Reviewer’s report

Title: Neuromuscular shoulder activity during exercises with different combinations of stable and unstable weight mass

Version: 1  Date: 24 Nov 2019

Reviewer: Scott Heinlein

Reviewer's report:

I appreciate the work that went into the design of this study and its data collection, but I have reservations about publication without some major revision work.

1- Can the s-EMG placements be verified to be on the desired muscles without doing specific muscle testing to verify this? I'm not certain that a single movement MVIC with the isokinetic device is enough to verify the accurate EMG placements.

2-Leads to second problem of high variability of muscle activity across pretty much all the measurements on the tables. Is this a placement issue or a math issue?

3-It would seem logical that higher weight would produce higher muscle activity. It would also seem obvious that an unsteady weight would be still higher activity. When the subjects were able to choose a "constant-moderate exercise velocity” the variability in the timing could have been a stabilizing factor for the unsteady weight. Even using the instruction of "~3sec for each contraction mode" allows for variation timing. Perhaps as high as 0.5 seconds faster or slower, which is a large percentage (16-32%) difference in time, and could therefore be a large difference in speed/unsteady load perturbation.

4- Why in the section (Line 354) do you use the term "neuromuscular activation"? What is different about "muscle activation” as measured by the s-EMG and "neuromuscular activation?" Please clarify your use of the terms.

LINE EDITS AS FOLLOW

Line 35 should read "analyze" not analyzed.

Line 95 should read "kneeling", not kneeling.

Line 161 delete comma between "test"and "that"

Line 163 should specify the use of surface EMG ("s-EMG-electrodes")

Line 177 Change "firstly" to "initially"
By shoulder-extension and arm-extension, do you mean "elevation?" Please clarify as "extension" is a sagittal plane movement for the shoulder.

Delete "better."

Change "at first attempt" to "on first attempt."

Should read "...roughened with sandpaper to remove surface epithelial layers, and disinfected."

Delete "which were triggered by" and substitute "...using visual inspection by..."

Delete the letter "t" between "for" and "shoulder"

"then" should be "than"

Delete comma between "P" and "in all muscles..."

Delete comma between "muscles" and "in".

Delete "reported" and use "registered."

Change "being" to 'which was'

Page 18 Tables - These tables show a very large variability in measurements based on the large standard deviation values, sometimes greater than the base numbers. This is especially concerning given the small sample size (n=16). What is the suspected cause in the large variability? Could this have been caused by s-EMG inaccuracy?

Reword to say "from a lower to higher demand training condition."

The speed of movement would have had an effect. Water movement would be greatest at change of direction (transitions) of movements. Could the movement speed have been better controlled for with the use of a metronome to set a specific pace to be sure that all subjects kept a more accurate pace.

Change "decrement" to "decrease."

Change "contributed" to contribute."

Reverse word order to balance sentence structure "internal/external rotation will decrease lower trapezius activation."

Delete space between "is" and "the"

Change "effects" to effect."
Line 450 Delete "the" before "scapula."

Line 453 Delete "an."

Line 461 Change "independently" to "independent."

Line 469-470 is very awkwardly worded. Please rewrite this sentence to not have double-negative wording, which is very confusing.

Line 480 Change "clearly stated if" to "assumed that."

Line 492 "scapula orientation" implies that you have measured scapular position during the testing, although this is not defined or explained anywhere else.

Line 493 Choose either "weight" or "mass," but not both as it appears redundant.

Line 495 You write that "the ratio of the muscle acting on the scapular orientation (SR)...," but the scapular ratio applies to muscle activity, not scapular orientation of the scapula. Suggest correcting by dropping the word "orientation" from the manuscript altogether.

Line 497 Change "therapists should..." to "therapists can..."

Line 499 Choose either "weight" or "mass," but not both as it appears redundant.

**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.

No

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

Unable to assess

**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 recommend additional statistical review
Quality of written English
Please indicate the quality of language in the manuscript:

Needs some language corrections before being published

Declaration of competing interests
Please complete a declaration of competing interests, considering the following questions:

1. Have you in the past five years received reimbursements, fees, funding, or salary from an organisation that may in any way gain or lose financially from the publication of this manuscript, either now or in the future?

2. Do you hold any stocks or shares in an organisation that may in any way gain or lose financially from the publication of this manuscript, either now or in the future?

3. Do you hold or are you currently applying for any patents relating to the content of the manuscript?

4. Have you received reimbursements, fees, funding, or salary from an organisation that holds or has applied for patents relating to the content of the manuscript?

5. Do you have any other financial competing interests?

6. Do you have any non-financial competing interests in relation to this paper?

If you can answer no to all of the above, write 'I declare that I have no competing interests' below. If your reply is yes to any, please give details below.

I declare that I have no competing interests.

I agree to the open peer review policy of the journal. I understand that my name will be included on my report to the authors and, if the manuscript is accepted for publication, my named report including any attachments I upload will be posted on the website along with the authors' responses. I agree for my report to be made available under an Open Access Creative Commons CC-BY license (http://creativecommons.org/licenses/by/4.0/). I understand that any comments which I do not wish to be included in my named report can be included as confidential comments to the editors, which will not be published.

I agree to the open peer review policy of the journal.