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The Reliability of an Isokinetic Dynamometer and Force Gauge in Measuring Core Strength

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PURPOSE: To determine the test-retest reliability of the isokinetic dynamometer (ID) and a portable analog force gauge when measuring voluntary peak torque and average peak force of isometric trunk flexion and extension. **METHODS:** Eighteen students (aged 19.5 ± 0.9) completed all aspects of the study. Subjects participated in a familiarization session prior to data collection sessions. Testing sessions consisted of three maximal contractions of the abdominals and back extensors (five seconds each) on each device, with 30 seconds of rest allowed in between repetitions and 90 seconds between sets. Subjects were measured with a goniometer for any change in hip-torso angle, and any measurement exceeding 10° of motion was discarded and re-tested. Subjects were asked to return for two subsequent testing days post-familiarization to repeat the protocols. All tests were separated by at least 24 hours and performed at the same time of day. An Intraclass Correlation Coefficient (ICC) was used to determine within-day reliability and dependent t-tests were used to compare day-to-day reliability ($p > 0.05$). **RESULTS:** Results yielded an average peak torque of 14.31 ± 3.42 Nm and 12.45 ± 4.44 Nm on the ID extension and flexion protocols respectively. With the exception of the first day of extension peak torque ($ICC = 0.500$), the ID demonstrated good within-day reliability ($0.914 < ICC < 0.942$), as well as good day-to-day reliability for both flexion ($p = 0.22$) and extension ($p = 0.11$). The force-gauge measured flexion and extension of the average peak force during the contraction at 7.01 ± 2.53 N and 7.43 ± 2.26 N respectively. The force-gauge demonstrated good within-day reliability on all testing measurements ($0.870 < ICC < 0.924$), no difference between day-to-day testing for flexion ($p = 0.94$), but not for extension ($p = 0.02$). **CONCLUSION:** This study confirms that the ID is a reliable means of testing isometric trunk strength, and that it has good test-retest reliability. The force gauge apparatus also demonstrated good within day reliability and test-retest reliability with flexion measures. The force gauge apparatus demonstrated test-retest reliability in flexion measures, meaning that it may be used as a potentially more cost-effective measure of strength progression in a clinical setting.