

Abstract

Title: Musculoskeletal changes in the foot and lower leg induced by exercise intervention program and their effect on diabetic foot disease in patients with type 2 diabetes mellitus

Objectives: The aim of our study was to investigate whether our proposed 12-week movement intervention program can affect the musculoskeletal system in patients with diabetic foot syndrome in remission

Methods: The study was conducted over a 12-week period. The research population was divided into two groups: the experimental group (n = 19), which received the intervention program and the control group (n = 19), which was not instructed to do any physical activity. The required examinations were performed for all groups before the start of the intervention – baseline measurement (pretest), after the end of the movement intervention – 12 weeks after the start of the study – exit measurement (posttest).

Results: Six subjects were excluded from the study due to ulcer recurrence, i.e., three subjects from control group (15.8%) and three subjects from experimental group (15.8%). Waist to Hip Ratio and Body Mass Index anthropometric parameters were not significantly affected by the intervention program. In the experimental group, statistically significant improvements were found in large joint flexibility ($p = 0.012$), dynamometry (plantar flexion strength) of lower right limb ($p = 0.043$) and lower left limb ($p = 0.013$), compared to the control group. There was also a positive trend in the improved fitness of the experimental group compared to the control group. Positive correlations were also confirmed between heavy physical activity and dynamometry ($r = 0.58$; $p = 0.0025$), Senior Fitness Test ($r = 0.453$; $p = 0.011$) and selected flexibility parameters ($r = 0.47$; $p = 0.007$). Based on the International Physical Activity Questionnaire, more activity was demonstrated in the experimental group after the intervention than in the control group – moderate PA ($p = 0.06$) and heavy PA ($p = 0.03$). The change in weight distribution of the individual between forefoot and rearfoot of lower left limb and lower right limb was statistically significant in the experimental group following the intervention program ($p = 0.04$ lower left limb and $p = 0.05$ lower right limb).

Keywords: Diabetes mellitus, diabetic foot syndrome, diabetic foot disease, physical activity, education, intervention program.