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Urologic Education in the Era of COVID-19: Results From a Webinar-Based Reconstructive Urology Lecture Series



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OBJECTIVE	To determine the response to a virtual educational curriculum in reconstructive urology presented during the COVID-19 pandemic. To assess learner satisfaction with the format and content of the curriculum, including relevance to learners' education and practice.
MATERIALS AND METHODS	A webinar curriculum of fundamental reconstructive urology topics was developed through the Society of Genitourinary Reconstructive Surgeons and partnering institutions. Expert-led sessions were broadcasted. Registered participants were asked to complete a survey regarding the curriculum. Responses were used to assess the quality of the curriculum format and content, as well as participants' practice demographics.
RESULTS	Our survey yielded a response rate of 34%. Survey responses showed >50% of practices offer reconstructive urologic services, with 37% offered by providers without formal fellowship training. A difference in self-reported baseline knowledge was seen amongst junior residents and attendings ($P < .05$). Regardless of level of training, all participants rated the topics presented as relevant to their education/practice (median response = 5/5). Responders also indicated that the curriculum supplemented their knowledge in reconstructive urology (median response = 5/5). The webinar format and overall satisfaction with the curriculum was highly rated (median response = 5/5). Participants also stated they were likely to recommend the series to others.
CONCLUSION	We demonstrate success of an online curriculum in reconstructive urology. Given >50% of practices surveyed offer reconstruction, we believe the curriculum's educational benefits (increasing access and collaboration while minimizing the risk of in-person contact) will continue beyond the COVID-19 pandemic and that this will remain a relevant educational platform for urologists moving forward UROLOGY 152: 2–8, 2021. © 2021 Elsevier Inc.

The first US case of coronavirus disease 2019 (COVID-19) was diagnosed in Washington State in January 2020, and the emerging pandemic has had lasting effects on socioeconomics and healthcare delivery throughout the United States.¹ Additionally, the pandemic affected graduate medical education in unprecedented ways. As a result, residency programs had

to adapt quickly beyond the 2020 academic year to meet educational needs of learners across all levels of training.²⁻⁴ Record high rates of infections during the second wave of the pandemic suggest that these adaptations will continue to be a key part of the medical community's response.

Urology training programs in particular have been affected by these challenges, with some researchers citing outpatient urologic procedures (benign procedures, lower urinary tract surgeries, and andrology) among those most affected by the restrictions.⁵ In response to these unique limitations, programs turned to technology in order to mitigate the impact of the loss of direct clinical exposure, while maintaining safety through social distancing. Indeed, several programs report utilizing teleconferencing, virtual learning platforms, recorded lectures, and surgical videos in place of in-person teaching.⁵⁻⁸ However, few studies have queried learners to determine the response to

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an online learning platform and whether content presented is relevant.

We hypothesized that an online learning platform could be an effective and flexible tool to present topics in urologic reconstruction and that these subspecialty topics are relevant to urology trainees and those in practice. Here we report our experience with delivery of an online webinar-based curriculum in reconstructive urology endorsed by the Society of Genitourinary Reconstructive Surgeons (GURS).

METHODS

Educational Series

A series of online lectures spanning broad topics in reconstructive urology was organized as a joint effort between GURS, the Urology Institute at University Hospitals Cleveland Medical Center, Case Western Reserve University School of Medicine, the State University of New York - Upstate Medical Center Department of Urology, and Eastern Virginia Medical School Department of Urology.

Topics were selected to span common cases encountered in urologic reconstruction (e.g. urethral stricture disease, urologic trauma, urinary incontinence), as well as topics representing emerging fields in reconstruction (eg, gender affirming surgery), in order to inform general urologic care of these patients. Field experts delivered live lectures weekly to an online audience between April and July 2020 via the Zoom Webinar platform (Zoom Video Communications, Inc., San Jose, CA). In addition to live broadcast, lectures were recorded and uploaded to YouTube for future review and development of a curriculum library. Lectures involved audience participation through polling software, panel discussions, and question-and-answer segments.

To determine the reach of the current educational program, registration data at the city, state, and country levels were recorded at the time of participant registration.

Surveys

At the conclusion of each lecture, viewers were asked to complete a survey regarding several self-reported demographics, as well as their level of training and local practice patterns. Respondents were assigned a unique survey link and once a response was entered, the survey was locked out in order to prevent duplicate entries. The survey included 6 questions to gauge response to the online curriculum. Questions were scored on an ordinal 5-point scale (higher values representing increased agreement). Survey questions are included in **Supplementary Table 1**.

