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RELIABILITY OF TWO-DIMENSIONAL VIDEO-BASED RUNNING GAIT ANALYSIS

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ABSTRACT

Background: While two-dimensional (2D) video running analysis is commonly performed in the clinical setting, the reliability of quantitative measurements as well as effect of clinical experience has not been studied.

Purpose: The purpose of this study was to assess the intra-rater and inter-rater reliability of six different raters using 2D video analysis of sagittal and frontal plane kinematic variables while running on a treadmill.

Study Design: Cross-sectional Study

Methods: Running videos from 10 individuals (five female, five male) with a mean age of 22.8 years were selected for analysis. Two raters had over 10 years of experience with running video analysis and the other four raters had no prior experience. Before beginning analyses, the senior investigator conducted two hours of training with all raters to review the measurement procedures and the movement analysis software program. After completing training and one practice analysis, each rater assessed four 60-second video clips for the 10 runners twice (20 total). A minimum of one week separated the two assessments on each runner. The order of the runner analyses were randomly assigned and each rater completed a single analysis within 24 hours. After the rater had completed their initial assessment on all 10 runners, a second analysis was completed one week later with a different order of randomization. Eight sagittal plane (SAG) and four frontal plane (FRT) quantitative variables were measured for the left and right lower extremities on all 10 runners. Intra- and inter-rater reliability was assessed using intraclass correlation coefficients (ICC) and standard error of the measurement (SEM).

Results: The intra-rater ICC values for experienced raters ranged from 0.75 to 0.98 for the SAG and 0.45 to 0.96 for FRT variables. The inter-rater ICC values between the experienced raters ranged from 0.76 to 0.99 for the SAG and 0.82 to 0.98 for FRT variables. The intra-rater ICC values for inexperienced raters ranged from 0.54 to 0.99 for the SAG and 0.08 to 0.97 for FRT variables. The inter-rater ICC values between the inexperienced raters ranged from 0.93 to 0.99 for the SAG and 0.79 to 0.98 for FRT variables. Intra-rater SEM values based on average means of all raters ranged from 1 to 47% of the mean values obtained for the SAG and from 6 to 158% for the FRT variables.

Conclusions: The intra-rater and inter-rater reliability levels were higher for SAG quantitative variables assessed in this study in comparison to FRT variables. Experience does not appear to be a factor when consistency is required with repeated analyses on the same runner.

Level of Evidence: 4, Controlled laboratory study

Keywords: Gait analysis, interrater, intra-rater, reliability, running assessment

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The authors declare no conflict of interest in matters associated with this paper.

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