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### DISCLOSURE

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areas of the specialty.<sup>5</sup> Successfully implementing this teaching modality required overcoming medicolegal challenges, the logistical and technical details involved in the creation of this educational modality, and educational hurdles.

In coordination with the Yale School of Medicine and the Yale Graduate Medical Education office, the virtual rotation was registered as a formal course for credit through the Association of American Medical College's Visiting Student Application Service, identical to in-person visiting electives. By formally registering for the virtual rotation through the Visiting Student Application Service, virtual rotators met the same medical malpractice liability coverage and Health Insurance Portability and Accountability Act requirements as in-person rotating subinterns. Many of the participating students used the virtual rotation toward clinical credit for their graduation requirements. In addition, patients completed written consent forms for the hospital and university, giving permission to livestream surgery. (See Document, Supplemental Digital Content 1, which shows the photographic consent form for patients agreeing to participate in the livestream surgery, <http://links.lww.com/PRS/E735>.) These steps enabled clinical information to be shared freely with students in a remote learning environment.

The technical challenges included high-quality visual capture of the surgery, real-time transmission to enrolled students, and real-time interactive communication between students and the surgical team. For image capture, we utilized a high-definition resolution, loupe-mounted camera with two-times and three-times magnification options. Loupe magnification enabled optimal macro image transmission for viewing of detailed surgical anatomy. For more macroscopic surgeries, a nonmagnified camera would be preferable. The high-definition camera captured images onto a computer that livestreamed images to the virtual participants using a Zoom platform (Zoom Video Communications, San Jose, Calif.) with password protection. To enable real-time two-way communication, speakers were strategically placed in the operating room to allow faculty and students to continuously discuss the case (Figs. 1 and 2).

The virtual surgery curriculum included one live surgery per day spanning the breadth of plastic surgery, which replicated many of the benefits of being physically present in the operating room. Students could view a surgery step by step from the attending's viewpoint. In addition, a multitude of students can simultaneously participate in the same case, unlike with in-person rotations. Participants were able to reference case-relevant study materials during the operation, which may enhance understanding of the procedure.

Related digital media are available in the full-text version of the article on [www.PRSJournal.com](http://www.PRSJournal.com).



### Implementing Live Virtual Surgery in the COVID Era: Overcoming Medicolegal, Technical, and Educational Hurdles

**D**ue to current health concerns related to the coronavirus disease of 2019, remote learning has been adopted at every academic level. In congruence with policies drafted by academic surgical societies, a majority of medical schools nationwide have decided against accepting visiting medical students.<sup>1,2</sup> As such, there has been an emergence of virtual adaptations of educational sessions and clinical rotations across a variety of medical specialties.<sup>3,4</sup> Because surgical education occurs primarily in the operating room, adopting a virtual model for surgical education presents distinct challenges. At the Yale School of Medicine, we designed the first virtual surgical rotation format to center around livestream plastic surgeries across key



**Fig. 1.** Setup of the live-stream surgery, with images transmitted to participants via Zoom, with password protection and communication between surgeon and applicants in real time.

The development of live virtual surgery poses some initial challenges, but ultimately it can be replicated with ease to create a surgical rotation more authentic to the in-person experience as pandemic restrictions continue. By elucidating the process by which we implemented livestreamed surgeries, other interested institutions will be able to easily traverse the necessary medicolegal and technical aspects of constructing similar models.

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**Fig. 2.** High-definition resolution, loupe-mounted camera was used for the video streaming of the procedures from the surgeon point of view.

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### Plastic Surgeons in TikTok: Top Influencers, Most Recent Posts, and User Engagement

Social media platforms enable plastic surgeons to interact with a wide audience, including other providers, trainees, and patients. Plastic surgeons, in particular, can benefit from visual-based platforms and are frontrunners among physicians in the adoption of social media.<sup>1</sup> Some plastic surgeons are even recognized as social media influencers. Influencers are content producers with established credibility in a specific field and a large enough following to “influence” public perception. As influencers, plastic surgeons can improve patient knowledge and affect health-related behaviors.<sup>2</sup> Platforms such as Instagram, Facebook, and Twitter have been shown to be influential in plastic surgery patient populations.<sup>1,3</sup> However, the literature lacks evaluation of plastic surgery content in TikTok (ByteDance, Beijing, People’s Republic of China), the most downloaded mobile application on Android smartphones and iPhones in 2020.<sup>4</sup>

TikTok is a feed-based, video-sharing social media platform that has increased in popularity since its 2017 release. As of August of 2020, there are over 100 million monthly active users in the United States alone.<sup>4</sup> Unlike other social media platforms, TikTok’s algorithm creates a video feed of user-generated content that is agnostic to followership, thereby allowing videos to reach a broader audience. TikTok is more community-oriented than other social media platforms. It is not geared toward marketing, and sponsored content is less prevalent. The application offers creators (e.g., plastic surgeons) tools to create videos responding directly to questions, comments, and videos from other users (e.g., patients). Engaging with patients in real time on the platform allows plastic surgeons to promote evidence-based medicine, correct misinformation, and ease patient anxiety.

To understand how plastic surgery influencers are using TikTok, we conducted a cross-sectional study to determine the most influential plastic surgeons

on the platform. These plastic surgeons were identified using the number of followers on February 19th, 2021. Their five most recent posts were categorized as “educational,” if a condition or procedure was explained, “advertisement,” for any sponsored content, and “personal,” if the content was unrelated to plastic surgery. In addition, the anatomical location of the procedure or condition exhibited was identified along with the patient’s sex when determinable. Usage of unique TikTok features was also documented.

The results are displayed in Table 1. One female influencer ranked among the top 10. The influencers had, on average, 13 years of practice and all were American Board of Plastic Surgery–certified, except for those based outside the United States. Most plastic surgeons (90 percent) responded to patient comments with videos using TikTok’s functionality. Among the most recent posts, 76 percent were educational, 20 percent were personal, and 4 percent were advertisements. The most-liked post (496,600 likes) depicted a male patient undergoing an aesthetic abdominoplasty and the postoperative results.

Patients utilize social media to learn more about plastic surgery, and much of that is aesthetic surgery.<sup>2</sup> Board-certified plastic surgeons have the opportunity (and obligation) to be leaders in this domain. We can rectify misinformation from providers with lesser training and credentialing, and offer educational content catered to patient needs, supporting the quality and safety of our practice.<sup>3</sup> Improving the presence of educational content and perspectives from board-certified plastic surgeons on TikTok may improve patient experiences in plastic surgery.

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