

## USE OF A MOBILE MEASUREMENT TOOL FOR ASSESSING BALANCE

Krause, DA, Anderson SE, Campbell GR, Davis SJ, Tindall SW, Hollman JH

Mayo Clinic

No Funding

This study was approved by the Institutional Review Board at Mayo Clinic. Prior to testing, procedures were explained and subjects provided written consent.

**Background and Purpose:** Balance assessment is used by clinicians as part of athlete concussion screening. The King-Devick (KD) Balance Test is a FDA510(K) cleared mobile application to provide an objective sideline assessment. The purpose of this study was to investigate the reliability of the KD Balance Test.

**Subjects:** 25 participants, ages 20-25.

**Methods and Materials:** Three stances were assessed in order: double leg, tandem right, and tandem left. Participants warmed up for 5 minutes, then an iPhone was secured to the midline of their chest with a device holder. The KD app guided all positions and test times. Participants held each stance for 20 seconds with eyes closed and hands on hips. In double leg stance, subjects stood with feet together. In tandem right, the right heel was directly in front of the left toes, while tandem left was the opposite. This test sequence was repeated one week later.

**Analyses:** Group means and standard deviations were calculated along with reliability coefficients.

**Results:** The KD score is a quantitative measure of pitch, yaw and roll via the internal accelerometer of the mobile device. The mean Time1 KD score was  $.84 \pm .75$ . The mean Time2 KD score was  $1.23 \pm 2.42$ . The interclass correlation coefficient was  $.42$  ( $.04 - .70$ ).

**Conclusion:** The use of the KD balance test is unreliable based on the results of this study. Poor reliability may be partially explained by use of a healthy, active population with minimal balance deficits and minimal differences between subjects. Further research is needed with varied subjects to further assess the reliability of the KD balance test.

**Implications:** This study does not find the KD balance test reliable in a healthy, active population.