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## 学 位 論 文 要 旨

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<p>論文題名 Study on masseter muscle activity during awake and sleep in relation to history of orofacial pain (口腔顔面痛の既往の有無と昼夜咬筋活動の関係に関する研究)</p>		
<p>論文内容の要旨 (2000字程度)</p> <p><b>Background</b> The relationship between mandibular parafunction and orofacial pain has not been established yet. To investigate the mechanism of clenching leads to orofacial pain, most of the previous studies conducted experimental clenching task to evoke pain and fatigue in healthy subject. However, this task may not be representative of patient behavior in normal environment. Moreover, the elimination of cross contamination from others facial activities especially speech activity to the masseter muscle EMG activity has not been performed so far. Therefore, the purpose of the present study was to perform a quantitative EMG examination during wakefulness and sleep to determine whether subjects with history of orofacial pain exhibited more tonic episodes (TEs) than the subjects without history of orofacial pain, using the analyzing system which eliminates the speech activity.</p> <p><b>Methods</b> Thirty-three students (11 men and 22 women; mean age, 23.9 ± 4.2 years) participated in this study. All subjects completed the Research Diagnostic Criteria for Temporomandibular Disorders (RDC/TMD) questionnaire. The subjects were divided into two groups which were the pain history group (PG) and non-pain history group (non-PG) based on the results of the RDC/TMD questionnaire. The study protocol was approved by the ethics committee of Okayama University (Ken 1508-003).</p> <p>EMG recordings of the left masseter muscle were performed using a portable EMG device. A voice-operated trigger switch (VOX) was used to distinguish EMG activity during speech. During data analysis, EMG signals regarded as speech activities, mastication during meals, and calibration were excluded from subsequent analysis. A TE of the masseter muscle was defined as continuous EMG activity higher than the threshold with a duration at least 2.0 s. The mean %MVC was calculated for each TE categories into &lt;7.5% MVC, 7.5%–10% MVC, 10%–15% MVC, 15%–25% MVC, 25%–40% MVC, and &gt;40% MVC. The incidence and total duration of sustained TE and short TE in two groups (PG and non-PG) then analyzed.</p>		

論文内容の要旨 (2000字程度)

### Results

The mean duration of TEs observed in non-PG awake and sleep was (mean  $\pm$  SD)  $4.64 \pm 4.50$  and  $5.10 \pm 5.62$ , respectively. According to this value, the cutoff for sustained TEs was defined as mean in non-PG + 2SD resulted the cutoff for sustained TE was 13.65 for awake, and 15.01 s for sleep. Subsequent analysis adopted 15 s as a cutoff for sustained TE, which was rounded-up value for wakefulness and sleep. We found that during awake, the incidence of sustained TEs was significantly higher in the PG compared with the non-PG. However, no significant difference observed between two groups during sleep.

Comparing the incidence and total duration of short and sustained TEs classified according to intensity level observed in PG and non-PG. During awake, no significant different observed for the incidence and total duration of short TE in two groups (PG and non-PG). However, the incidence and total duration of sustained TE were significantly higher and longer in PG than in non-PG for intensities of 7.5%–10% MVC, 10%–15% MVC, and 15%–25%MVC. No significant difference was observed during sleep between two groups with respect to the incidence and total duration of short TEs or sustained TEs.

### Discussion

Low-level clenching has been an issue of interest in relation to the etiology of TMD. However, study which investigate the properties of low-level clenching is limited. We found that sustained TE was predominantly in group with pain. These finding suggest that the longer duration of clenching may have a responsible to leads orofacial pain than clenching with shorter duration.

Our study analysis revealed that sustained TEs in the intensity range of 7.5%–25% MVC in the PG was observed significantly higher than in the non-PG. The influential range of the intensity of masseter muscle activity during wakefulness observed in this study is consistent with the previous study which were reported a shorted range of intensity (10%–15% MVC). These findings suggest that the intensity range of 7.5%–25% MVC would be suggested as an important range of interest in future low-level clenching studies.

Most of the low-level masseter muscle activity was observed during waking hours, which was consistent with our previous data. These findings on low-level muscle contraction could be explained if most of the parafunctional masticatory muscle activity was performed during waking hours.

### Conclusion

Our study revealed that sustained low-level TE of surface masseter muscle EMG activity may have a correlation with orofacial pain and we also suggest that a 15-s duration could work as cutoff for detecting sustained low-level tonic masseter muscle activity.