

A STUDY ON GAIT PATTERN BETWEEN OLD AND YOUNG ADULTS TO EVALUATE ELDERLY SHOE: PRELIMINARY STUDY

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INTRODUCTION: There are differences between gait performance of old and that of young adults (Paroczai, 2006). It is believed that these differences might have effects on the developmental procedure of shoes for the elderly. However the standard of elderly shoe for development and evaluation is not enough. Traditional gait analysis methods (kinematics and kinetics) and gait variability were used. Gait variability can offer a complementary way of quantifying locomotion and its changes with aging and disease as well as a means of monitoring the effects of therapeutic interventions and rehabilitation (Hausdorff, 2007). Especially, according to recent studies, variability was closely related to gait stability (Hausdorff, 2007). The goal of this study was to find elderly gait pattern for evaluating elderly shoe based on stability point of view.

METHOD: The subjects in this study were 34 elderly (17 male: 69.2 years, 168.8 cm, 64.7 kg, 17 female: 67.5 years, 154.2 cm, 58.1 kg) and 20 young adults (10 male: 24.7 years, 170.8 cm, 65.8 kg, 10 female: 22.4 years, 158.5 cm, 52.2 kg) with no known neurological, orthopaedic or cognitive impairment. Experiment was consisted of two parts: inner test and outer test. In the inner test, subjects were performed walking on the straight walk way (10m X 3m) five times with preferred walking speed. Six Falcon high speed digital motion capture cameras (Motion Analysis Corp. Santa Rosa, CA USA) and two force plates (AMTI, Inc., MA, USA) were used to acquire kinematic and kinetic data simultaneously. In the outer test, subjects were performed walking with preferred walking speed for 10 minutes on overground. Motion detecting module which were consisted with FSR (force sensitive resistor) sensor and accelerometer was used. To evaluate differences in gait performance between elderly and young adults, kinematic (joint angle), kinetic (joint moment, joint loading rate, vertical ground reaction force) variables, and gait variability (temporal variables) were used. CV (coefficient of variance) and DFA (detrended fluctuation analysis) were used to compare with difference between gait variability of elderly and that of young adults. CV which quantifies the amount of variability and DFA which explains the structure (self-similarity) of the variability were used for analysis (Hausdorff, 2007, Peng, 1995).

RESULTS AND DISCUSSION: This study will focus on the kinematics, kinetics and gait dynamics between 2 groups. They will be helpful to classify between characteristics of 2 groups and to evaluate elderly comfortable shoe. The purpose of this study was to classify elderly gait pattern for evaluating shoe. If we find suitable indexes, it will be useful to evaluate shoe for the elderly.

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