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The reliability and criterion validity of the Goniometer Pro app in comparison to the Standard Goniometer when measuring knee flexion angles

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Abstract

Introduction: The Standard Goniometer (SG) measures Range of Motion (ROM). It is an outcome measure for establishing treatment effectiveness. Reliability and validity of the Goniometer Pro App (GPA) was investigated.

Aim: The purpose of this study was to investigate reliability and criterion validity of a Goniometer Pro app in comparison to the standard Goniometer whenmeasuring knee flexion angles.

Method: Six raters measured eighteen different knee angles six times using the SG and GPA.

Results: High Intraclass Correlation Coeffiecient (ICC) values between and within raters were reported for the SG (ICC >0.914) and GPA (ICC >0.996). Standard Error of Measurement (SEM) revealed good agreement between measurements with both devices (SEM<1.4°). Pearson correlation coefficient of 0.987 showed good correlation between the SG and GPA indicates criterion validity of the GPA. A scatter plot revealed that the GPA measures larger angles compared to the SG. The GPA has higher inter- and intra-rater reliability than the SG. The GPA delivers more constant readings than the SG and showed good correlation to the SG.

Conclusion: The GPA is reliable and has criterion validity to be used as an alternative device for measuring ROM of knee flexion angles. The GPA should be used cautiously for diagnostic purposes because it measures larger angles, thus can be useful for assessing change in ROM.

Keywords: goniometer; standard goniometer; Smartphone applications; goniometric devices; validity and reliability.

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