

AnatomyAdvances 2026: Bridging Clinical and Surgical Anatomy for Medical Progress

Conference Proceedings

May 26, 2026 - (Virtual)

Curricular Integration of Cadaveric Knee–Based Surgical Training within a Newly Established Surgical Anatomy Learning Center: An Outcomes-Based Educational Evaluation

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Abstract

Background: In alignment with World Federation for Medical Education (WFME) standards emphasizing competency-based training, integration of basic and clinical sciences, and the use of appropriate educational resources, a Surgical Anatomy Learning Center was newly established at Princess Nourah bint Abdulrahman University. As part of its formal training schedule, a cadaveric knee–based surgical module was introduced to address limitations of mannequin-based simulation and enhance anatomical realism, procedural competence, and learner outcomes. This study evaluated the educational impact of this initiative as a center launch activity during January 2026.

Methods: A structured cadaveric knee surgery two-day training module was delivered to 35 orthopaedic residents as part of the center’s curriculum. The training focused on applied surgical anatomy, instrument handling, portal placement, spatial orientation, and procedural sequencing using human cadaveric knees. Educational outcomes were assessed through pre- and post-training evaluations using a validated technical skills questionnaire (maximum score: 20). Learner satisfaction and perceived educational value were measured using a 5-point Likert scale. Outcome data were analyzed using a paired t-test, consistent with WFME-recommended program evaluation practices.

Results: Mean technical skill scores increased significantly from 12.1 ± 2.3 pre-training to 17.4 ± 1.6 post-training ($p < 0.001$). Significant improvements were observed in anatomical structure identification ($p = 0.002$), hand–eye coordination ($p = 0.004$), and procedural confidence ($p < 0.001$). Learner satisfaction was high (mean score 4.7 ± 0.4), with 94.3% of participants rating the module as essential to the training program and superior to mannequin-based simulation.

Conclusion: The integration of cadaveric knee–based surgical training within a Surgical Anatomy Learning Center aligns with WFME standards for outcomes-based, learner-centered medical education. As a flagship center launch initiative, this program demonstrates measurable educational impact and establishes a sustainable framework for competency-driven surgical training. Institutional investment in anatomy-based education supports the development of reproducible, high-quality models for academic medical centers committed to competency-based curricula.

Keywords: Cadaveric Training, Surgical Anatomy Education, Orthopaedic Residency, Curriculum Innovation