Statistical Analysis

Survey responses were used to determine group medians amongst all participants across levels of training (APPs, Trainees, and Attending Physicians). Sub-group analyses were performed between junior residents, senior residents, and fellows. Group responses were compared using a Kruskal–Wallis one-way analysis of variance (ANOVA) to determine group differences. Post hoc testing for multiple comparisons was performed using Dunn's multiple comparisons test. Threshold for statistical significance was set at $P < .05$ a priori. All statistical analysis was performed using GraphPad Prism (GraphPad Software, Inc., CA) and Stata version 13.1 (StataCorp, College Station, TX).

RESULTS

Lecture Series

Overall, a total of 21 live lectures were delivered. A complete list of lecturers and content topics is demonstrated in **Supplementary Table 2**. Additionally, publication of the lecture series to YouTube, has yielded a total of 12,478 views between January 1, 2020 and September 2, 2021. **Supplementary Table 3** demonstrates the most viewed topics.

Respondent Demographics

A total of 657 viewers registered for the lecture series. Of these, 224 viewers responded to the lecture series survey, for a response rate of 34%. Respondent demographics are demonstrated in **Supplementary Table 4**.

Registration Heat Map

While the majority of registered participants were located within the region of the primary hosting institution, the lecture series expanded nationally and internationally. **Figure 1A** represents geographical distribution of the participants from the United States, with participants from a total of 56 Urology programs throughout the country. **Figure 1B** demonstrates the participation worldwide as designated by country, with a total of 49 countries represented.

Practice Demographics

Respondents were asked to comment on the presence of a reconstructive urologist in their practice (**Fig. 2**). Reconstructive surgery was offered in 62% of respondents' practices. A total of 87 of the 224 (39%) respondents noted that fellowship-trained reconstructive surgeons were performing surgery at their institution.

Content Response Statistics

Self-reported baseline knowledge was found to be significantly different across physician level of training ($p < 0.05$; **Fig. 3A**). Post-hoc testing demonstrated this difference was driven by knowledge differences between junior trainees and attendings ($P < .05$), but not trainees and urology fellows.

Content was rated as highly relevant to the clinical scenarios encountered in participants' practices (**Figure 3B**). There was no difference among respondents at different practice levels in this response ($P = .23$), with both attendings and trainees rating our content highly.

Across all levels of training, respondents noted that lectures supplemented their baseline knowledge and addressed gaps in their training (**Fig. 3C**). There was no effect of level of training in this response ($P = .44$).

Curriculum Satisfaction

Respondents were asked to comment on the effectiveness of an online webinar format, overall satisfaction with the lecture series, and how likely they would be to recommend the current lecture series to others. Regardless of scope of practice, all respondents reported high satisfaction with formatting (**Fig. 4A**, $P = .37$) and overall success of the current lecture series (**Fig. 4B**, $P = .09$). Across practice settings, the median response of providers toward recommending the current series was favorable (**Fig. 4C**, $P = .85$).

