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How do we teach surgical residents in the COVID-19 era?

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OBJECTIVE: In response to ongoing concerns regarding transmission of the novel coronavirus (COVID-19), surgical practice has changed for the foreseeable future. Practice guidelines recommend only urgent or emergent surgical procedures be performed to minimize viral transmission. This effectively limits standard training and practice for surgical residents. The purpose of this article is to describe opportunities in surgical simulation, and highlights the challenges associated with training in the COVID-19 era.

DESIGN: This is a perspective summarizing the potential role of surgical simulation to target training gaps caused by decreased surgical caseloads.

CONCLUSIONS: This manuscript concisely discusses simulation options available to training programs, including the novel concept of “surgical kits.” These kits include all instruments necessary to simulate a procedure at home, effectively pairing safety and utility. (J Surg Ed 77:1005—1007. © 2020 Published by Elsevier Inc. on behalf of Association of Program Directors in Surgery.)

KEY WORDS: Surgical simulation, 3D printing, Surgical kits, Covid-19, Coronavirus, Take-home simulation

Since its discovery in December of 2019, the novel coronavirus (COVID-19) has exhibited sustained transmission across the world. As of April 20, 2020, there were 2.31 million cases of confirmed COVID-19 globally, and 157,847 deaths.1 Although the situation in China appears to be improving, the United States continues to report higher numbers of cases, prompting widespread departure from normal societal activity.

Closure of non-essential businesses, and the implementation of encouraged practices such as social distancing, or the maintenance of at least six feet from other persons, present novel barriers to normal social interaction.

The field of surgery has not been spared. In response, and with guidance from the Centers for Disease Control and Prevention,2 most academic centers have delayed elective surgical cases for the foreseeable future. This has created significant changes in the organization of surgical residency. Inpatient resident teams have been debulked to minimize exposure to the virus, didactics and grand rounds are digital, and only urgent or emergent consults are staffed by on-call residents. Perhaps most significantly, surgical residents are not operating.

Surgical training and prevention of skill decay should be a priority for any training center. However, this requires innovation and imagination in the current healthcare environment. How do we teach surgical residents if there are no operations? How can we practice skills if being together risks transmission? When will we resume a normal operative schedule?

Nonuse of procedural skills risks skill decay. In a large meta-analysis of skill decay and retention literature, after 365 days of nonuse or nonpractice, the average participant’s performance was reduced by almost a full standard deviation (d = 0.92).2 There is also evidence that declarative knowledge (i.e., facts, laws or concepts) decays at a slower rate than procedural knowledge (i.e., multiple physical steps that must be performed to complete a task).3,4 In light of these concerns, surgical simulation appears to offer utility of both safety and procedural training for the surgical resident.

In an effort to address current limitations on procedural education in our otolaryngology program, we have designed “simulation kits” to be distributed to otolaryngology junior residents. These models will be 3D printed in silicon, and are aimed to represent either important surgical skills (i.e., soft tissue handling, local flaps, intubation, tracheotomy), or commonly seen otolaryngology consults (i.e., facial lacerations, auricular hematoma, Figure 1). Over the past month, we have distributed a new ‘surgical kit’ for each junior resident on a weekly basis, which they can take home. Each kit includes the materials necessary to perform the relevant...
procedure (Figure 2), (Table 1). Each kit is linked to an online module with an associated case and description, and the procedure is discussed virtually with a senior resident and otolaryngology attending after completion. Pre and post surveys are provided to the residents to evaluate the utility of the exercise.5

Although we are actively designing novel models for future kits, there are numerous previously published, validated and easy-to-build options in the literature we intend to take advantage of.5,6 In addition, we see opportunities to support simulation exchange, whereby institutions or departments share models following use.

In the worst healthcare crisis of recent history, innovation and imagination are needed. We aim to improve surgical training for junior residents, but training gaps persist that require creative solutions. How do we train without patients, and how do we do this at a distance? We hope other institutions will take similar steps to improve surgical training for surgical residents, and appreciate the opportunity to collaborate and address this issue together.
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PRIOR PRESENTATION

None prior

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