ABSTRACT

Background: Motor control therapeutic exercise (MCTE) for the neck is a motor relearning program that emphasizes the coordination and contraction of specific neck flexor, extensor, and shoulder girdle muscles. Because motor imagery (MI) improves sensorimotor function and it improves several motor aspects, such as motor learning, neuromotor control, and acquisition of motor skills, the authors hypothesized that a combination of MCTE and MI would improve the sensorimotor function of the cervical spine more effectively than a MCTE program alone.

Purpose: The purpose of this study was to investigate the influence of MI combined with a MCTE program on sensorimotor function of the cranio-cervical region in asymptomatic subjects.

Study Design: This study was a single-blinded randomized controlled trial.

Methods: Forty asymptomatic subjects were assigned to a MCTE group or a MCTE+MI group. Both groups received the same MCTE program for the cervical region (60 minutes), but the MCTE+MI group received an additional intervention based on MI (15 minutes). The primary outcomes assessed were cranio-cervical neuromotor control (activation pressure value and highest pressure value), cervical kinesthetic sense (joint position error [JPE]), and the subjective perception of fatigue after effort.

Results: Intra-group significant differences were obtained between pre- and post interventions for all evaluated variables (p<0.01) in the MCTE+MI and MCTE groups, except for cranio-cervical neuromotor control and the subjective perception of fatigue after effort in the MCTE group. In the MCTE+MI group a large effect size was found for cranio-cervical neuromotor control (d between -0.94 and -1.41), cervical kinesthetic sense (d between 0.97 and 2.14), neck flexor muscle endurance test (d = -1.50), and subjective perception of fatigue after effort (d = 0.79). There were significant inter-group differences for the highest pressure value, joint position error (JPE) extension, JPE left rotation, and subjective perception of fatigue after effort.

Conclusion: The combined MI and MCTE intervention produced statistically significant changes in sensorimotor function variables of the cranio-cervical region (highest pressure value, JPE extension and JPE left rotation) and the perception of subjective fatigue compared to MCTE alone. Both groups showed statistically significant changes in all variables measured, except for cranio-cervical neuromotor control and the subjective perception of fatigue after effort in the MCTE group.

Level of Evidence: 1b

Key Words: Cervical disorders, motor imagery, motor control, therapeutic exercise.