Verification of Force Sensor Apparatus Data using Expert Grading of a Radical Prostatectomy Nerve Sparing Simulation


Simulation Innovation Lab, Department of Urology, University of Rochester Medical Center, NY

Disclosures: None
@SimLabURMC
Objective: Verify how accurate the force sensors are at indicating neurovascular bundle (NVB) injury by comparing it’s results to injuries determined by an expert surgeon.

Methods:

- Development of apparatus (sensor + algorithm) that records force, and translates to NVB insults.
- 5 expert surgeons (>250 cases) completed the nerve sparing (NS) simulation.
- Their NS was graded by another expert (baseline).
- Sensor and expert insult indication were compared to quantify accuracy.
Data Analysis:
  • Excessive forces = minimum peak prominence over 0.1x standard deviation of the overall force.

Statistical Analysis
  • Sensitivity = 67.73%
  • Precision = 70.29%
  • F1 score = 0.7071

Conclusion:
  • The addition of sensor provides a standardized and reproducible metric for NVB detection during NS.
  • Removes the need for mentor review; an advantages not seen in other simulation platforms.
  • Further steps are required to utilize it as a feedback, training and assessment tool in NS-RARP simulation.