Acute postural modulation of the soleus H-reflex after Achilles tendon vibration

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HIGHLIGHTS

- Soleus H-reflex was reported to be decreased when standing compared to sitting position.
- After prolonged Achilles tendon vibration, this postural modulation was increased.
- Those results are discussed in terms of changes in presynaptic inhibition.

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ABSTRACT

Alteration of Soleus (SOL) H-reflex has been reported after prolonged vibratory exposure and it was hypothesized that presynaptic inhibition, known to depress the H-reflex during vibration, largely contributed to the H-reflex changes. To confirm this hypothesis, the purpose of the present study was to quantify the SOL H-reflex changes between sitting and standing positions (postural modulation) with or without the after-effects of 1 h of Achilles tendon vibration. Indeed, postural modulation of the SOL H-reflex has been reported to inform on the level of presynaptic inhibition exerted on Ia afferents. SOL H-reflex and M waves were measured in healthy voluntary subjects in both sitting and standing positions before and after 1 h of Achilles vibration (frequency: 50 Hz) applied in sitting position (vibration group, n = 11) or before and after 1 h of sitting position only (control group, n = 6). SOL $H_{\text{max}}/M_{\text{max}}$ ratios were calculated. Furthermore, in order to quantify presynaptic inhibition induced by prolonged vibration, an index of SOL H-reflex postural modulation was calculated as the standing $H_{\text{max}}/M_{\text{max}}$ ratio relative to the sitting one. After 1 h of Achilles tendon vibration, a significant decrease in the SOL $H_{\text{max}}/M_{\text{max}}$ ratio was observed both in sitting and standing positions ($p < 0.05$). However, the decrease was more pronounced in the standing position, leading to a significant decrease of the index of SOL H-reflex postural modulation. Those results suggest that presynaptic inhibition could have largely contributed to the H-reflex decrease observed after one bout of vibration.

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