The session on examining the lower extremity had gone surprisingly well, considering the masked instructors were doubling as film crew, the students were participating over Zoom, and Celeste, a skeleton, was serving as our patient. As we concluded, I sat Celeste up on the exam table and her skull fell off, landing on the floor with a loud “klonk” easily heard in the nine locations around the United States where our students were sheltering in place.

The moment was ripe with teaching points. The impact had cracked Celeste’s skull directly over the middle meningeal artery, allowing us to observe why that blood vessel can cause such devastating injuries when the lateral skull strikes something hard – in this case, the floor of our examination room.

My mistake set a new bar for the learning errors that mortify beginning medical students. All year my co-teacher and I had emphasized that patient care involves the complex interplay of human relationships, memory, technology, and improvisation. Mistakes are integral to the learning process, rather than occasions for embarrassment or self-rebuke. (Nevertheless, I was experiencing both after beheading my patient and damaging an expensive piece of borrowed equipment in front of my students and colleague.) Still, the comedy of the moment was obvious. “Just modeling that you cannot learn the art and science of medicine without making mistakes,” I remarked, laughing hard.

Although impossible to know at the time, the real takeaway of that afternoon in April 2020 would have nothing to do with Celeste’s accident or the middle meningeal artery, but rather its foreshadowing of the themes of medical education and patient care in the unfolding pandemic.

### Altered Connections

Debriefing at the end of class, students and instructors expressed appreciation to be communicating over video despite our far-flung locations, yet we all noted an unfamiliar sense of remove. Reflecting about the difference between screen and in-person connections, we speculated that an invisible energy passes between people sitting together sharing stories, emotions, and human touch. Why does a computer screen prevent that spark?

That afternoon also hinted at the love-hate relationship students, patients, and physicians would develop across the pandemic with video meetings. We’re pleased to connect and communicate but afterward feel like “Zombies,” with tired brains and drained souls, distinct from the physical and emotional fatigue following in-person teaching and patient care. After telehealth days my colleagues and I long for “real patients.”

Seeing their instructors in masks brought home the sobering reality of SARS-CoV-2 to our students. We considered how a patient’s – or doctor’s – mask might alter comfort, communication, and observation. Across the pandemic,
we’ve continued to wonder how masks, goggles, face shields, and gloves will impact student learning and future practice. How best to train students to read non-verbal cues without full facial expressions or teach accurate physical exam skills when institutional guidelines require gloves and limit close examination of the eyes, nose, and mouth? Personally, I’ve grown to love the mouth exam – my patient is back momentarily with a full face, smile, tonsils! – reminders of more normal times, relationships, and routines.

Shifting Boundaries
Developing new personal and professional boundaries is a fundamental aspect of physician maturation. Remote teaching and patient care blur the usual borders between study, work, and home. “My commute is now six feet,” announced a physician friend.

In medical school we were taught to bring our patients home with us. At the time I wasn’t quite sure what that meant, but across my career it has grown to embody many imperatives, ranging from calling patients after promising to do so, to reading about their concerns, to handing their problems to the unconscious mind to devise better solutions. While caring for patients from our living rooms and kitchens, bringing home one’s patients takes on a life of its own.

Practicing telemedicine from home during the lockdown, I often felt my patients had moved in, along with a snow-balling sense of distraction, worry, and responsibility. They appeared in my dreams. It was hard to stop working. There was always more to do.

Virtual teaching and doctoring require us to slow down, address fewer subjects, explain things clearly, and find creative ways to investigate questions and symptoms. We gain insight into the order or chaos of patients’ and students’ homes and their material wellbeing, relationships, and pets …and vice versa! Sometimes this information brings us closer, at others it blurs patient-doctor, student-teacher, and work-home boundaries.

