Reviewer's report

Title: The effects of hypoxia on muscle deoxygenation and recruitment in the flexor digitorum superficialis during submaximal intermittent handgrip exercise

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Reviewer: Tadej Debevec

Reviewer's report:

The study by Nell et al. examined the acute effects of submaximal intermittent handgrip exercise under normoxic and normobaric hypoxic conditions on oxygenation and muscle activation of flexor digitorum superficialis muscles in healthy adult males. The results seem to indicate that hypoxia induces greater deoxygenation and also lowers recorded mean power frequency during the submaximal intermittent handgrip exercise. The paper is reasonably well written and the results clearly presented. It also fits the scope of the journal and might provide valuable addition to the literature. There are however some issues, as outlined below, that need to be properly addressed by the authors.

MAJOR

Generally, I found the manuscript to suffer from excessive use of acronyms (in all sections). While I appreciate that this might be warranted in the abstract (albeit even in the abstract the reader has a hard time to follow the flow) I would suggest to seriously reduce the acronym usage for the benefit of prospective readers.

Since the authors opted to employ normobaric vs. hypobaric hypoxia this needs to be emphasized as these two should not be used interchangeably and significant physiological differences between the two have previously been demonstrated (c.f. PMID: 22267386; PMID: 22895381)

It would seem beneficial to also discuss the applied value of the obtained results for altitude sports/ physical exercise (e.g. climbing & mountaineering) in the concluding part of the manuscript.
MINOR

Page 3 - Line 7 "...and compare...

Page 4 - Lines 6-8. However, exercise might be beneficial for redox balance equilibrium in such scenarios (c.f. PMID: 28243207)

Page 4 - Line 11 - Would suggest to use either "acute hypoxic exposures" or "acute exposure to hypoxia" throughout the manuscript.

Page 4 - Line 32 - "12% oxygen hypoxia" the wording is cumbersome. Would suggest to standardize it to something like hypoxia (FiO2 = 0.12) or similar...

Page 4 - The authors should also discuss some other pertinent previous studies on this topic where applicable (c.f. PMID:17453233)

Page 4 - Line 51 - remove "those"

Page 5 - Exclusion criteria - Were the participants checked for prior altitude exposure? If not why not and if yes this should be noted in the manuscript.

Page 5 - Line 11. Please add the ethics approval number.

Page 5 - Were the researchers blinded regarding the testing conditions and if so, how?

Page 5 - Line 20. - The employed protocol for pulmonary testing should be reported.

Page 5 - Lines 29-31 - The authors should also report PiO2's for the designated conditions

Page 5 - Lines 37-38 - Methodology of the cardio-respiratory monitoring is missing (device etc..)

Did the authors check that the 10-min lead in period was sufficient to stabilize the SpO2 & SmO2 under nomobaric hypoxic condition?

Are the authors sure that the MVC protocol performed prior to the first trial did not affect the results (as compared to the no MVC protocol prior to the second trial)?

Page 6 - Line 44 - in the methods section the authors state that 24 individuals were recruited.

Page 7 - Lines 33-36 - This sentence needs to be reworded (previous).

Page 7 - Line 46 - "normoxic HGE"
Page 8 - Lines 14-23 - Is this surprising? One cannot directly compare the mean SmO2 and SpO2 values. It is well established that exercise (especially isometric) can provoke profound reductions in muscle O2 content (i.e. oxygenation) and moreover that systemic (de)oxygenation as reflected in SpO2 has a negligible effect on intramuscular PO2.

Page 8 - Lines 41-43 - I agree, that this is a limitation of the NIRS technology. However, is this really pertinent in this scenario? How much myoglobin vs hemoglobin there is when assessing flexor digitorum superficialis oxygenation??

Page 8 - Line 53-54 - Again this is not surprising....

Page 8 - Would suggest to remove the following concluding sentence: Further work needs to be completed to examine the dose (time, intensity) of hypoxic exertion that results in a training effect and the thresholds that induce muscle injury or atrophy.

Figure 2 - Legend - "... difference between conditions..."

**Are the methods appropriate and well described?**
If not, please specify what is required in your comments to the authors.

Yes

**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

**Are you able to assess any statistics in the manuscript or would you recommend an additional statistical review?**
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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Please indicate the quality of language in the manuscript:

Acceptable
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