Author’s response to reviews

Title: How Shoulder Immobilization Influences Daily Physical Activity – An Accelerometer Based Preliminary Study

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Author’s response to reviews:

Response to Associate editor:

1.1. “General: The paper needs language and structural editing (e.g. consistent use of abbreviations and statistical indicators) before it could be considered for publication. Examples are lines 69-80 with multiple formatting errors (reference format, punctuation, and clarity of language such as the apparently arbitrary use of “physical activity” and “activity” or “therapy” and “rehabilitation”). This list of short-comings is not exhaustive and the authors need to edit the whole text on their own.

A1.1. We apologize the formatting errors and confusion about different terms of “activity”. We screened the whole document and edited it accordingly.

1.2. How about the upper extremity, can you give specific examples for the upper extremity?

A1.2. Line 36: Following reference is added: Maggio et al documented an activity-related energy expenditure (AEE) due to upper limb cast immobilization in children.
1.3. 44: You do not need to introduce abbreviations that are not used in the abstract after their introduction
A1.3. Thank you for your valuable suggestion. The abbreviation SAM is being cleared.

1.4. Lines 48 and after: please be consistent in the usage of statistical indicators such as the p-value, you introduce it for one outcome only and omit it for all other outcomes
A1.4. Thank you for your useful comment. We removed the p-value for gait cycles/day, because we have detailed information in the methods section about p-values of all outcomes.

1.5. Line 58: this statement is a bit strong, your results indicate this but this would still need to be verified – kindly rephrase.
A1.5. The phrase “can be expected” is rephrased to: “can potentially occur”

1.6. Line 107 – where were the participants recruited?
A1.6. The participants were recruited from fellow students.

1.7. Line 110 – kindly explain why people over 35 were excluded
A1.7. We excluded people over an age of 35 to achieve comparability of the results.

1.8. Line 140 – 148 kindly specify which questionnaires were used and provide them if they were self-made
A1.8. We apologize the lack of the two self-made questionnaires. They are added to the submitted revised manuscript.

1.9. Line 154 – what requirements were examined by the Kolmogorov-Smirnov test and which outcome variables were examined with each test for which reason?
A1.9. Following additions were made:

♦ Kolmogorov-Smirnov test (for age, gender and BMI)
t test for dependent samples (total gait cycles with/without SO, activity levels with/without SO)

Wilcoxon test for non-parametric distributions (activity level with/without SO)

Correlation test of Spearman/Pearson (activity level and total gait cycles)

1.10. Line 166 – kindly explain your handling of the missing data: was the data lost on one measurement session or multiple sessions?

A1.10. Data lost was on all sessions of one person.

1.11. Line 170 – this abbreviation seems to be missing from the abbreviation table

A1.11. We apologize the lack of the abbreviation “Totcyc”. We added the term to the abbreviation table

1.12. Line 171 – please be consistent with the number digits throughout the text

A1.12. We corrected the number.

1.13. Line 224-228 – without any information on the questionnaires (see comment above) this information is very hard to understand and interpret, if the questionnaires were self-made their validity might be an issue that should, at the very least, be elaborated on in the limitations section

A1.13. Thank you for your valuable comment. The questionnaires are added and an appropriate comment of the validity is inserted into the limitations section.

1.14. Line 244 – if this study is a pilot study, this needs to be declared beforehand (e.g. in the title, abstract and methodology), furthermore a study should only be declared a pilot study if its aim was to investigate feasibility, duration, cost, adverse events, and improve upon the study design prior to performance of a full-scale research project.

A1.14. Thank you for your useful suggestion. We added the term “pilot study” in the title
Response to Reviewer 1:

R1.1. In order to simulate the shoulder immobilization, joint orthosis is used. However, it is not clear how accurate this simulation is. In order to have a better understanding, the method should be applied on real patients after shoulder surgery.

A1.1. Thank you for your valuable comment. Currently we are doing a study with patients after having a shoulder surgery. The present study was only the pilot study to investigate the feasibility.

R1.2. The participants were asked to wear the orthosis for 10 hours on two consecutive days. I believe in order to have a more comprehensive study and results that can be generalized, the time frame should increase. Because the daily activity might come back to normal after the patient/participant gets used to his/her new body situation.

A1.2. Thank you for your valuable comment. Currently we are doing a study with patients after having a shoulder surgery, who are wearing the orthosis 24 hours/day for 6 weeks. The present study was only the pilot study to investigate the feasibility.

R1.3. Did you incorporate the participant's life style (based on the questioner) or gender for the t-test? In other words, did you use a one-way t-test or two-way? Please clarify it.

A1.3. For statistical analysis of participant’s lifestyle and gender a two-way t-test was used.

R1.4. The bar plots only show the average of the totcyc with and without shoulder orthosis. Please add sd to these plots. Is the activity level reduction varies across the subjects significantly?

A1.4. Thank you for your useful suggestion. We added sd to the plots.

Response to Reviewer 2:

R2.1. Despite the activity maybe the combination with sleepless nights due to orthosis and/or pain might also be taken in consideration for negative postoperative effects.

A2.1. Thank you for your valuable comment. We will think about adding this question into our questionnaire. Unfortunately we cannot investigate this in the present study.
R2.2 In the conclusion I would add a paragraph of 3 to 4 lines about maybe patient screening (who is the patient with the biggest loss of activity) and possible interventions for gaining more activity (ergometer/self-exercise program,...) to increase the clinical relevance of the data.

A2.2. Because of the homogeneous distribution of the data it is not possible to screen the maximum deviation.

In line 259-261 a paragraph is added.

R2.3. Line 43: Please specify „activity was measured“ - which variables did you document?

A2.3. “including gait cycles per minute and total gait cycles per day” is added.

R2.4. Line 44: What kind of questionnaire did you use - a standardized available or an individual questionnaire for this study

A2.4. We used an individual self-made questionnaire. We added the questionnaire to the manuscript.

R2.5. Line 48: Please mention the total number of gait cycles in both groups

A2.5. We added the total number of gait cycles of both groups: 5501.2 with SO, 7728.7 without SO

R2.6. Line 69-85: Please shorten - general knowledge is repeated here without focusing on the main topic.

A2.6. Thank you for your useful comment. We shortened this part of the manuscript.

R2.7. Line 97-98: The sentence does not clearly fit into the context - this is another interesting topic but in my eyes not related with general activity.

A2.7. Thank you for your comment. We took this sentence out.
R2.8. Line 140-148: Please explain the questionnaires more in detail or provide it as figure/supplement

A2.8. We apologize the lack of the two self-made questionnaires. They are added to the submitted revised manuscript.

R2.9. Line 243: You included young and healthy subjects - the concerning population in my eyes are rc patients with an average age of maybe 65 years. Why did you choose the young population? In the Hatta study the focussed on instability patient that are normally young and active. Please add as lim-itation.

A2.9. Currently we are doing a study with elderly patients after having a shoulder surgery (rc or arthro-plasty), who are wearing the orthosis 24 hours/day for 6 weeks. The present study was only the pi-lot study to investigate the feasibility. We added this as limitation.

R2.10. Also the measuring of „only“ two days should be mentioned as limitation as individual activity dif-ferences e.g. on one day might change the results significantly.

A2.10. See answer 2.9.

R2.11. Additionally the probands know that activity is measured - that might influence the activity in either one ore another way. Did you consider to measure e.f. 4 days an randomly choose twice 10 hours?

A2.11. Thank you for your valuable suggestion. We would consider this kind of measurement in the next study.