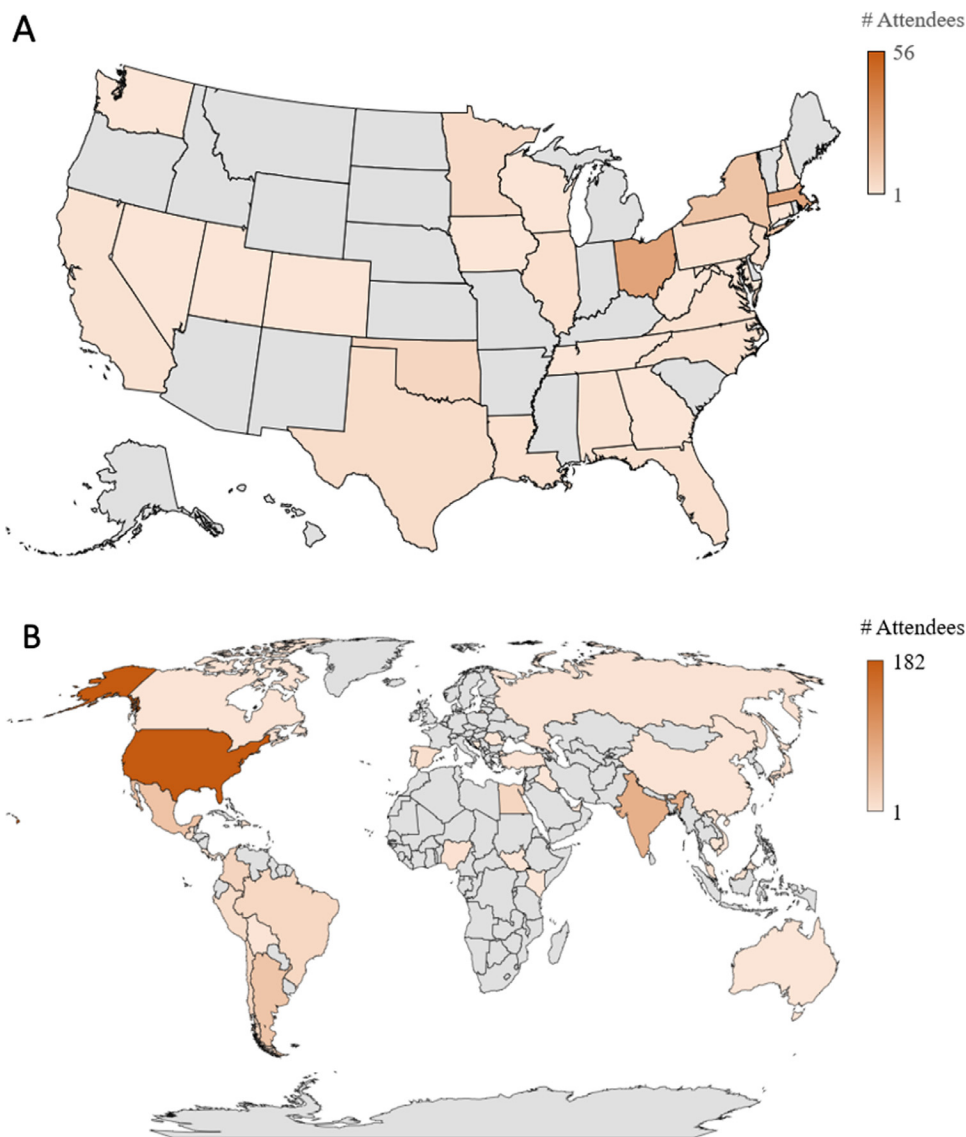


Figure 1. Participant geography. (A) State geographical information for US participants registering for lecture series. (B) International participation denoted by country of origin. (Color version available online.)

DISCUSSION

Program requirements for graduate medical education in urology include regularly scheduled didactic sessions with nine core domains, morbidity and mortality reviews, urological imaging assessment, and academic literature review.⁹ These structured didactics supplement learning that takes place by residents during patient interactions and the development of surgical skills obtained by operating. Together these training tools are essential to achieving milestones of clinical and surgical competency.

The COVID-19 pandemic and associated nationwide bans on mass gatherings, halting of elective surgery, and reduction of urologic consultations, created new barriers to traditional methods of urologic education across these different competencies.^{2,9} As such, Urology training programs were forced to quickly restructure their educational

offerings.^{3,10} While many programs were unable to address the hands-on surgical components of trainee education during the COVID-19 pandemic, these areas are supplemented through improvement in educational didactics.

In addition to structured resident education, COVID-19 has forced the cancellation of academic conferences vital to exchange of information within the medical community.¹¹

During these unprecedented times, we created a virtual curriculum to cover fundamental reconstructive topics encountered most commonly, as well as specialized topics that may be encountered less commonly but represent complex cases in reconstruction. The principal objective of our study was to evaluate the response to a virtual curriculum providing supplemental knowledge in areas of reconstructive urology.

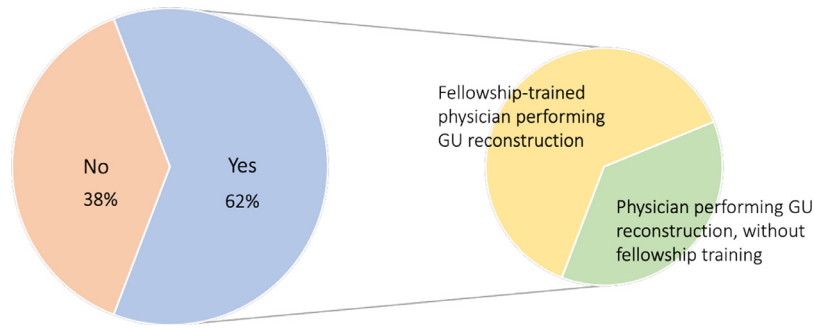


Figure 2. Urology practice demographics. Percentage of practices offering GU reconstruction (left). Presence of fellowship trained urologist (right) among those practices that do offer GU recon. Most practices offer reconstruction, most often performed by a fellowship-trained reconstructive urologist. (Color version available online.)

