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AGE-RELATED CHANGES OF UPPER EXTREMITY MOTOR PERFORMANCE IN DUAL-TASK TEST

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Elderly people experience motor performance decline associated with cognitive deficits since aging induces degeneration of the nervous system, such as brain atrophy and dedifferentiation during cortex recruitment. This senescence induces a decrease in attentional resources and a slowdown in information-processing capacity, which often lead to confusion in the presence of a difficult and complex situation such as dual task condition. The Fitts' task is an appropriate tool to examine an individual's capacity of information processing and motor control through unimanual movement. As the index of difficulty (ID) increases, the attentional demand also increases, thus, performance deficits emerge. In this study, we compared the influence of a secondary cognitive task on the performance during the Fitts' task, at two IDs, between young and elderly groups. Seventeen volunteers were recruited for each group. All subjects performed a single motor task (Fitts' task, including 2 IDs) and a dual task (the conjunction of the Fitts' task with a cognitive task, counting number backward) in a random order. Acceleration data were collected during the experiment and processed using a custom-made MATLAB. We examined movement time (MT), acceleration time (AT), deceleration time (DT), and tapping number (TN) parameters. Two-way mixed ANOVA was used to test for the main and interaction effects of age and difficulty for each task. Two-way repeated measures ANOVA was used to test for the main and interaction effects of task and difficulty within each age group.

No interaction effects between age and difficulty or between task and difficulty were identified; therefore, we analyzed data with independent and paired t-test. The results showed that MT, AT, and DT were significantly longer, and TN was significantly lower in the elderly group, difficult ID, and dual task conditions. Altogether, elderly people are more vulnerable to difficulty and dual task interference than young individuals.

BIOGRAPHY

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