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Promoting Technology and Collaboration

Novel Augmented Reality-Based Surgical Simulator Empowering the Modern Surgical Team: Bridging Skill Gaps in the Digital Era

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Background: The landscape of post-graduate education in surgical skills has transformed significantly, driven by factors like the COVID-19 pandemic and an increased focus on patient safety. This shift has led to a greater reliance on simulated technology for skill practice and assessment.

Technology Overview: (LapAR™) is a Novel Augmented Reality-based surgical simulator/training suite producing natural haptics from soft tissue models in combination with integrated screen-based digital overlays for immersion & objective performance capture. The take home version of the (LapAR™), the technology utilized in this study, allows for distant learning, where trainees can perform basic skill tasks, as well as full surgical procedures by connecting the simulator to their PC.

Potential Application in Surgical Simulation and Education: This study evaluates the effects of the take home (LapAR™) on junior surgical trainees' skill acquisition and overall experience. It involved 15 trainees and 2 consultants across three training sites. Trainees performed ten appendicectomies, interspersed with relevant (LapAR™) tasks. Objective measurements of completion time and distance were collected, followed by interviews. Improvements in completion time and distance during repeated laparoscopic appendicectomies, along with enhanced smoothness, acceleration, and ambidexterity were observed among surgical trainees. It is of interest that the consultant benchmarking saw improvements largely in distance travelled, and somewhat in acceleration. Qualitative analysis emphasized (LapAR™)'s relevance in early surgical training, advocating mandatory integration. Participants sought extended technology access, valuing it for list prep, skill acquisition, and knowledge enhancement. Home training offered flexibility, contrast from high-pressure theatres. Despite technical challenges, (LapAR™) offered realistic educational benefits.

Potential Opportunities to Collaborate: (LapAR™) simulation highlights collaborative opportunities for surgeons and engineers. Integrating AR into training showcases cross-disciplinary synergy. Surgeons' insights and engineers' skills can enhance AR's applications, and address challenges together to ensure better surgical and educational outcomes.

