Intrasession and Intersession Reliability and Precision of Knee Internal/External Rotation Proprioception

Takashi Nagai, Timothy C. Sell, Takumi Nakagawa, Joseph B. Myers, Freddie H. Fu FACSM, Scott M. Lephart FACSM.
Neuromuscular Research Laboratory, University of Pittsburgh, Pittsburgh, PA, University of Tokyo, Japan

Knee internal/external rotational (IR/ER) instability in ACL-d knees has been reported, and associated with early progression of osteoarthritis, potentially related to lack of proprioceptive information. The integrity of proprioceptive information through conscious appreciation can be evaluated by joint position sense (JPS), threshold to detect passive motion (TTDPM), force sense (FS), and velocity sense (VS); however, few studies are available examining knee IR/ER. **PURPOSE:** To assess intrasession and intersession reliability (intraclass correlation coefficient (ICC)) and precision (standard error of measurement (SEM)) of JPS, TTDPM, FS, and VS. **METHODS:** Ten healthy individuals (5 males, 5 females) participated in two sessions one week apart. All testing was performed on an isokinetic dynamometer with the subjects' hip and thigh fixed at 90° of knee and hip flexion. An air-cushioned boot was used to isolate knee rotation on a fixed thigh. JPS was performed actively or passively, moving to IR and ER target positions. TTDPM was performed by having the subject signal when movement direction was appreciated. For FS, subjects exerted 30% of their peak isometric torque for 5 seconds with visual feedback; then, reproduced without visual feedback. For VS, subjects' knee was passively rotated by dynamometer at 20°/sec followed by the subject actively reproducing the velocity. For measures, the differences between the target and reproduced values were used for analyses. The middle three out of five trials were used in the intrasession, and the average of middle three out of five trials between day 1 and day 2 were used in the intersession reliability and precision. **RESULTS:** The intrasession ICC (SEM) were 0.64±0.20 (1.48±0.67°) for JPS, 0.75±0.06 (0.33±0.05°) for TTDPM, 0.80±0.08 (0.36±0.10Nm) for FS, and 0.65±0.09 (1.19±0.24°/sec) for VS. The intersession ICC (SEM) ranges were 0.49±0.19 (0.95±0.28°) for JPS, 0.84±0.09 (0.23±0.09°) for TTDPM, 0.86±0.03 (0.26±0.09Nm) for FS, and 0.63±0.13 (1.08-0.14°/sec) for VS. **CONCLUSIONS:** The intrasession and intersession reliability and precision were observed good to excellent for TTDPM and FS and moderate to good for JPS and VS. Knee IR/ER proprioception could be feasible in future studies dealing with IR/ER instability.