氏　　名	廣澤（ヒロサワ）　全紀（マサキ）
所　　属	人間健康科学研究科 人間健康科学専攻 理学療法科学域
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論文審査委員	主査　池田　由美 委員　金子　文成 委員　古川　順光

【論文の内容の要旨】

Neck muscle vibration (NMV) influences proprioceptive sensations and modulates standing postural orientation and spatial perception. However, the effects of NMV in healthy participants would vary based on the influence of stimulus duration and combination with trunk muscle vibration. Therefore, this study with a cross-over design clarified these effects. Twenty-four healthy participants (mean age, 25.7±3.7 years) were enrolled. To assess standing postural orientation, standing center-of-pressure (COP) measurements were recorded on a COP platform, starting with closed eyes and then with open eyes. The mean mediolateral (ML) and anteroposterior (AP) position [mm] of COP and other parameters were calculated. To assess spatial perception, subjective straight ahead (SSA) measurements were recorded, wherein participants were instructed to point and project the position of the manubrium of sternum on the touch panel using their right index finger with their eyes closed. Measurements were taken before and after four conditions: no vibration (control), left NMV for 30 s, left NMV for 10 min, and left NMV and left lumbar back vibration for 10 min. Vibratory stimulation was performed with the eyes closed at 80 Hz. The measurements under the four conditions were conducted with random cross-over and 5-min resting period between the conditions. COP and SSA values were subtracted before and after each condition for standardized variation and compared.

NMV combined with trunk muscle vibration for 10 min resulted in significant deviations of the ML-COP toward the stimulation side and AP-COP toward the anterior side compared to the control condition with closed eyes. SSA showed no significant differences. These findings suggest that NMV-induced nervous system modulation would be amplified by proprioceptive sensory input to trunk muscles. Therefore, this method could provide a new option for clinical trials on postural orientation using NMV. SSA based on proprioceptive sensation may not be biased without visual illusions.