

Dynamic Testing for Occult Pelvic Ring Instability Lacks Standardization and Reproducibility

Adam K. Lee MD; Douglass Tucker BS; Geoffrey Marecek MD; Cory Alan Collinge MD
Keck School of Medicine of USC, LOS ANGELES, CA, United States

Purpose: Stress examination under anesthesia (EUA) after pelvic ring injury is commonly used to identify occult instability, the rationale being that unstable disruptions may displace causing morbidity. Many tests are used in medicine to guide treatment, but tests should be standardized and reproducible. Although promising, EUA for occult pelvic ring instability has not been standardized regarding force applied during examination. The purpose of this study is to determine the forces applied during the components of pelvic EUA between and repeated by experienced pelvis surgeons.

Methods: Fellowship-trained orthopaedic traumatologists performed similar multiplanar EUA on a single cadaver including internal rotation (IR), external rotation (ER), and push-pull (PP) on each leg utilizing a hand-held digital dynamometer. All surgeons used a similar method, and each expert performed EUA 3 times separated by a brief intermission. The maximum force applied was determined in Newtons (N).

Results: 21 surgeons were assessed. Six surgeons (28.6%) had been practicing <5 years, 6 (28.6%) for 6-10 years, 6 (28.6%) for 11-20 years, and 3 (14.3%) for >20 years. Six (28.6%) practiced in the US West, 6 (28.6%) in the US South, 3 (14.3%) in the US Northeast, 3 (14.3%) in the US Midwest, and 3 (14.3%) internationally. Surgeons applied a force ranging from 40.4 to 374.9 N during IR, 72.9 - 338.4 N during ER, 92-262 N during PP right, and 25.3-323.2 N for PP left with significant variability seen between surgeons (Fig. 1). Three surgeons (17.6%) had >50-N range on repeat trials of IR.

Conclusion: This is the first study to report force applied during an EUA to assess for pelvic ring stability. There was significant variability among surgeons performing the examination and in repeated exams by the same surgeon. This suggests that results of EUA may be surgeon-dependent. Further study is needed to determine what applied force should be used to assess pelvic stability.