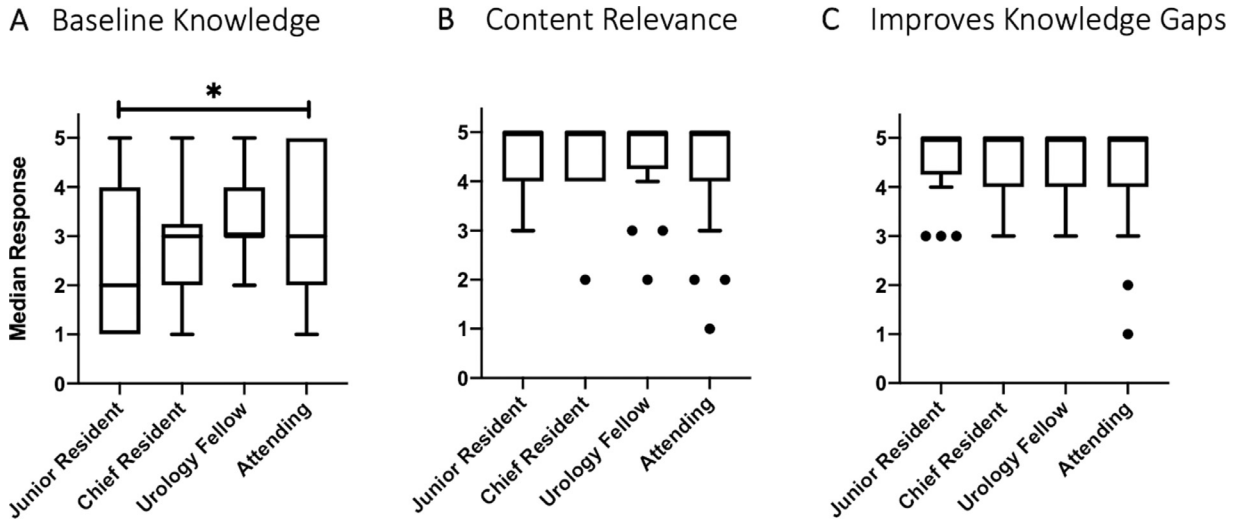


Figure 3. Physician responses regarding curriculum content. (A) Box and whisker plot of responses detailing level of baseline experience/knowledge in reconstructive topics (median response, 95% CI), demonstrating difference between junior residents and attending physicians, but not between residents and fellows (Kruskal–Wallis one-way ANOVA, $P < .05$). (B) Responses to relevance of material to respondents' practice setting. All respondents rated curriculum content as highly relevant to their practices. (C) Responses to whether lectures address knowledge gaps. Content was rated highly, supplementing respondents baseline knowledge.

