ACS 2023 Surgeons and Engineers: A Dialogue on Surgical Simulation Meeting

Challenges in Surgical Education

Teaching the Surgeons: A Novel VHA-Based 3D Printing Fellowship for General Surgery Residents

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Background: Three-dimensional printing (3DP) has been utilized at the Point of Care (POC) in many capacities, one of which is the field of surgical planning. 3DP has been applied broadly in the field of surgery in the following categories: anatomic models, surgical instruments and implants and prostheses. Broadly, 3DP has been utilized successfully in surgery due to its ability to allow for rapid transformation or conversion of anatomical images into physical objects. Surgical applications with 3DP fall into three broad time points: pre-operatively (pre-procedural planning), intra-operatively (incisional or marking guides) and post-operatively (case review and simulation).

Current Challenges: Despite the broad surgical application of 3DP technology, there are no known formal training pathways in 3DP for surgeons outside the VA system nor within it.

Need of Innovation: The Veteran's Affairs Health Care System (VHA) has created the Office of Advance Manufacturing (OAM) to aid in the diffusion and successful application of 3DP at POC. Part of this effort has been to establish broad and focused educational offering to aid in the successful surgical application of the technology. OAM has funded the first piloted training program (academic year 2021-2022) for a dedicated 3DP fellowship for general surgery. The goal of the program was "to provide to surgical trainees an extensive exposure to 3D Printing as it applies in the clinical environment". Supporting objectives: 1. recognize the essential materials in the 3DP Process, 2. understand the common types of 3D printers, 3. appreciate the essential steps in 3D model segmentation, 4. recognize the positive and negative aspects of patient imaging approaches as it pertains to 3D model creation and 5. apply the essential steps in communicating with surgeons regarding potential and actualized 3D printed models. Learner and program assessments have been undertaken on this inaugural fellowship class.