

New Approach in Diabetic Foot Prevention

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Subjects affected by diabetes show an abnormal distribution of weight, walking abnormalities, muscular weakness as well as generalized limited joint mobility and important relationships have been shown between these conditions and the development of diabetic foot ulcers.

The aim of the present study is to define and verify the applicability of a protocol of adapted physical activity in subjects with longstanding diabetes mellitus in order to prevent diabetic foot problems. Two groups of subjects were evaluated: group A (diabetic patients n: 40) included subjects affected by diabetes mellitus; among these 22 were diagnosed with diabetic neuropathy, 8 had a history of foot ulceration, and 10 were diagnosed with neuroischemic foot; group B (controls) included 10 healthy subjects in the same age range. In order to evaluate joint mobility and ankle strength in active flexion-extension, a goniometer and a portable dynamometer were used. The posture and distribution of weight were evaluated by baropodometry system. Group B underwent evaluation only at the first examination, while group A was evaluated both at the beginning and at the end of the study. Diabetic subjects underwent adapted physical training three times a week for 12 weeks. Each training session lasted 30' - 45' and was structured for 4 different working areas: organic activation, proprioceptive activity, stretching of muscles and tendons, and strengthening of muscles. At the beginning of the study diabetic patients showed a significant reduction of ankle mobility in comparison with controls (right ankle: - 24,2°, left ankle-20.6°, $P < 0,01$). This difference was significantly reduced after the training period (right: + 17,5°, $P < 0,05$, left: + 16,5 $p < 0.01$), and ankle mobility showed no significant difference after 12 weeks of training in diabetics in comparison with controls in basal conditions. Regarding maximum strength during extension and flexion, at the beginning of the study diabetic patients showed a significantly different median value in comparison with controls (right: extension: median 20,6 Kg, , $P < 0.05$; flexion: 22.3 Kg, $P < 0.005$). After the training period this difference was no longer statistically different. The increase obtained in strength was significant (right : extension: 20.6 Kg., $P < 0.05$; flexion: 22.3 Kg, $P \leq 0.01$). In diabetics with long term disease, joint mobility and motor performance with muscle weakness were performed. In conclusion, a short period of adapted physical activity appears to play an important role in limiting functional defects which otherwise potentially contribute to diabetic foot lesions such as reduced joint mobility and limited strength.

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