Author’s response to reviews

Title: Identification of the occurrence and pattern of sleep bruxism using EMG and accelerometer systems

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Author’s response to reviews:

Dr. Thomas Stamm
Head and Face Medicine – Editor-in-chief
Department of Orthodontics, University of Münster,
Münster, Germany
January. 8th, 2009
Dear Dr Stamm,

Thank you very much for your kind response to our manuscript (#: 1383687680209081). We greatly appreciate the comments of the editors and reviewers. The manuscript is much improved now that we have incorporated the revisions suggested by the three reviewers. The revisions are detailed on the enclosed sheet. Hopefully, the revised manuscript is now acceptable for publication in The Head and Face Medicine.

Yours sincerely,

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Reviewer Dr. Ulrich Meyer and Dr. Takahumi Kato
Comment 1: inclusion and exclusion criteria of the subjects
We have revised the paper with more detail.

Comment 2: Description of the subjects (eg, were they bruxer?)
We have revised the paper with more detail. Subjects were healthy, young post-graduate and dental college students who were not bruxers.

Comment 3: Calibration data of the use accelerometer when measuring jaw movement
We have revised the paper with more detail. We calculate coefficient calibration through calibration voltage and scale value (physical set value). We set both calibration voltage and scale value to terminus (point 2) and origin (point 1). We formulate first-degree equations. We procure inclinations and equations. We canceled offset voltage (DC component).

Comment 4: Purposes of the use of EEG and video (eg, no sleep data was presented)
We have revised the paper with more detail to show that the purpose of using EEG is to measure sleep stage and that the purpose of using infrared video cameras is to observe the mandibular and body movement. With video, we refine and improve the analytical judgments of our software.

Comment 5: Reasons for using 5% MVC criteria for detecting bruxism.
Various kinds of noises were eliminated from raw data. In the past, researchers have not been able to separate this noise from weak masseter muscle activity in the low muscle-activity range (5~20% MVC). This weak activity, thus, could not be included in analyses of bruxism. We can now include such episodes which have 5~20% MVC. We still cannot analyze low-level muscle activity (under 5% MVC), which is obscured by noise.

Comment 6: Validation data on the bruxism analyzing software
After setting up analyzing software, we checked the reactions through wakeful voluntary basic movement and video recorder data of all volunteers. Basic test movements were carried out for tapping, small-range right and left side grindings, wide-range right and left side grindings, maximum muscle contraction (MVC) clenching with and without slight lateral movement, protrusion-retrusion. Figure 3 indicates the coincidence of analyzing software reactions and voluntary wakeful jaw movements.

Comment 7 Actual number of motor event (before normalized as %)
The low-level muscle activity (under 5% MVC) was easily obscured by noise and muscle movements were too weak and too many to count.

Comment 8 Lack of statistical evaluation to validate the ACC analysis and to
assess physiological range?

One-way Anova and Tukey HSD test were used to establish significance for variables on the questionnaire based on each bruxism pattern’s activity recorded by bruxism analyzing software among three groups (grinding, clenching, tapping). P<0.05 was to be statistically significant. Therefore, we could confirm significant difference between grinding and tapping activities. The statistical analyses were carried out using the Statistical Package for SPSS (version 13.0).

Comment 9 Methodological information in results section, and repetition results in the discussion.

We have moved the methodological information to the results section and deleted the repeated text.

Reviewer Dr. Ales Celar

Comment 1 p2: BruxChecker is not widely known tool, therefore write: the prevalence of bruxism was studied adults using a custom made color-stained foil on the maxillary dentition overnight. This BruxChecker showed occlusal contacts where the color was ground off indicating a majority of subjects exhibiting sleep bruxism [9].

I changed sentences according to your comment.

Comment 2 p5: Accelerometer on the chin-did you make sure if there were any skin movement without any mandibular movement?

Accelerometers were fastened on the forehead as a reference and on the middle point of the chin concavity of the mandible with vinyl polysiloxane and adhesive material.

Comment 3 p5: Measurement of maximum voluntary contraction-how much time before the subjects went to sleep?

30 minutes before they went to sleep.

Comment 4 at least 3 clenches – did they clench into intercuspal position?

Yes they did.

Comment 5 Results: The first three sentences belong into the discussion. The fourth sentence should be: bruxism was assigned to three types: grinding, clenching, and tapping. this 4th sentences and the following ones until p8 “in the XY-axis” belong to “method”!

I changed the sentences according to your comment.

Comment6 p11: although the duration and events of clenching and grinding were not significantly different, the total muscle activities in clenching and grinding were (significantly?) different. Which are the statistically significant findings
Our study indicates that two types of bruxism were dominant, grinding and clenching. There was tendency that higher muscle activity was in grinding than that in clenching, especially in volunteers who brux strongly, although the length and events of clenching and grinding were not significantly different.

Comment7 p11: "1.6%mvc to 0.05%mvc." is absolutely unclear-parafunational movements are expected reach higher levels than maximum voluntary contraction.

I amended calculating process of %MVC. The modified %MVC range is 55.1±58.4 (%MVC).