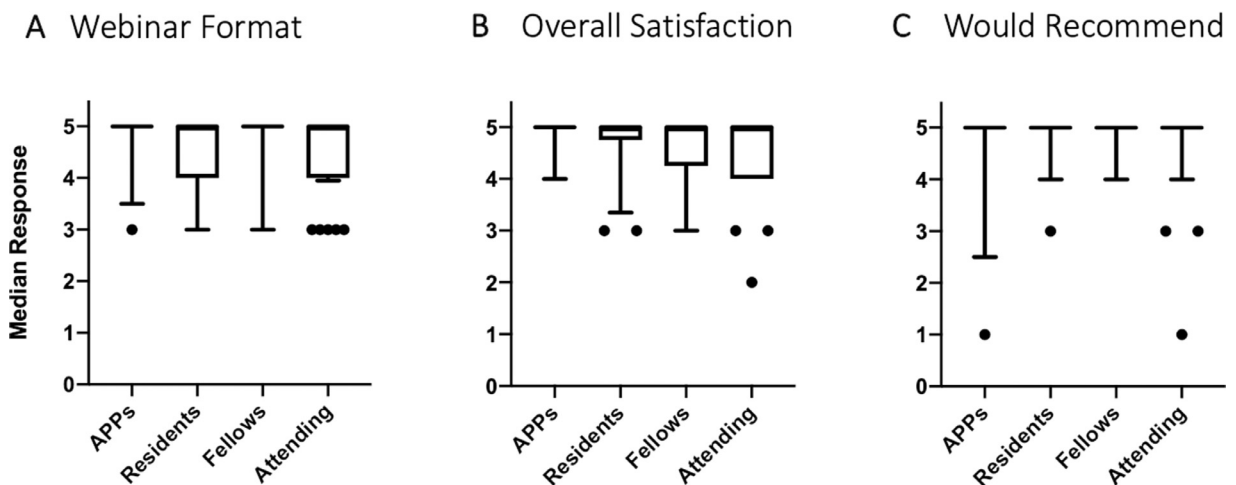


Figure 4. Curriculum satisfaction. (A) Box and whisker plot (median response, 95% CI) of responses detailing level of satisfaction with online webinar format. No difference in satisfaction across level of practice ($P = .37$). (B) Responses to overall satisfaction with reconstructive urology curriculum. Median satisfaction scores across practice level not statistically different ($P = .09$). (C) Likelihood of respondents to recommend lecture to others did not vary statistically along practice setting ($P = .85$).

GENERAL ATTITUDES TOWARD THE VIRTUAL CURRICULUM AND ITS CLINICAL UTILITY

Among our 224 study participants, the general attitude toward the virtual curriculum was positive. Participants felt that an online platform successfully presented material. The online platform was versatile and allowed us to remain flexible while presenting lecture slides, recorded surgical videos, and panel discussions.

Urologists and urology trainees considered the lecture series relevant to their education and clinical practice across training levels. Despite their perceived baseline, our results also demonstrated that participants felt the content of the lectures supplemented knowledge gaps in reconstructive urology topics. Lastly, survey results demonstrated that participants were satisfied with the lecture series and would recommend this curriculum to others. Thus, our hypothesis was supported; responses indicated that an online learning platform is an effective way to maximize learning during the COVID-19 pandemic in order to deliver highly relevant content in urology.

EDUCATIONAL IMPLICATIONS AND FUTURE DIRECTIONS

Online webinar-based lecture series, like the one described, can be an important adjunct to education in all medical fields. Here we demonstrate a high degree of participant satisfaction with a hybrid curriculum, involving an expert lecture/panel discussion followed by audience participation with polls and question-answer session.

Major advantages of this platform include easy access to experts in the field with reduced cost and travel burden, as well as a means to broaden exchange of ideas and foster collaboration among different institutions.^{12,13} Buxton and De Muth evaluated adult learners' perceptions by comparing live distance learning with local didactics. They identified that both modalities of learning had high satisfaction and were able to apply acquired knowledge.¹²

Given the advantages of online education, urology programs are likely to maintain some component of virtual lectures. The COVID-19 pandemic has proven pervasive in the United States and will potentially take longer than expected to resolve. Even with the development of COVID-19 vaccines, sources speculate that the pandemic will stretch well into 2021 and beyond.¹⁴ Thus, virtual learning will remain a critical tool for medical education across the spectrum. Given the success of the current lecture series, we intend to continue creating content to expand on each of the topics discussed and introduce new topics (eg, prosthetics, abdominal reconstruction).

A prior study by Crawshaw et al¹⁵ demonstrated a benefit amongst general surgery residents in performing laparoscopic right hemicolectomy after watching a brief narrated surgical video. Residents randomized to the narrated video walkthrough of the procedure scored higher on a validated global assessment scale directly measuring

laparoscopic skills. In the second phase of this curriculum, we will also focus on guided, annotated surgical videos demonstrating operative techniques in urologic reconstruction.

Given the high proportion of participation amongst attending physicians, we also intend to pursue accreditation by the Accreditation Council for Continuing Medical Education (ACCME) to evolve the current series into a tool with which physicians can earn continuing medical education credits required to maintain licensing.

