Abstract:

Movement is one of the basic signs of life, and motor learning is the fundamental process of acquiring and improving motor skills through experience, practice, and repetition. This process allows individuals to learn new movement patterns, improve coordination and movement efficiency, and adjust to new motor tasks, which is essential for performing everyday activities and specialized tasks. Most patients with central motor neuron damage require long-term rehabilitation focused on improving limb and trunk mobility, postural stabilization and balance, and other functions. Rehabilitation helps by activating neuroplastic, reparative, and compensatory mechanisms through activities of appropriate type and intensity, and motor learning using visual feedback is one of the promising approaches. The aim of the thesis was to observe the effect of motor learning of balance skills on a posturographic platform with visual feedback and to confirm the impact of sensory inputs on posturographic balance parameters. The second aim was to observe the mechanisms of motor learning in two age-differentiated groups and to verify whether there is a difference between them. In the motor learning study, a young woman and a senior woman trained on a posturographic platform with visual feedback once a week for ten consecutive weeks, and the time they took to perform each training sequence was recorded. In the study evaluating the effect of motor learning on stability, patients who had suffered a stroke were trained in the same way, and stability parameters were measured before and after the training period. The results showed that after training with visual feedback, the measured stability parameters improved, with the vestibular component showing the most significant improvement. A study aimed at motor learning confirmed that motor learning with visual feedback is effective in both older and younger populations and shows similar dynamics, although the older population reaches the limit of improvement earlier. The results demonstrate good ability to learn motor balance skills even at an elderly age. They also show the positive impact of training on balance in patients after brain damage. Therefore, such training activities should be included in the rehabilitation of patients in rehabilitation centers and in programs based on individual exercise at home, as well as in the prevention of balance disorders in seniors and the prevention of further difficulties and falls.

Key words: Motor learning, balance skills, visual feedback, stroke, aging