

August, 15, 2013

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Dear Prof. Peng, Editor-in-Chief

Thank you and both reviewers for your work. We agree to an anonymous publication of the peer reviewers' comments. Please find enclosed the edited manuscript in Word format (file name: EPSP 4072-revision 1508.doc).

**Title:** Acute Effects of Stochastic Resonance Whole Body Vibration

**Author:** Achim Elfering, Jasmin Zahno, Jan Taeymans, Angela Blasimann, Lorenz Radlinger

**Name of Journal:** *World Journal of Orthopedics*

**ESPS Manuscript NO:** 4072

The manuscript has been improved according to the suggestions of reviewers. Changes are highlighted:

1 Format has been updated, the ms has been proofread and corrected by a native speaker of English and should reach Grade A now.

2 Revision has been made according to the suggestions of the reviewer

1) Reviewer 1: It seems from the Introduction that there is already data available in literature showing that the SR-WBV technique is efficient at improving musculoskeletal function and at preventing musculoskeletal disorders. In my opinion, authors should therefore better justify why it is original and of particular interest to specifically focus an investigation on the effect of the SR-WBV technique on (one single) back muscle, namely the

Descending Trapezius. In other words, what is expected to be specific to that muscle's response to WBV? Why is it important to focus on that particular muscle (e. g. because it is particularly involved in office work, e.g. when typing on a computer) ? These justifications are important because it seems that this technique is a priori expected to mainly target those lower limb muscles involved in postural balance control, e.g. ankle musculature (as vibration is applied to the feet).

Our answer: Thank you for this point. Yes, there are a few paper on SR-WBV technique is efficient at improving musculoskeletal function but these studies did not measure actual change of physiological indicators in response to SR-WBV but focused on change in self-reported musculoskeletal pain across 4 to 8 weeks of training. Indeed, this is the only study on immediate short-term SR-WBV training effects that includes both, physiological indicators of musculoskeletal activation and self-reported change of musculoskeletal function. We now add this point to the introduction to better justify why the study is original. We also better justify why we chose the descending trapezius (Introduction). The descending trapezius is most frequently recommended to be studied and suggested to be the muscle that is often associated with reported pain in computer workers. A just recently published review (Hanvold et al., 2013) could show that sustained trapezius muscle activity is associated with neck and shoulder pain in young adults. We added:

Hanvold TN, Waersted M, Mengshoel AM, Bjertness E, Stigum A, Twisk J, Veiersted KJ. The effect of work-related sustained trapezius muscle activity on the development of neck and shoulder pain among young adults. *Scand J Work Environ Health* 2013;**39**:390-400 [PMID: 23494255 DOI:10.5271/sjweh.3357]

2) Reviewer 1 : In their conclusion, authors elaborated about the relationship between verum SR-WBV and "musculoskeletal activity". Now, one single muscle in the back was recorded in this study. Authors should therefore be cautious with the generalization of their results. In the same vein, authors stated in the abstract section that they aimed to investigate the preventive effects of this method against "musculoskeletal disorders". It seems that this preventive aspect was not specifically investigated in this study. Could this method be beneficially applied to any "musculoskeletal disorders" as it seems to be

implicitly stated?

Our answer: Thank you for this point. We agree and changed the text (Abstract -> Aim; Conclusion) accordingly. We are now more cautious with the generalization of our results. We also added this point to the limitations. The preventive effect was not investigated in this study and therefore we skipped that passage. We now are more cautious with respect to the potential benefit of SR-WBV. We did not intend to suggest SR-WBV to be beneficial for all "musculoskeletal disorders", we now changed the text accordingly. We would expect SR-WBV to be beneficial when neuromotor function is reduced or impaired as in many individuals suffering from nonspecific back pain. We expect no benefit of SR-WBV in infections, neoplasm, disc degeneration, herniated discs, or many forms of spinal instability.

3) Reviewer 1 :Authors proposed that the application of this technique to office workers (before during and after work) might be beneficial to prevent musculoskeletal diseases. However, it seems from the literature on ergonomics that one major problem for office workers is the excessive tension in low back and upper limb musculature. Therefore, it is not clear how a further increased activity in these muscles with WBV applications might be beneficial to this population. Wouldn't this population rather need methods to decrease the muscle activity (e.g. by adopting more appropriate postures and/or more appropriate office furniture)? Please clarify this aspect.

Our answer: Relaxation is deeper after muscles have been forced. Many relaxation techniques include this technique (e.g., progressive relaxation after Jacobson). So, to improve muscle relaxation in clerical workers with excessive stable tension in low back and upper limb musculature SRWBV is promising technique that induces relaxation after activation. We agree that more appropriate postures better office furniture should be addressed to avoid excessive muscle tension during work. We added these considerations to the discussion.

4) Reviewer 1 : I have some concerns about the way muscle relaxation was quantified, i.e. with self-reported questionnaires, while many objective physiological measures were taken (Page 9 Last paragraph of the Results section). Authors found that the EMG activity of the TD was greater with verum than with sham training. So, the differential of muscle activity with the rest baseline and therefore the perception of an effort, is greater in verum than in sham. Could this differential of effort perception simply explain why subjects reported that muscle relaxation was greater in verum than in sham training?

Our answer: Thank you for this point. With reference to the previous point we agree that perceived relaxation is deeper after muscles have been forced more in verum training including more effort to keep posture compared to sham training. Indeed, this is presumably the intended consequence of SR-WBV that muscle relaxation after verum training muscle activation is more pronounced than after sham training where muscle activation was lower as shown by EMG. We made a reference to the relaxation technique developed by Jacobson in response to this point:

Jacobson E. Progressive relaxation (2nd ed.). Chicago: University of Chicago Press, 1938

Thank you again for publishing our manuscript in the World Journal of Orthopedics.

Sincerely yours,

A handwritten signature in black ink that reads "Achim Elfering". The signature is written in a cursive, flowing style.

Achim Elfering, PhD