

VIRTUAL REALITY SIMULATION TRAINING IN ORTHOPAEDIC SURGERY

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ABSTRACT

Orthopaedic educational curricula have traditionally been centered on reading, lectures, clinical and surgical experience. In this technical and skill-based discipline, there is considerable interest in utilizing virtual reality-based simulators to augment resident education. Simulation-based training offers an opportunity to learn and practice specific skill sets and procedures in an accessible, safe environment. With rapid advances in technology virtual reality (VR) simulation training has the potential to be transformative to residency training. Consistent evaluation tools and evaluation of the transferability of the training experience to the operating room are imperative to determine the effectiveness of this learning modality. Modularity of VR-systems allows for adaptability for learning multiple techniques and for cost efficacy.

Keywords: virtual reality simulation, orthopaedic surgery, resident training

INTRODUCTION

Residency training in orthopaedic surgery, as in other surgical disciplines, involves acquisition of a core base of knowledge specific to the field, as well as development and skilled application of technical skills. Medical knowledge is conveyed by traditional methods such as didactic lectures, seminars and symposia, and discussions with surgical faculty. Technical training is based on a 5-6-year apprenticeship model involving observation, and as training progresses, assisting in surgical procedures [1] with eventual one-on-one proctored cases. The traditional process of reading surgical technique guides, textbooks, and journal articles in modern training is supplemented with watching videos, use of easily quick online mobile references and nationwide large group training by subspecialties (e.g., FOCAL) [2].

Increased hours of hands-on training have been demonstrated to increase technical proficiency[3]. The need for extended training reflects the steep learning curve associated with many orthopaedic surgical procedures [4-6]. There are many constraints on the time available for orthopaedic residents to practice and gain experience. In 2003, the Accreditation Council for Graduate Medical Education (ACGME) introduced regulations that limited the resident work week to 80 hours [7]. In 2020, the decrease in surgical volume secondary to the Covid-19 pandemic brought about efforts to bridge the technical gap in residency training [8].