

Pressure Distribution of Diabetic Patients after sensory-motor training with unstable shoe construction

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MBT Model: Sole 2004

ABSTRACT

OBJECTIVES: To investigate changes in pressure distribution after sensorimotor training and the changes in muscle timing in normal subjects and diabetic patients.

DESIGN: A portable four channel electromyographic system (Noraxon) has been synchronised in real time with the PEDAR[®] in-shoe pressure measurement system.

BACKGROUND: Until now, peak pressures under the diabetic foot have generally been investigated via the application of orthopaedic insoles. To date nobody has published objective information of sensorimotor training in relationship to foot pressure distribution for the diabetic foot.

METHODS: Three groups of subjects have been studied, a normal reference group (n=23), a randomly assigned diabetic intervention group (n=24), and a diabetic control group (n=20), by recording electromyography of the lower leg muscles and in-shoe foot pressure measurements simultaneously.

RESULTS: After a period of 6 weeks of daily training with an unstable shoe construction (USC) peak pressure under metatarsal heads 1, 2/3, and big toe were lower but higher for metatarsal heads 4/5 in group 1. Group 2 showed a reduction in peak pressure and the pressure-time integral under the first metatarsal head and a tendential increase in peak pressure in the midfoot. Group 3 did not show any significant changes in peak pressure but a delayed peak muscle activity for the anterior tibialis muscle.

CONCLUSION: Sensorimotor function is an important parameter in the study of foot pressure distribution under the normal and the diabetic foot which can be trained to reduce foot loading by 16%, especially in the most endangered region of the diabetic foot, the medial forefoot.