

## ABSTRACT

Musculoskeletal disorders are the second most common cause of sick leave in people at working age, for this reason it is necessary to search ways of early detection of reversible functional disorders of the locomotor system before they develop into irreversible structural disorders. The aim of this thesis has been to examine the Medical Expert Information System Computer Kinesiology (MEIS CK), to present its effectiveness and to compare the results of therapy with the MEIS CK system in a group of participants with subacute and chronic back pain in the lumbar spine and in a group of participants without any back pain. The results of these two groups have been compared with the control group without MEIS CK therapy.

The pilot study included 55 participants with subacute and chronic back pain (Group 1) and 51 participants without back pain (Group 2). Both groups were treated by MEIS CK therapy. In the third group, there were 67 healthy participants without back pain and without MEIS CK therapy. All 173 participants underwent MEIS CK tests three times during our research, which included 46 standard physiotherapy tests. The effect of MEIS CK therapy was assessed using the H score. Improvement after the therapy was defined by a reduction in the H score by at least 1 point. Data were statistically processed using R software at a significance level of 5%.

A significant improvement in the grade H score was observed in groups 1 and 2. The distribution of the H score in Group 1 before the therapy was grade 2 and 3, and after therapy there was a regrouping to grade 1 ( $p < 0.0001$ ), grade 2 ( $p < 0.0001$ ) and grade 3 ( $p < 0.0001$ ). Before treatment, Group 2 had grade H scores 1, 2, 3 and after the therapy only grade 1 ( $p < 0.0001$ ) and grade 2 ( $p = 0.4270$ ). There was no change in the distribution of the grade H score in Group 3, before the follow-up there were 1, 2, 3 and after follow-up grade 1 ( $p = 0.8161$ ), grade 2 ( $p = 0.8571$ ), grade 3 ( $p = 0.6040$ ). The improvement rate was 87.3% (95% CI: 75.5 to 94.7%) for Group 1 and 78.4% (95% CI: 64.7 to 88.7%) for Group 2. The improvement rate in Group 3 was only 11.9%. It was confirmed that the improvement in the treated groups did not depend on other observed factors - gender, age, BMI, or duration of therapy.

The Medical Expert Information System Computer Kinesiology is created primarily for the early diagnosis of incipient functional disorders of the musculoskeletal system and thus for the primary prevention of structural disorders. The main importance of MEIS CK is the prevention of the onset and early detection of developing vertebrogenic algic syndromes. This study demonstrated the high therapeutic efficacy of MEIS CK in individuals with back pain (Group 1) and in individuals without back pain (Group 2) who used MEIS CK therapy as primary and secondary prevention. The integration of the MEIS CK system can be recommended as a part of the current system of diagnostics and therapy for torpid vertebrogenic algic syndromes resistant to conventional treatment.

**Key words:** back pain, Computer Kinesiology, differential diagnostics, information technologies, primary prevention of back pain, secondary prevention of back pain