

Periodic limb movements in sleep is linked to decreased hippocampus and amygdala volume

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Objective: Potential alterations of brain morphology related to periodic limb movements in sleep (PLMS) have not yet been studied. Our aim was to explore MRI-assessed brain structure volumes in association with PLMS.

Methods: 190 subjects (57.0 ± 7.8 years, women: 50.5%) selected from the general population in the BiDirect study underwent a single-night polysomnography and high-resolution T1-weighted MRI. Standard criteria of the American Academy of Sleep Medicine were applied to evaluate sleep characteristics and to calculate the PLMS-index. MRI variables describing the thickness and volume of cortical segments and subcortical grey matter areas were determined. The independent relationship between each brain structure volume and PLMS-index was analysed with linear regression with adjustment for age, gender, BMI, and intracranial volume. The presence of depressive symptoms was measured with the Center for Epidemiological Studies Depression (CES-D) scale.

Results: Regression analyses indicated significant inverse associations of the PLMS-index with the size of the hippocampus (left and right hemisphere) and left amygdala. Given the prominent role of amygdala in emotional regulation, further analyses were conducted to explore the relationship of PLMS and depressive symptoms. The PLMS-index was positively associated with the CES-D score independent of antidepressant use, while the left amygdala volume was inversely related to the CES-D score.

Conclusion: Our results suggest an association between PLMS and decreased size of the hippocampus and amygdala. In addition, both amygdala volume and PLMS were related to depressive symptoms. The presented analyses are cross-sectional, therefore they do not provide evidence for a causal relationship between PLMS, altered brain morphology, and depressive symptoms. Furthermore, the findings are exploratory and need to be confirmed in other independent samples before drawing firm conclusions.