

PEER-REVIEW REPORT

Name of journal: World Journal of Orthopedics

Manuscript NO: 39110

Title: Acute effects of partial-body vibration in sitting position

Reviewer's code: 02444711

Reviewer's country: China

Science editor: Li-Jun Cui

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Review time: 2 Days

| SCIENTIFIC QUALITY | LANGUAGE QUALITY | CONCLUSION | PEER-REVIEWER STATEMENTS |
|--|--|--|---|
| <input type="checkbox"/> Grade A: Excellent | <input checked="" type="checkbox"/> Grade A: Priority publishing | <input type="checkbox"/> Accept | Peer-Review: |
| <input checked="" type="checkbox"/> Grade B: Very good | <input type="checkbox"/> Grade B: Minor language | (High priority) | <input checked="" type="checkbox"/> Anonymous |
| <input type="checkbox"/> Grade C: Good | polishing | <input type="checkbox"/> Accept | <input type="checkbox"/> Onymous |
| <input type="checkbox"/> Grade D: Fair | <input type="checkbox"/> Grade C: A great deal of | (General priority) | Peer-reviewer's expertise on the |
| <input type="checkbox"/> Grade E: Do not | language polishing | <input type="checkbox"/> Minor revision | topic of the manuscript: |
| publish | <input type="checkbox"/> Grade D: Rejection | <input checked="" type="checkbox"/> Major revision | <input type="checkbox"/> Advanced |
| | | <input type="checkbox"/> Rejection | <input type="checkbox"/> General |
| | | | <input type="checkbox"/> No expertise |
| | | | Conflicts-of-Interest: |
| | | | <input type="checkbox"/> Yes |
| | | | <input type="checkbox"/> No |

SPECIFIC COMMENTS TO AUTHORS

This study aimed to compare the acute effect of stochastic resonance (STOCH) and sinusoidal (SIN) partial-body vibration in sitting position on muscle activity, heart rate variability, balance and flexibility, which involved 50 healthy participants (33 females and 17 males). The novelty of this topic is good, as this topic is seldom reported, esp.



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vibration in sitting position.

Our answer: Thank you for this evaluation.

I have the following concerns: 1. This study aims to evaluate the acute effect of vibration. However, both Introduction and Discussion mentioned that the differences in training effectiveness between SIN and STOCH are likely to emerge after longer training periods. In this case, why did the authors target to study acute effect instead of long-term effect?

Our answer: Thank you for this point. The study of long-term effect will be the next important step in our research agenda. So far, the training was held on a prototype of a vibration platform which was tested in a single-case, but never on a larger sample before. Also, immediate effects of stochastic vibration in sitting position have not been tested before. To be sure that no side-effects emerge from stochastic vibration in sitting position on this device, immediate effects were tested first.

2. This study worked on the subjects in sitting position. Discussion also told that STOCH might be advantageous in deconditioned person, who suffer from frailty, Parkinson's disease, multiple sclerosis or after a stroke. However, the subjects recruited in this study were very young with mean age at 25.3. Why do the authors choose to study young and healthy subjects?

Our answer: Thank you for this point. We agree, the training of deconditioned individuals will be another important step in our research agenda. As immediate effects of stochastic vibration in sitting position have not been tested before, especially on this



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prototype device, we needed to make sure that stochastic vibration in sitting position did have the expected effect and that no negative side-effects emerge from one single vibration training in this study. If side-effects would have appeared in healthy people, the device would not be used on an unhealthy sample in the future. As we observed the intended effects, and side effects did not appear in healthy people in this study, this device could possibly be used with patients in future research.

3. In “Materials and Methods”, under “Participants”, it mentioned “Expecting a moderate effect size ($d=0.5$)....” I am curious how to propose the moderate effect size? Based on what?

Our answer: Thank you for this point. Indeed, we had no information on the size of the expected effect size. In this situation, it is rather common to use “moderate” as an expected effect size. Number of participants was calculated using G-power software^[1]. A moderate effect size was chosen as a standard in this calculation.

4. For the vibration training regime (five series of a one-minute vibration training), any reason to choose this training regime?

Our answer: Thank you for this point. We added an explanation of why we used this training regime. The training regime with five series of a one-minute vibration training was based more on empirical experience from other studies about stochastic vibration training [2, 3] than on scientific evidence, because the training parameters of stochastic vibration training show a wide range of applications that are not as well known as they are for strength or endurance training [4].

5. In “Materials and Methods”, under “Participants”, it directly described the demographic data of all the recruited subjects, which should belong to Results. Please kindly move to Results. Instead, Methods should tell the recruitment inclusion and exclusion criteria before recruitment, including age range, gender requirement, etc.

Our answer: Thank you, we moved the demographic data of the recruited subjects to Results. We also checked the Methods section and included recruitment inclusion and exclusion criteria before recruitment, including age range, gender requirement, etc.

6. For the recruitment criteria, did the authors consider level of routine exercise of the subjects? As exercise level affects the subjects’ muscle functions that may further influence the acute response, this may be a confounding factor.

Our answer: Thank you for this question. Participants were advised not to do any kind of exercise/sports 24 hours before the experiment. This advice was given because of a possible effect on heart-rate-variability. Nevertheless, an effect on muscle activity or other variables could be possible. Therefore, level of routine exercise (“Sport”) was also assessed. Table 1 shows no baseline differences in frequency of sport as a potential confounder for the two groups.

