Dr. Danny P. Goel

"Immersive Virtual Reality Effectiveness in Orthopaedic Education: A Randomized Controlled Trial"

Immersive virtual reality (iVR) is at the forefront of surgical simulation in orthopaedic surgery. This technology allows the user to combine high-fidelity audiovisuals with sense of touch, or haptics, in a simulated operating room environment. Portability, cost-effectiveness, and design principles rooted in behavioral science concepts of deliberate practice provide theoretic benefits in learning using iVR systems. Evidence previously provided by our research group and the CSES shows that iVR provides rapid, efficient learning with demonstrable transfer of skills to realistic operating room scenarios. Traditional training structures such as the use of cadavers lacks evidence despite widespread use. Our goal is to characterize patterns of learning to produce more competent and proficient surgeons. To achieve this end, the value of iVR in teaching complex surgical skills must continue to be studied. The funding provided by the COF and CSES will allow for continued protocols to rigorously validate iVR compared to other traditional learning methods. We will be completing a randomized controlled study of orthopaedic trainees to directly compare the learning effects of iVR compared to training on cadavers. This has never been performed and could signal a paradigm shift in thinking in surgical education towards enhancing or perhaps reducing the need for costly cadaver-based laboratories. Effective use of iVR technology in transferrable motor skills will also be studied. The current generation of iVR allows for haptic feedback and will be used to assess how well it can teach basic orthopaedic skills to novices compared to other currently available products. We may see that the seminal research changing the structure of orthopaedic training around the world provided by the COF, CSES and PrecisionOS Technology.