Shadow Goniometer

ABSTRACT

Background: Clinicians and researchers use Isokinetic moving devices and Electro goniometer to quantify the movement sense and position sense respectively. The high cost and the seldom availability of such devices in Indian market gives less opportunity to do research as well as accurately measure the proprioception of joints. Hence Shadow goniometer was developed and designed to analyze proprioception during a research study where the joint position sense (proprioception) of knee joint need to be measured pre and post intervention. However the reliability and validity of this new method need to be investigated so that this tool can be used to measure the joint position sense.

Design: A Correlative study was employed for assessing the intraratar reliability and concurrent validity of shadow goniometer with standard goniometer.

Methodology: Ten healthy subjects were selected with an age group of 20 to 25. The standard goniometer was used to measure knee flexion followed by Shadow goniometric measurement of knee flexion. The knee flexion was measured according to the guidelines given by Cynthia C. Norkin. The measurements were repeated with shadow goniometer on second day to find out the reliability of the instrument.

Results: The statistical analysis of Intraclass correlation and Karl Pearson’s correlation were used to find intraratar reliability and concurrent validity, and found to be statistically significant. The shadow goniometer was found to be a good reliable with Intraclass correlation of 0.993(p value < 0.0001) and valid tool with correlation coefficient 0.996(p value < 0.0001) in measuring knee flexion range of motion. This psychometric properties mainly depends up of the less human error made while using the shadow goniometer, as the calibration made at the beginning of measurement will not change throughout the procedure of measurement.

Conclusion: The shadow goniometer found to be a reliable and valid tool for measuring knee flexion range of motion. Further researches are required to validate this instrument in other joints. This instrument can be used to measure joint position sense instead of electro goniometer. This method is another reliable way of measuring joint range, but further studies are required in other joints.

Introduction.

Joint range of motion is measured by Standard goniometer, electrogoniometer etc., but standard goniometer cannot measure joint position sense as the contact of the goniometer with the body will affect joint position sense.

Clinicians and researchers use Isokinetic moving devices and Electro goniometer to quantify the movement sense and position sense respectively. The high cost and the seldom availability of such devices in Indian market gives less opportunity to do research as well as accurately measure the proprioception of joints. Hence Shadow goniometer was developed. However the reliability and validity of this new method need to be found so that this tool can be used to measure the joint position sense.

Methodology

Materials required:

1.OHP
2. Protractor
3.Set squares
4.Wide screen/Wall.
5.Long table
6.Standard Goniometer

Procedure: Subjects in prone lying on table. The knee flexion was measured according to the guidelines given by Cynthia C. Norkin.

Discussion

The objective of the study was to find the reliability and validity of shadow goniometer, comparing with standard goniometer in measuring knee flexion range of motion. The study was done on ten subjects with uniform demographic variables with age group between 20 to 25 years. For the concurrent validity Karl Pearson correlation test was performed. The result showed that the shadow goniometer is a valid tool with correlation coefficient of 0.996 which was statistically significant. This could be due to both standard and shadow goniometer use standard protractor divisions (in degrees) in measuring ROM and in this study the measurements were taken using the guidelines of Cynthia C. Norkin 3 in measurements using standard goniometer and shadow goniometer. The repeated measurements on the same subjects on 1st and 2nd day with shadow goniometer found same result (day one - 132.10 and day two -132.50). This finding could be due to less error from the measurement as once the axis is being fixed, neither the subject nor the shadow goniometer moves. More over the size and contours of the body parts are not affecting the measurements. Thus repeated measurements thus do not change the results obtained. Conclusion: Thus the shadow goniometer is a reliable and valid tool in measuring knee flexion range of motion.

References