

Streszczenie w języku angielskim

Summary

Title: Evaluation of the effectiveness of hand rehabilitation with the use biofeedback in patients in the late phase after a stroke

Introduction: Research shows that the retraining of paretic hand function is considered the most problematic element of the rehabilitation process after a stroke. Therefore, based on the analysis of the currently available literature, a gap in knowledge was identified regarding the assessment of the effectiveness of biofeedback in the rehabilitation of the motor function of the hand and self-care of patients after a stroke.

Aim of the study: Comparison of the effects of hand rehabilitation with the use of biofeedback and conventional therapy in patients in the late phase after a stroke.

Materials and methods: The study involved 100 patients with hemiparesis in the late phase after a stroke, randomly assigned to two groups: the study group (50 people) implementing a conventional rehabilitation program additionally supplemented with biofeedback training, the control group (50 people) implementing only a conventional rehabilitation program. The examination was performed twice, before and after the 3-week rehabilitation program. The following ways of assessing the effects of rehabilitation were used: hand grip strength and pinch strength using a dynamometer and pinchmeter, range of motion of the radiocarpal joints of the hand using a goniometer, manual dexterity of the hand using the Box and Blocks Test, grip function of the hand according to the Frenchay scale, hand motor skills according to the Fugl-Meyer assessment scale, efficiency in activities of daily living according to the Barthel index.

Results: Improvement of manual dexterity in the Box and Bloks Test was demonstrated in both studied groups, however, conventional rehabilitation combined with biofeedback proved to be more effective ($p < 0.001$), both when taking into account the affected/non-affected side, the dominant hand and the right/left side of paresis. When examining the motor and gripping efficiency of the hand using the Fugl-Meyer and Frenchay scales, a better effect was observed in the treatment group ($p < 0.005$). Also in the case of ranges of hand movements with the use of a goniometer, patients from the treatment group achieved better rehabilitation results. The range of the radiocarpal joint in flexion, ulnar adduction and radial abduction improved for the right hand and in all ranges of the radiocarpal joint in the left hand ($p = 0.0083$; $p = 0.0001$; $p < 0.0001$; $p = 0.0005$). When analyzing hand grip strength and pinch strength using a dynamometer and a pinchmeter, the patients from the treatment group also achieved better results ($p = 0.0001$). On the other hand, in the assessment of the performance in activities of daily living using the Barthel index, a statistically significant improvement was noted in both groups at the level of $p < 0.0001$.

Conclusions: Rehabilitation of patients in the late phase after stroke with the use of biofeedback and conventional methods significantly improves the motor function of the hand and self-care. Rehabilitation with the use of biofeedback brings better results in terms of the improvement of manual dexterity, mobility, grip and pinch strength, both in the affected and non-affected hand, compared to conventional rehabilitation in patients in the late phase after a stroke.

Key words: stroke, hand rehabilitation, biofeedback, late phase