
ORIGINAL RESEARCH

INTER- AND INTRA-RATER RELIABILITY OF PERFORMANCE MEASURES COLLECTED WITH A SINGLE-CAMERA MOTION ANALYSIS SYSTEM

Nathanial A. Bates, PhD^{2,3}

April L. McPherson¹

John D. Berry²

Timothy E. Hewett, PhD^{2,3,4,5,6}

ABSTRACT

Background: Previous reliability investigations of single-camera three dimensional (3D) motion analysis systems have reported mixed results.

Purpose: The purpose of the current study was to determine the intra- and inter-rater reliability of a single-camera 3D motion analysis system for subject standing height, vertical jump height, and broad jump length.

Study Design: Experimental *in vivo* reliability study.

Participants: Twelve subjects (age 20.6 ± 4.9 years) from a cohort that included high school to adult athletes who participated in sports at a recreational or competitive level entered and completed the study. Performance measurements were collected by a single-camera 3D motion analysis system and two human testers for standard clinical techniques. Inter- and intra-class correlation coefficients (ICC (2,k), ICC (2,1)) were determined.

Result: Intra-tester and inter-tester reliability were excellent ($ICC \geq 0.935$) for single-camera system measured variables. Single-camera system measurements were slightly more reliable than clinical measurements for intra-tester ratings (ICC difference 0.020) for the standing broad jump. Single-camera system measurements were slightly less reliable than clinical measures for both intra- and inter-specimen standing height (mean ICC difference 0.003 and 0.043, respectively) and vertical jump height (mean ICC difference 0.017 and 0.036, respectively).

Conclusions: The excellent reliability and previously demonstrated validity of the single-camera system along the anterior-posterior axis indicates that single-camera motion analysis may be a valid surrogate for clinically accepted manual measurements of performance in the horizontal plane. However, this single-camera 3D motion analysis system is likewise reliable, but inaccurate, for vertically oriented performance measurements.

Level of Evidence: 2b

Key words: Athletic performance; clinical motion analysis; Kinect™; reliability

¹ Mayo Graduate School, Mayo Clinic, Rochester, MN, USA

² Department of Orthopedic Surgery, Mayo Clinic, Rochester, MN, USA

³ Department of Biomedical Engineering and Physiology, Mayo Clinic, Rochester, MN, USA

⁴ Sports Medicine Center, Mayo Clinic, Rochester, MN, USA

⁵ Department of Physical Medicine & Rehabilitation, Mayo Clinic, Rochester, MN, USA

⁶ Department of Biomedical Engineering, The Ohio State University, Columbus, OH, USA

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CORRESPONDING AUTHOR

Nathanial Bates

Mayo Clinic

200 First St SW

Rochester, MN 55902

Phone: (507)-538-6953

Fax: (507)-284-5392

E-mail: Bates.nathaniel@mayo.edu