Spatiotemporal parameters of gait in patients with knee osteoarthritis

Vitor Ferreira[1], Leandro Machado[2], Adélio Vilaça[3], Francisco Xará-Leite[4], Paulo Roriz[5]

[1]School of Health Sciences, University of Aveiro (ESSUA), Portugal, v.ferreira@ua.pt
[2]CIF2D, LABIOMEP, Faculdade de Desporto da Universidade do Porto, Portugal, lmachado@fade.up.p
[3]Serviço Ortopedia Hospital Santo António, Porto, Portugal, adeliovilaca@gmail.com
[4]Serviço Ortopedia Hospital Santo António, Porto, Portugal, franciscoxdl@gmail.com
[4]CIDESD-ISMAI, INESC-TEC, LABIOMEP, Portugal, paulororiz@ismai.pt

ABSTRACT

BACKGROUND: Gait is used to quantify physical function, quality of life and health status since is the most frequently performed physical activities in daily life[1]. Knee osteoarthritis (OA) is a complex disease influenced by many factors, including the loading environment. Analyzing biomechanics during walking is therefore particularly relevant[2] and the study of spatiotemporal parameters in various pathologies a relevant topic of attention[3]. **OBJECTIVE:** This study aimed to study spatiotemporal parameters of gait the in patients with knee OA. **METHODS:** A laboratory, analytic and cross-sectional study was design. A 3D motion analysis system, consisting of 11 infrared cameras (Qualisys, Gothenburg, Sweden), was used to collect kinematic data at 200 Hz. Forty-two trajectory passive markers were attached to the lower body segments of each participant. Participants were asked to walk with own shoes on a flat surface for 10 m at a self-selected speed. Three trials of each participant were recorded to eliminate variation in walking speed and to enhance the reliability and accuracy of the average. Post-processing calculation of all gait parameters were studied using Visual3D software (Version 6.00.12, C-Motion, Rockville, USA). Several gait parameters were measured in this study: walking speed, stride and step length, cadence, duration of 1 gait cycle double limb support, duration and percentages of swing and stance phase. **RESULTS:** This study includes 15 patients (10 female; mean age 62 ± 7,1; weight 77,2 ± 12,9 kg, and height 162 ± 8,1 cm) with diagnosed radiographic medial knee OA Kellgren/Lawrence (K/L) grade 2 or 3, recruited in hospitals. The mean walking speed was 1.16 m/s (± 0.15), the cycle time was 1.08 s (± 0.16) and other gait parameters are similar to a population of the same age. No significant differences were found between right and left side. **CONCLUSIONS:** This study shows that the analysis of spatiotemporal parameters of gait can serve as a basis for understanding of possible changes in gait in patients with osteoarthritis of the knee. The gait analysis provides critical information needed to understand the knee OA development and to design therapeutic interventions.

Keywords: *Biomechanics, gait, osteoarthritis, knee*

Health & Well-Being Intervention
INTERNATIONAL CONGRESS

May 31st and June 1st 2019

Instituto Piaget
University Campus of Viseu

Organization

RECI
Research in Education and Community Intervention

INSTITUTO PIAGET | VISEU

References:

[1] Afiah IN, Nakashima H, Loh PY, Muraki S. An exploratory investigation of changes in gait parameters with age in elderly Japanese women. SpringerPlus. 2016; 5(1): 1069. doi:10.1186/s40064-016-2739-7

[2] Favre J, Jolles BM. Gait analysis of patients with knee osteoarthritis highlights a pathological mechanical pathway and provides a basis for therapeutic interventions. EFORT Open Rev. 2016; 1(10): 368-374. doi:10.1302/2058-5241.1.000051

[3] Herssens N, Verbecque E, Hallemans A, Vereeck L, Van Rompaey V, Saeys W. Do spatiotemporal parameters and gait variability differ across the lifespan of healthy adults? A systematic review. Gait Posture. 2018; 64: 181-190. doi:10.1016/j.gaitpost.2018.06.012

Health & Well-Being Intervention
INTERNATIONAL CONGRESS

May 31st and June 1st 2019
Instituto Piaget
University Campus of Viseu

Organization
RECI
Research in Education and Community Intervention
INSTITUTO PIAGET | VISEU