7. Also under “Participants”, it claims “due to technical problems during measurements, datasets of two participants were removed”. This looks vague. What are the exact technical problems?

Our answer: The exact technical problem was in both cases as followed: “EMG signals were forwarded from a transmitter (TeleMyoTM 2400T G2, Noraxon Inc. U.S.A., Velamed GmbH,



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Medizintechnik und Biomechanische Konzepte, Köln, Germany) to a receiver (TeleMyo™ 2400R Receiver, Noraxon Inc. U.S.A., Velamed GmbH, Medizintechnik und Biomechanische Konzepte, Köln, Germany), which transformed these digital signals into analogue outputs. For recording and processing the data, the software ADS (analog and digital signal processing ©, uk-labs, Kempen, Germany) was used.” Due to a broken cable, EMG measurements of two participants were not recorded. Therefore, these data sets were removed for data analysis. Thank you, we added an explanation of the exact technical problem.

8. In “Materials and Methods”, under “Statistical analysis”, one-tailed analysis was performed. As the effect of vibration training is not yet well proven, I do realize that two-tailed analysis is more appropriate. I wonder whether the significance will be different if two-tailed analysis is used.

Our answer: Thank you for this point. One-tailed analysis was performed because we had directional hypotheses. In order to justify the one-tailed test of directional hypotheses, we now refer to: Wonnacott, T. H., & Wonnacott, R. J. (1984). Introductory statistics for business and economics. New York: Wiley. Note that power calculations were also based on one-tailed significance tests based on directional hypotheses. Applying nondirectional omnibus hypotheses (“STOCH makes a change in XY”) would have resulted in the need of a larger sample.

9. Table 1 generally showed demographic data of all subjects and Results part claimed no significant difference of demographic characteristics between STOCH and SIN groups. But I realize that the demographic data of two separate groups should be presented but not a grouped data of all subjects. P values of demographic features between two groups should be presented too.



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Our answer: Thank you for this point. We show demographic characteristics of both groups independently in table 1. Furthermore, we added t-test values and p-levels for differences at baseline in this table.

INITIAL REVIEW OF THE MANUSCRIPT

Google Search:

- ☐ The same title
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- ☐ Plagiarism
- ☐ No

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- ☐ No

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Reviewer's code: 03067679

Reviewer's country: United States

Science editor: Li-Jun Cui

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| | | | <input type="checkbox"/> No expertise |
| | | | Conflicts-of-Interest: |
| | | | <input type="checkbox"/> Yes |
| | | | <input checked="" type="checkbox"/> No |

SPECIFIC COMMENTS TO AUTHORS

The overall concept of the manuscript is novel and has potential to contribute to the literature. The background and methods are well written and easy to follow.

Our answer: Thank you for this evaluation.



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Results: Given the lack of randomized sample, a comparison of the group descriptives is warranted. A baseline comparison should be performed.

Our answer: Thank you for this point. In the revised manuscript, we showed demographic characteristics of both groups independently in table 1 and also added t-test and p-levels for differences at baseline -in this table.

Given that the starting balance excursion of STOCH is 73.34 and SIN is 77.77; this difference between groups may influence the results. I recommend that Table 1 have a breakdown by Group assignment.

Our answer: Thank you for this point. In the revised manuscript, we showed results of both groups independently in Table 1.

There is no discussion of correlations in the results section, therefore Table 2 seems extraneous.

Our answer: We agree and deleted Table 2.

I question whether a paired t-test is more appropriate.

Our answer: Thank you. We agree. Indeed, we used a paired t-test. As is written in the paragraph "Statistical Analysis", we used a dependent t-test, also called paired t-test: "Muscle activity, HRV as well as balance and flexibility were analyzed in a dependent sample t-test to examine differences between baseline and training conditions." We also showed it in Table 3.



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Discussion: There is a disconnect between the treatment provided and the outcome measures performed. The treatment was performed in sitting for the novel idea that the treatment could benefit a person in a wheelchair, however, all outcomes are performed in the standing position with the exception of EMG. This disconnect needs to be addressed. Perhaps the testing is something that would be beneficial for a person temporarily in a wheelchair,

Our answer: Thank you. This is actually a very good point. We assumed that an increase in balance and flexibility, which were assessed in standing position, would also be present in people who are not able to stand (e.g. people in a wheelchair). This, however, is only an assumption. Therefore, your conclusion is right and we changed it to “this training is something that would be beneficial for a person temporarily in a wheelchair”.

although, any lasting effect of the treatment is not measured in this study.

Our answer: We are looking forward to doing a longitudinal analysis on this topic in the future.

Overall writing and study methods are well done. References are reasonable.

Our answer: Thank you!

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References

1. Faul, F., et al., *G* Power 3: A flexible statistical power analysis program for the social, behavioral, and biomedical sciences*. Behavior research methods, 2007. **39**(2): p. 175-191.
2. Elfering, A., et al., *Stochastic resonance whole-body vibration, musculoskeletal symptoms, and body balance: a worksite training study*. Safety and health at work, 2013. **4**(3): p. 149-155.
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