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DISCLOSURE

The authors have no financial interest to declare in relation to the content of this communication.

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Three-Dimensionally-Printed Hand Surgical Simulator for Resident Training

Sir:

The recent article published in the November of 2020 edition of *Plastic and Reconstructive Surgery* describes an intriguing tool for the purpose of surgical fixation of hand fractures training among surgical residents.¹ Learning opportunities for surgical trainees are becoming more limited, with reduced training hours and improved patient safety awareness, driving surgical departments to become more senior led. As such, the role of simulation as a part of surgical training has become ever more prominent.²

Are the authors planning to integrate the three-dimensional model they have developed into a formal curriculum or training pathway at their institution? In addition, is there any measure of concurrent validity, and did those residents who performed well with the model also perform well in their surgical practice during their rotation?

It is also important to mention that performing hand fracture fixation requires a great deal more

than simply performing the procedure required. There is also a great deal of planning and communication with other health professionals, as well as preoperative and postoperative management. Is there any integrated concurrent development of nontechnical skills alongside the technical skills development?

There is strong evidence of a statistically significant correlation between technical and nontechnical skills of trainees. Development of both technical and nontechnical skills will ultimately give residents and junior doctors the confidence to operate more independently.^{3,4}

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Vascularized Composite Allotransplantation in a Post-COVID-19 Pandemic World

Sir:

It was with great interest that we read the Viewpoint article by distinguished plastic surgeons led by Dr. Eduardo Rodriguez.¹ The authors reported how the vascularized composite allotransplantation community has been affected by the coronavirus disease of 2019 (COVID-19) pandemic. We would also like to share our experience with COVID-19 in the preparation for our next vascularized composite allotransplantation surgery. We hope to provide some insights for future vascularized composite allotransplantation management in this uncertain period.

Vascularized composite allotransplantation is a very challenging procedure on different levels:

Surgery: Each case has to be thoroughly planned based on the defect being restored.

Immunology: The immunosuppression regimen must be optimized to prevent immune rejection.

Psychiatric condition: Long-term follow-up is mandatory.

Multidisciplinary approach: Many plastic surgeons in a wide range of subspecialties intervene to perform this surgery.

Despite 20 years of experience in vascularized composite allotransplantation worldwide, constant improvement in surgical technique is still required from the surgeon² thanks to newly available technologies (e.g., three-dimensional printing). Moreover, 80 percent of the effort required to perform vascularized composite allotransplantation is estimated to be due to time-consuming perioperative preparation.³

In our experience, the cadaver transplant training sessions planned monthly for vascularized composite allotransplantation had to be suspended. On the other hand, we report positive feedback for the preparation because of the reduction of our clinical activities. This freed up more time for us to finalize crucial steps, such as the elaboration of cutting guides, webinars to train new members of the team, computed tomography scan analysis, and coordination of the teams (“nonsurgical steps”).

This time savings must, however, be balanced with the new requirements imposed by COVID-19, as the authors pointed out very well.¹ This time should be allocated to implementation of infection precautions, optimization of patient safety, and updating operative and perioperative quality assurance protocols in the specific vascularized composite allotransplantation field. This could be reduced by sharing the protocols currently being developed among the various vascularized composite allotransplantation centers. A recent study⁴ based on a cohort of 80 patients with COVID-19 showed that the immunosuppression regimen was frequently associated (38 percent) with poor outcomes (intensive care unit hospitalization and/or deaths). Thus, we need to closely monitor the emerging literature on the consequences of COVID-19 in immunosuppressed patients to determine the necessity of developing enhanced safety protocols tailored to our vascularized composite allotransplantation patients compared to nonimmunosuppressed patients.

Finally, this period emphasizes the fact that vascularized composite allotransplantation, more than a surgical challenge, requires major preoperative preparation and organizational work. Thus, one of the additional solutions in response to the changes in plastic surgery related to COVID-19⁵ is the possibility

of continuing vascularized composite allotransplantation surgery, despite COVID-19, by carrying out the major preparation steps required via remote work that does not necessitate a physical meeting of a group of people.

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Reply: Vascularized Composite Allotransplantation in a Post-COVID-19 Pandemic World

Sir:

We would like to thank our reputable colleagues for sharing their experience in response to our recent Viewpoint article in *Plastic and Reconstructive Surgery*.¹ We welcome others in the field to join this discussion around the evolution of vascularized composite allotransplantation in a changing health care landscape.

The respondents highlight important aspects of vascularized composite allotransplantation preparation that have been affected by the coronavirus disease of 2019 (COVID-19) pandemic. Many of these challenges are shared across teams. In our experience, the setbacks imposed by the pandemic are further validation of the value of scheduled year-long multidisciplinary planning, team building, and operative rehearsals. To ensure quality and safety, the entire operative and perioperative spectrum of care for vascularized composite allotransplantation patients has to be rehearsed and optimized until reproducible excellence is achieved. Once a steady level of team and institutional expertise is reached, this can be reliably adapted to any combination of unforeseen logistical factors or environmental circumstances. Year-long preparation ensures that the patients we have committed to caring for receive the same level of coordinated care and seasoned expertise as those whose elective plastic surgery procedures had to be rescheduled or revisited in light of the pandemic.

While cadaveric transplant rehearsals typically involve a large number of team members and personal protective equipment expenditure, a reduced “skeleton crew” approach can allow rehearsals to continue while simulating a scenario in which team members or resources could be limited. From the time a patient is listed for potential transplantation until the patient receives the allograft, all critical team members are available on standby, ready to be deployed at any moment. This ultimately puts the fruits of months of preparation at the mercy of potential sickness, emergency travel, life and family events, and environmental or global conditions, as we have seen in 2020. The pandemic is a stark reminder of the true value of preparation: being able to deliver the best possible outcome in the worst-case scenario by eliminating any foreseeable obstacles and establishing alternative strategies to mitigate unforeseeable situations.

The interaction of COVID-19 with immunosuppression, particularly in transplant recipients, is a matter of ongoing study.² While most trials allow participation of transplant recipients, choice and dosing of immunosuppression and the efficacy of antibody response to COVID-19 in this population are evolving topics.³ This has not prevented solid organ transplantation and vascularized composite allotransplantation from resuming with caution after an initial hiatus.^{2,4} With the deployment of population-wide vaccination, we expect further progression in that trajectory.⁵

The investments made in revisiting and upgrading our infectious and immunological protocols and clinical workflows during this critical period will surely have lasting impact on the viability of the field. The clinical lessons learned in managing our health care resources, equipment, and personnel in response to the pandemic further sharpen our approach to vascularized composite allotransplantation and place higher emphasis on safety, cost-effectiveness, and versatility to adapt to modern medicine’s challenges. Plastic surgeons are yet again at the forefront of innovation. More than ever, collaboration among leaders in plastic and reconstructive surgery has far-reaching repercussions beyond our immediate field.

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