Validity and reliability of the WIMUTM inertial device for the assessment of joint angulations

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Range of motion measurement is fundamental in the physical examination and functional evaluation of different joints. WIMU? is an inertial device that allows the analysis of joint motion easily in real time. This study had a two-fold goal: (i) to evaluate the validity of WIMU? on the measurement of different angle positions, compared with a standard goniometer and 2D video-based motion analysis software; and (ii) to evaluate the use of WIMU? in the assessment of angulations in a joint, specifically assessing the validity and reliability of WIMU? on the measurement of ankle dorsiflexion, compared to a standard goniometer and Kinovea. The intraclass correlation coefficient and Pearson´s correlation coefficient (r) were performed to calculate the concurrent validity, and Bland-Altman plots were performed to analyze agreement between measures. For the analysis of reliability, both relative and absolute indices were used. The results showed excellent validity and reliability of WIMU? in the assessment of angle positions and ankle dorsiflexion. The current findings conclude that WIMU? is a valid and reliable instrument to measure angle and joint motions. In short, WIMU? provides a new clinical and sportive method of angle measurement. © 2019 by the authors. Licensee MDPI, Basel, Switzerland.

Angle assessment

Dorsiflexion

Inertial device

correlation

reliability analysis

adolescent

ankle

Article

concurrent validity

controlled study

correlation coefficient

functional assessment

human

human experiment

joint angulation

joint mobility

male

measurement

musculoskeletal system parameters

normal human

reliability

validation study

videorecording

devices

equipment design

football

joint characteristics and functions

pathophysiology

physical examination

physiology

procedures

reproducibility

sport injury

Adolescent

Ankle Joint

Athletic Injuries

Equipment and Supplies

Equipment Design

Football

Humans

Male

Physical Examination

Range of Motion, Articular

Reproducibility of Results