2004 Fiscal Year Final Research Report Summary

Influence of movement onset prediction and postural control preparation on postural muscle activity associated with upper limb movement

Research Project

Project/Area Number

15500436

Research Category

Grant-in-Aid for Scientific Research (C)

Allocation Type

Single-year Grants

Section

一般

Research Field

Sports science

Research Institution

Kanazawa University

Principal Investigator

FUJIWARA Katsuo Kanazawa University, Graduate School of Medical Science, Human Movement and Health, Professor, 大学院・医学系研究科, 教授 (60190089)

Project Period (FY)

2003 – 2004

Keywords

event related potential / anticipatory postural control / upper limb movement / odd-ball paradigm / reaction movement / contingent negative variation / electromyography / standing posture

Research Abstract

Many previous studies have found that the activation onset in the postural muscles of the legs and trunk that control standing postures precedes that in the focal muscles that rapidly move the arms. Based on the previous researches, we presumed that when the initiation of movement is easy to predict and the preparation for postural control is adequate, the preceding activation of postural muscles will be facilitated.
Relationship between uncertainty of go signal taming and evoked brain potential was examined using event related potential (P300) during odd-ball paradigm with auditory stimulation. Reaction task was conducted under the various preparatory periods between warning signal and go signal, and contingent negative variation (CNV) was analyzed.
The amplitude of P300 was significantly large in the stimulation presentation probability 15% compared with 45%. The reaction time of the anterior deltoid to the sound stimulation was significantly earlier in 45% probability than in 15% probability. The activation onset of the erecter spinae and gastrocnemius to the anterior deltoid were earlier in 45% probability than in 15% probability. Significant negative correlations were observed between the amplitude of P300 and postural muscle showing the earliest onset, and the erecter spinae in both reaction tasks.

Integrated late CNV and slope of late CNV were significantly smaller in the 3.5-s period than in the 2.0-s period. Start time of gasbncnemius was significantly earlier in the 3.5-s period than in the 3.0-s period. A significant correlation was found between start time of gastrocnemius activity and integrated late CNV.

Research Products (7 results)

All | 2005 | 2003

All | Journal Article | Book

[Journal Article] Relationship between improvement in cognitive function by balance board training and postural control adaptability in the elderly 2005

[Journal Article] Anticipatory activation of postural muscles associated with bilateral arm flexion in subjects with different quiet standing positions. 2003

[Journal Article] 高齢者におけるバランスボード平衡訓練による上肢運動時の予測的姿勢制御とP300の変化 2003

[Journal Article] 高齢者におけるオドボール課題での上肢運動時のP300と予測的姿勢調節 2003

[Book] 高齢者の姿勢制御(入門運動神経生理学) 2003

[Book] Change by balance training in anticipatory postural control and P300 during bilateral-arm-flexion in the elderly. 2003

[Book] Anticipatory postural control and P300 during bilateral-arm movements by oddball paradigm in the elderly people. 2003

URL: https://kaken.nii.ac.jp/report/KAKENHI-PROJECT-15500436/155004362004kenkyu_seika_hokoku_

Published: 2006-07-10