

平成 20 年度 博士後期課程学位論文要旨

学位論文題名 (注: 学位論文題名が欧文の場合は和訳をつけること)

Effects of joint traction and position changing of upper limb on the reaction time of quadriceps femoris

上肢関節牽引と上肢肢位変化が大腿四頭筋反応時間に及ぼす影響

学位の種類: 博士 (理学療法学)

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注: 1,000 字程度 (欧文の場合 300 ワード程度) で、本様式 1 枚 (A 4 版) に収めること

The purpose of this study was to examine the effects of joint traction and position of upper limb on the pre-motor time (PMT) and motor time (MT) of quadriceps femoris. Twenty healthy male subjects participated in this study. The subjects lay supine on the torque machine with their left knee flexed at 30-degree angle. The subjects were tested for the maximum isometric extension of the left knee in an immediate response to a signal sound trigger, while holding the following eight testing positions: Two types of right upper limb positions (neutral position and PNF position with shoulder joint extension of 30 degrees, abduction of 20 degrees, internal-rotation of 70 degrees) as combined with four types of traction forces (no-load, 30 N, 60 N and 90 N). Ten trials were measured for each testing position. PMT was measured to represent the time from the trigger to the onset of EMG, and MT, the time from the onset of EMG to the onset of the muscle torque. The results indicated major effects on the PMT in relation to traction forces and upper limb positions with significant level of interactions. No significant effect was found as to the MT. The result of multiple comparison analyses showed that the PMT shortened with the increase in the traction force in the neutral position (significant differences were observed for varying PNF positions and for 0N-all, 30N-60N, and 30N-90N traction forces). The PMT was significantly shorter in the PNF positions with 0N and 30N traction forces compared to that in the neutral position with the same traction forces. The PMT is known to reflect the process of the central nervous systems (CNS). These results suggest that the joint traction of upper limb and the PNF position have facilitating effects on the lower limb by arousing the CNS.