

ORIGINAL RESEARCH

VALIDITY OF ATHLETIC TASK PERFORMANCE MEASURES COLLECTED WITH A SINGLE-CAMERA MOTION ANALYSIS SYSTEM AS COMPARED TO STANDARD CLINICAL MEASUREMENTS

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ABSTRACT

Background: Previous investigations of single-camera 3D motion analysis camera systems validity have yielded mixed results for clinical applications.

Purpose: The purpose of the current study was to determine the validity of a single-camera 3D motion analysis system for subject standing height, vertical jump height, and broad jump length. It was hypothesized that single-camera system values would demonstrate high correlation to the values obtained from accepted standard clinical measurements.

Study Design: Experimental *in vivo* validation study.

Methods: Twelve subjects (age 20.6 ± 4.9 years) from a cohort that included high school to adult athletes who participate in sports at a recreational or competitive level entered and completed the study. Performance measurements for standing height, vertical jump height, and broad jump length were measured with standard clinical measurements and a single-camera 3D motion system.

Result: Single-camera system measurements were significantly different than clinical measures for standing height ($p < 0.01$) and vertical jump height ($p < 0.01$). There was no statistically significant difference between single-camera system measures and clinical measures for broad jump distance ($p > 0.07$). The relative performance of subjects was highly correlated between single-camera and clinical measurements ($r^2 > 0.80$).

Conclusions: Single-camera measurements lacked precision along the vertical axis of motion, but correlated well with clinically accepted measurements for standing height, broad jump length, and vertical jump height. The single-camera system may be capable of making accurate performance assessments in the horizontal plane, but should be limited to relative assessments along the vertical axis of motion. Additional refinement to increase the data reporting accuracy of the motion system along the vertical axis should be considered before relying on this single-camera 3D motion analysis system over clinical techniques to measure vertical jump and standing broad jump performances.

Level of Evidence: 2b

Key words: Athletic performance; Clinical motion analysis; Kinect™; Measurement validity; VirtuSense validation

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