

Kovaleski JE, Gurchiek LR, Barnard BJ, Schwarz NA. Measurement Reliability of Anterior Translation of the Knee Using a Digitally Instrumented Arthrometer. *J Athl Train*. 2018;53(6):S-330.

Context: Measurement reliability is important when new sports-medicine devices or techniques are developed. The Blue Bay Knee Arthrometer is designed to reproduce the measurement capability of the KT1000 and KT2000 devices with a touchscreen electronic interface for assessing anteroposterior knee joint motion and laxity. Objective and reliable assessment data of normal anterior knee translation is critical before comparison with an injured ACL knee can be made. **Objective:** To determine the reliability of anterior translation measurements obtained from an instrumented knee arthrometer. **Design:** Intratester reliability was examined using a test-retest design. **Setting:** A university sports-medicine research laboratory. **Participants:** Both right and left knees of 20 participants (12 men, 6 women; age 22.5 ± 2.6 years; mass 81.6 ± 24.3 kg; height 173.1 ± 12.4 cm) with no history of ACL injury were tested. **Interventions:** Testing was conducted using the Blue Bay Knee Arthrometer (Blue Bay Medical, Inc., Navarre FL) that detects motion between two sensor pads, one in contact with the patella and the other in contact with the tibia approximately 10 cm distal to the joint line. With the subject lying supine, the examiner used a thigh support to position both knees in 20 to 30 degrees of knee flexion with the feet secured in a support. With a force-sensing handle, the examiner applied an anterior load and an audible “beep” sounded when a 67-N (15 lb.) and 89-N (20 lb.) force was applied through the force handle. A manual maximum test was performed and measured total anterior displacement. The touchscreen electronic interface allowed the examiner to visualize and record the applied loads and resultant translations. The test-retest procedure involved the examiner positioning the arthrometer, measuring and recording knee anterior translation, removing the instrument, and repeating the measurements. Three measurements were recorded for each test-retest trial and the greatest amount of translation achieved was used in the statistical analysis. **Main Outcome Measures:** Intraclass correlation coefficients (ICC 2,1) determined intratester reliability for the instrumented measurement of anterior translation (millimeters) at 67-N, 89-N, and manual maximum. The standard error of measurement (SEM) was calculated to provide an estimate of precision. **Results:** Excellent ICCs for intratester reliability were found (67-N load: ICC = .933 (95% CI, .877-.964); Trial 1 = 4.88 ± 2.0 mm, Trial 2 = 4.87 ± 1.9 mm (95% CI, 4.43-5.31 mm); 89-N load: ICC = .935 (95% CI, .880-.965); Trial 1 = 6.16 ± 2.2 mm, Trial 2 = 6.20 ± 2.2 mm (95% CI, 5.69-6.67 mm); Manual Maximum: ICC = .922 (95% CI, .858-.958), Trial 1 = 8.04 ± 2.0 , Trial 2 = 8.13 ± 1.77 mm (95% CI, 7.77-8.50). The SEMs indicated high precision of anterior knee translation measurement (range, .369 to .407 mm). **Conclusions:** The results are clinically useful in providing information about reliability and objective measures at different force loads for reproducible anterior knee-translation measurement using the Blue Bay Knee Arthrometer.