Inducing Cardiac-Locomotor Synchronization During Walking

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Purpose: We aimed to evaluate whether synchronization between cardiac and locomotor rhythms during walk results from an entrainment or occurs just by chance.

Method: Nine healthy men participated in this study. Each subject walked at the frequency of his heart rate on a treadmill. Synchrogram and histogram data during the walk were generated based on the electrocardiogram and foot switch signals. We also generated surrogate data by randomly sorting the original data of the locomotor rhythm, and then compared the two data.

Result: The cardiac-locomotor synchronization was observed in 7 of the 9 subjects. There was a significant difference between the original and the surrogate data. This result may indicate that the observed synchronization between the cardiac and locomotor rhythms represented entrainment.

Conclusion: Walking at the frequency of heart rate would induce the cardiac-locomotor synchronization by entrainment.