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Influence of the shoe type on the ground reaction forces during gait

Małgorzata Klepczyńska, Bartłomiej Zagrodny, Wiktoria Wojnicz, Michał Ludwicki, Jan Awrejcewicz

Abstract: Aim: The aim of this research was to estimate a relationship between the type of footwear and ground reactions forces (GRF) during gait, and to examine its influence on postural stability. Background: Most of the experiments dedicated to gait analysis are made with barefoot volunteers. This type of research does not give any information about the influence of shoe-type on GRF. Also, the influence of the shoe type on postural stability, like body sway and center of pressure displacement (COP) is still unclear. In the literature no complex study performed by male and female volunteers in different shoe types can be found, i.e. no experiment was done in which each of the volunteers was performed gait in different footwear and barefoot in one session. Materials and methods: 7 women and 5 men took part in the experiment. Each of them performed a gait on the force platform (Steinbihler, Zeiss) in different shoe types — with different heel height and stiffness. Women walk: barefoot, in shoes with flat, profiled sole, high-heels and men: barefoot, suit shoes and sports shoes Also, one minute stabilograms were recorded. Results: Results revealed differences in maximal values of ground reaction forces for different footwear types and their influence on static stability, like amplitude of COP medio-lateral (M-L) and anterio-posterior (A-P). Also kinetic, like time of support phase, heel-off and toe-off phase changed. Moreover, an influence of the shoe type on the M-L, A-P and vertical forces are described.

[1] Małgorzata Klepczyńska, M.Sc.: Lodz University of Technology, Stefanowskiego 1/15, Poland (PL), bartlomiej.zagrodny@p.lodz.pl.

[2] Bartłomiej Zagrodny, Ph.D.: Lodz University of Technology, Stefanowskiego 1/15, Poland (PL), bartlomiej.zagrodny@p.lodz.pl, the author presented this contribution at the conference in the special session "Analysis and control of bioinspired and biomimetic dynamical systems — sensors, manipulators and locomotors" organized by C. Behn and A.M. Zelei.

[3] Wiktoria Wojnicz, Associate Professor: Gdańsk University of Technology, Gdańsk, ul. Gabriela Narutowicza 11/12, Poland (PL), wiktoria.wojnicz@pg.edu.pl.

[4] Michał Ludwicki, Ph.D.: Lodz University of Technology, Stefanowskiego 1/15, Poland (PL), michal.ludwicki@p.lodz.pl.

[5] Jan Awrejcewicz, Professor: Lodz University of Technology, jan.awrejcewicz@p.lodz.pl, Poland (PL), jan.awrejcewicz@p.lodz.pl.