

Statistical analysis in clinical gait analysis using Kinovea between normal and simulated abnormal gaits

Abstract

Kinematic analysis of human gait is an effective strategy to detect and assess an individual's gait to diagnose and develop and guide follow-on rehabilitation protocols. So, an accurate, objective gait analysis system has potential to facilitate rehabilitation process. System using smartphone-Kinovea represent an emerging technology for physical activity assessment and that may be relevant for gait analysis. The objective of this study was to determine gait displacement, speed and joint angle by using smartphone-Kinovea software system - to compare the normal gait with four distinct simulated gait abnormalities. Also, to assess validity of the proposed system by compared with QTM as gold standard. 30 participants completed an experiment in which they completed several gait trails on single day. Gait types were analyzed using statistical analysis (two-way MANOVA). As for validation assessment was analyzed using paired t-test by comparing proposed system with QTM. Results shows that joint angles for abnormal gaits are higher mean (Standard Deviation) compared to normal gait during HS and TO. While, normal gait exhibits higher mean (Standard Deviation) for d and s during both IDS and TDS phases compared to other four abnormal gaits in both genders. Also, there are significant different ($p < 0.05$) of gait for all gait comparisons for all parameters, except hip angle of normal-HP with $p = 0.495$. Moreover, there is some gait was similar with other gait due to they shared underlying kinematic aspects such as BA and DP. The validation of the system gives moderate result. These support that the smartphone-Kinovea system have potential in detecting and identifying abnormal gaits, and for future implementation in diagnosis and rehabilitation.