Adapting Process of Motor Patterns During Walking on Different Floor Materials

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Objective: To examine the changes in motor patterns during walking on different floor materials.

Methods: We obtained electromyograms and recorded the joint motion of the left lower extremity of 10 healthy participants when they were walking on a path on which the floor material changed from wood to sponge. The entire path was covered with a cloth so that the floor material could not be visually identified. Before the study, the participants were not informed that the path was made of different materials. We determined the amount of muscular activity, curve showing the coordination pattern of each joint pair, and curve length for 7 gait cycles before and after the change in floor material. The test was performed for 3 consecutive times. Values for each parameter determined during each gait cycle in the first and third test were compared.

Results: During the first test, a significant increase ($p < 0.05$) was recorded in muscular activity immediately after the participants entered an area with a different floor material. The coordination pattern of each joint pair significantly increased ($p < 0.05$) immediately after a change in floor material during the first test, whereas this value significantly increased ($p < 0.05$) just before a change in floor material during the third test.

Conclusions: Our results indicate that human beings maintain stability during walking by predictively altering their gait motor pattern even after the circumstances changed.