



INVESTMENTS IN EDUCATION DEVELOPMENT

analyze the effect of Nordic walking and its velocity on the movement of the lower limbs and pelvis during level and uphill walking. Fifteen males with mean age 22.9 years walked on a treadmill with and without poles, in self-selected and increased (110 % and 120 %) velocities in level ground and slope 8 %. Kinematic data was observed by Vicon system. Statistical comparison was performed by three-way ANOVA and LSD Fisher's post hoc test. The results indicate that the effect of poles was small. During uphill walking hip flexion increased and maximal knee extension decreased in comparison with level walking. Increased walking velocity resulted in mainly increase of hip range of movement sagittal plane and pelvis rotation in transversal plane.

### **The possibilities of quantitative description of nonlinear loaded characteristics of soft tissue of locomotor apparatus of man in vivo**

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The goal of this study was to find out an appropriate mathematical description of nonlinear loaded characteristics of soft tissue of locomotoric apparatus in man by help of chosen deformation tests in vivo, in situ. We wanted to easy interpretate the results that we obtain from myotonometry testing. We have found out that this mathematical description of hysteresis curves may be used in clinical trials as well as in laboratory testing.

### **Evaluation of muscle activity during Nordic walking in different conditions**

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The purpose of this study was to determine the influence of slope of the ground on muscles of lower extremities during regular walking (RW) and Nordic walking (NW). Ten healthy men (mean age  $22.9 \pm 1.04$  years) walked at self-selected speed on a treadmill at different slopes of the ground (0% and 8%) without poles and with poles. We investigated electromyographic activities of the tibialis anterior (TA), gastrocnemius lateralis (GL), biceps femoris (BF), gluteus medius (GM), vastus medialis (VM), and rectus femoris (RF). Increased slope of the ground led to increase in activity of GL, BF, and GM during both NW and RW and RF only during NW. In comparison of RW and NW, the activity of some muscles enhanced on flat



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ground during the use of poles. During uphill walking the impact of the poles is not clear. Some muscles increased their activity and some decreased their activity.

## **The effect of rehabilitation intervention on the performance of the gait in professional ballet dancers**

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Ballet movements influence the mobility of the lower limb joints. This altered motion is translated to performance of the gait cycle (GC). The aim of this study was to observe the effect of rehabilitation on range of movement during the GC in ballet dancers. Fourteen ballet dancers (5 males, 9 females; age  $24.1 \pm 3.8$  years; height  $170.2 \pm 8.5$  cm; weight  $58.3 \pm 11.2$  kg) participated in this study. We analyzed the subjects before and after ten rehabilitation interventions. Ten trials of the GC at self-selected walking speed were obtained using the system Vicon MX (Vicon Motion Systems, London, UK). Dancers demonstrated significantly increased maximal knee flexion during the stance phase ( $14.8 \pm 4.5$ ) and decreased maximal extension during the swing phase ( $3.4 \pm 4.5$ ), as well as decreased maximal hip adduction ( $6.8 \pm 1.5$ ) after rehabilitation. The results confirm that rehabilitation should be a necessary part of comprehensive care about dancers to improve their dance technique and prevent injuries.