DOES EXERCISE ALLOW ELDERLY PEOPLE TO RETAIN THE DYNAMICS OF GAIT?
João Filipa, Moniz Pereira Vera, Veloso António
(Faculty of Human Kinetics, Portugal)

INTRODUCTION: The locomotion function is extremely important in the elderly and determinant in falls prevention, being also a useful indicator of this population functionality. The aim of this study was to analyze the gait cycle of active elderly men, using the inverse dynamics technique, in order to determine if elderly functional decline is minimized with the practice of physical activity. For this purpose, the gait kinetics of very active was compared with the one presented by young active male. The following kinetics variables were studied: ground reaction force (vertical and anterior-posterior components), joint moment of force and joint power (ankle, knee and hip joints).

METHOD: It was analyzed de gait cycle of 3 healthy elderly males (ages: 69.30 ± 1.41 years) participating in an exercise program (4x/week) and 5 healthy young males (ages: 21.80 ± 0.45 years) also physically active (4x/week). Joint moment of force and joint power were calculated by inverse dynamics, using the force plate data and the three-dimensional kinematics.

RESULTS: There were no significant differences between the groups. Comparing with literature, for the elderly group, the force parameters Fy2 and Fz2 (anterior-posterior and vertical GRF peaks during the push-off) were 2.19 ± 0.29N vs. 2.01 ± 0.48N (for the young) and 10.82 ± 0.60N vs. 11.11 ± 0.56N, respectively. The ankle torque peak during the plantarflexion was 0.77 ± 0.21Nm/kg vs. 1.56 ± 0.54Nm/kg. The three knee torque peaks (Mk1, Mk2, Mk3) were 0.26 ± 0.01Nm/kg, -0.64 ± 0.69Nm/kg and 0.33 ± 0.13Nm/kg vs. 0.85 ± 0.36Nm/kg, -0.46 ± 0.12Nm/kg and 0.19 ± 0.12Nm/kg, respectively. Hip torque peaks (Mh1, Mh2) were 1.14 ± 0.25Nm/kg and -0.83 ± 0.24Nm/kg vs. 1.45 ± 0.67Nm/kg and -0.35 ± 0.29Nm/kg, respectively. Joint powers (Pa2, Pk4, Ph3: 2nd ankle peak, 4th knee peak and 3rd hip peak, respectively) obtained were: 0.78 ± 0.27w/kg, -0.92 ± 0.28w/kg and 0.86 ± 0.40w/kg vs. 2.48 ± 1.22w/kg, -1.21 ± 0.33w/kg and 0.52 ± 0.30w/kg, respectively.

DISCUSSION: The analyzed variables showed a vigorous foot push-off and a higher foot traction on the walking surface on the elderly subjects when compared with literature results. The 1st hip torque peak showed high hip extensors initial action when absorbing energy at foot contact, which is a factor related with the trunk stabilization during the hip movement.

CONCLUSION: Once there were no significant differences between the two groups, the results obtained could be a good indicator that healthy and physically active lifestyles are important for the maintenance of functional ability, stability, independence and minor risk of falling with aging.

REFERENCES:

Keywords: Gait, Biomechanics, Elderly