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Manuscript NO: 29485 entitled “Neuromuscular trunk activation patterns in healthy and back pain patients during one-handed lifting”

Dear Reviewers,

Thank you very much indeed for all your helpful comments, which we all accounted for the 1st revision of our manuscript. As requested, we wish to provide some explanations and comments on all the points you raised (revised paragraphs are marked in the manuscript with red letters).

Response to Reviewer #1 (Reviewer’s code: 01220036):

Minor remarks

1. needs language correction

A native speaker revised the whole manuscript.

Response to Reviewer #2 :

Minor remarks:

The authors investigated EMG of back muscles of people with or without back pain when they underwent one handed lift task. The methods were clear, and the results were easy to imagine and understand.

1. The aim of this study was not clear.

The aim of the study is to compare the neuromuscular activation pattern of healthy controls and back pain patients during daylike lifting tasks in order to define a possible diagnostic tool as well as an

adequate therapy and/or prevention strategies for back pain patients. To point this out more clearly, the following has been added:

“Consequently, this trunk muscle activation analysis could help define adequate therapy and/or prevention strategies for back pain.”

2. It would help to understand the data if the authors showed the way of obtaining the “bars” of figure 2. It was assumed that waves of EMG was measured and modified to “bars” of figure 2.

Fig. 2 represents the mean±SD values of root mean square (RMS) calculations for the four muscle groups and not of the EMG-waves. Root mean square was calculated for each muscle over the whole lifting cycle (beginning with grasping of weight from the ground till put down onto the table) and afterwards averaged for the 3 muscles per muscle group.

The following was added to be more precise: “In addition, the mean (normalized) EMG-RMS for muscle groups was calculated and therefore averaged of the EMG-RMS of the three single muscles per group...”

3. Figure 2. Was statistical analysis applied? If so, characters were absent to show statistical significance.

As reported, student’s t-test was applied to all outcome measures to account for differences between H and BPP. However, during EMG-RMS analysis, no statistically significant group differences could be found (regardless of weight) as presented in the results part and leading to display of no statistical significance in Fig. 2. Therefore, we would stay with this figure and add no changes.

4. If the authors added how to apply their data or conclusions to daily life or clinical practice, this manuscript would add more values.

Application of results into clinical practice and/or daily life leads to the conclusion that therapy of back pain should consist of preparation of adequate compensation of high loading situations. In addition, the results imply that the clinical application of lifting tasks in the way we used it, is not sufficient to distinguish the neuromuscular activation pattern between healthy and BPP. Moreover, the results imply that an overall reduced performance capacity in BPP leads to the task failure shown and therefore additional diagnostics are recommended, e.g. strength assessment, in back pain patients to deliver individual therapy regimes.

The following parts are added to the discussion part:

“...Moreover, the results imply that an overall reduced performance capacity in BPP leads to task failure. Therefore, additional diagnostics are recommended, e.g. strength assessment, to deliver individual therapy regimes. “

“Consequently, the application additional diagnostics are recommended, e.g. strength assessment. Moreover, rehabilitation and prevention of back pain should focus on the preparation and compensation of high loading.”

If you have further questions, please do not hesitate to contact us,

Best regards

A handwritten signature in blue ink, appearing to read 'J. Müller', with a long horizontal flourish extending to the right.

Juliane Mueller (corresponding author; thormei@uni-potsdam.de) on behalf of all listed authors.