In order to combat audience-disconnect, we believe that maintaining flexible formatting with content presented in different ways (eg, panel sessions, question and answer sessions, and live polls) will help to increase audience participation and combat online fatigue. While the tenets of learning theory are well-established: cognitive, behaviorism, constructivism, humanism, and connectivism; there is a paucity of literature at how these can be applied to a virtual curriculum.¹⁷ Further studies are necessary to determine what factors in lecture formatting help increase salience and intrigue to the viewer, with the hope of translating this into more effective and efficient teaching

LIMITATIONS

The results of our survey demonstrate that the content of our lecture series supplemented knowledge gaps in the area of reconstructive urology, and this curriculum could be used to address the Accreditation Council for Graduate Medical Education (ACGME) requirement of didactic educational events, particularly during the COVID-19 pandemic which continues to lengthen. Nevertheless, the current study has several limitations. First, the current survey was not validated prior to use and therefore there is potential for bias related to design of the survey questions themselves and different participant interpretation. Second, our results are subject to response bias as the responders to the survey may have been more interested in the study topic than non-respondents.

Our survey yielded a response rate of 34%. This is well within the average response rates previously described for external survey research.¹⁶ However, there was no qualitative interrogation of the respondents or non-respondents, which could have further assisted in providing a better understanding of the participants and their interest in the content provided.

As previously stated, a larger proportion of survey respondents identified as attending physicians, whereas we conceived the curriculum in attempt to support resident and fellow education. It is important to note that, as prior studies have demonstrated, distance learning can result in the learner feeling disconnected from the audience and speaker.¹² This may have contributed to a lower overall response rate amongst residents and fellows, despite the fact that larger numbers registered for and attended our lectures. We further hypothesize that resident motivation to respond was low due to competing interests with other clinical responsibilities, as residents

have remained on the front line with regard to the specialty. We suspect that advertising through GURS resulted in the high turnout of attending physicians. We also believe that attending physicians performing reconstruction are interested in these topics, which directly apply to their practice. This is highlighted by the percentage of practices offering GU reconstructive surgery by physicians without formal fellowship training.

We also acknowledge that survey response was not compulsory or tracked. No follow up emails were sent to remind registered participants to complete surveys. Additionally, although surveys were created for each lecture, not all lectures made explicit reference to the survey at the conclusion of the lectures (ie, not all speakers reminded participants to complete the survey at the end of their discussion). Furthermore, participants were automatically directed to surveys via an automatic link at the conclusion of the lecture if they stayed logged on. If participants exited the lecture prior to the lectures end, they were not automatically directed to a survey. Further efforts will be required to increase resident response.

Additionally, this study did not include a postlecture assessment of knowledge level to objectively determine improvement in knowledge gaps. Further evaluation with “before” and “after” test scores, or individual self-assessment with Likert scales will be necessary to determine the impact of this series in addressing knowledge gaps in reconstructive urology.

The significance and popularity of each lecture was not assessed in our survey responses. We have a composite of 224 unique responses, which were not sub-stratified per lecture to determine whether certain lectures elicited a stronger response than others.

A final important question not answered by our study is whether the current content and format would be easily integrated into urologic practice outside of the COVID-19 pandemic, when clinical volume returns to normal and competes for time with these and other educational opportunities. The benefit of a stored online curriculum library (available online at: <https://www.youtube.com/c/caseurology>) is that it may be accessed at any time and learners can devote time based on their schedules. The average recorded lecture spans 1 hour, making it feasible to review any single topic at a time. Furthermore, the lectures are all independent of each other, provide their own introduction, and do not require a progression throughout the series for understanding. As such, we feel confident that the curriculum can be incorporated into traditional study sessions and educational conferences outside of the COVID-19 pandemic, as evidenced by each video having several hundred views after publication online.

CONCLUSION

To our knowledge, this is the first survey analysis assessing a virtual curriculum implemented in the field of reconstructive urology during the COVID-19 pandemic. We show that trainees and urologic providers consider updated

topics in reconstructive urology to be a potential knowledge gap relevant to their education and clinical practice. Furthermore, there is a high degree of satisfaction with an online webinar-based curriculum, which participants feel can supplement their knowledge deficits. Such a platform represents an effective way to adapt during the era of the COVID-19 pandemic in order to increase collaboration, continue medical education, and assure safety through social distancing practice. The advantages of such an educational approach make an online urology learning platform an educational tool that will continue to be relevant beyond the prolonged COVID-19 pandemic.

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SUPPLEMENTARY MATERIALS

Supplementary material associated with this article can be found in the online version at <https://doi.org/10.1016/j.urology.2021.03.004>.

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