Improvisation
Our improvised class on the lower extremity hinted at the creativity and flexibility we’d need to keep education and patient care going during the pandemic. Ironically, the early days of the pandemic served as a kind of final exam for the disruptive adventure we’d begun about a decade earlier with the arrival of the electronic health record. We have worked to protect the sacred space between patient and physician while integrating the computer, revising job descriptions, and modifying workflows.

Meanwhile, we’ve grown technologically facile in our private lives – texting and video chatting, shopping online, summoning virtual assistants, and employing multiple devices and smartphone apps to get stuff done. So, when the mandates to shelter in place and pivot to remote teaching and doctoring arrived, our brains already harbored a template for the skills of remote work. Over a few short days, medical school classes, meetings, and activities shifted online, and patient care pivoted to telehealth.

Tolerance for New Mistakes
All this improvisation also involved a constellation of mistakes. We neglected to schedule a remote patient’s follow-up visit, missed online meetings, bungled video technology, and forgot to unmute. Yet somehow, muddling through this together included a tacit understanding that such mistakes were part of our shared learning curve. Students and patients were remarkably tolerant. We all became more informal and open to testing good ideas regardless of their source. Young helped old, and somehow in the process, the pandemic chipped away at some ossified assumptions and hierarchies in our classrooms, offices, and hospitals.

Uncertainty
It has always been challenging to impress upon medical students busy memorizing facts and algorithms that the practice of medicine involves constant uncertainty. The pandemic helped ingrain this concept by derailing medical education at every turn. In our final meetings during May 2020, students described this realization arriving in waves. SARS-CoV-2 warned them their chosen profession could be dangerous, even life-threatening. The pandemic was going to affect every aspect of their well-planned educations, but in unforeseen ways. Would they ever take off their masks, shake patients’ hands, or share the facial expressions that pass naturally between human beings? Could they plan for the future? How best to fill time back with families of origin and turn this period of enforced exile into something positive for their families, educations, and resumes? These concerns shifted with the news of George Floyd’s death, rising COVID-19 cases, and sobering statistics revealing that most victims were Black, Brown, elderly, or impoverished. Students spoke of a growing sense of responsibility to prepare themselves to take on the second pandemic of structural racism as part of their medical careers. Although we had often mentioned uncertainty as a constant in medicine, here it was in full force.

The students tried to compare COVID-19 to a natural disaster but found it different. After a fire or hurricane, one climbs into the sunlight, surveys the damage, sighs, and gets to work restoring normalcy. The early pandemic, in contrast, more resembled living on Jell-O, with unsteady footing and chipped away at some ossified assumptions and hierarchies.

The Importance of Humor
Celeste and her cracked skull reminded us about the value of humor when crossing uncharted territory. One lasting benefit of the pandemic may be taking ourselves less seriously. As our course concluded, medical students and instructors...
joked about shaggier hairstyles and childhood bedroom decorations. We enjoyed selfies of the shorts and flip-flops students sported below the waist even as they appeared on screen in white coats for their final graded patient interview. We were happy to see their playfulness intact, recognizing humor as a powerful tool for healing, especially in lonely and scary times.

**Conclusion**

For more than two and a half years, our viral foe and societal awakening have tested the limits of medical knowledge and dismantled healing and community norms. Yet this painful period has also challenged us to find new ways to connect, learn, and care for patients. Amidst altered relationships, shifting boundaries, and improvisation, we understand uncertainty will be our constant companion. That said, a little tolerance and humor can help us navigate these murky waters and come together to create a more just world for our students and patients.

**Acknowledgment**

With sincere thanks to Medical Assistant Jessica Fife for the photograph, co-instructor Erin Scott, LCSW, OSW-C, and our students.

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**Author**

Elizabeth Toll, MD, Professor of Pediatrics and Medicine, The Warren Alpert Medical School of Brown University, Providence, RI.

**Disclosures**

CT Lin, MD, quoted in the essay, read the essay and gave written permission for the quotation to be used. The author reports no professional conflicts of interest. She receives grant and salary support from The Physicians Foundation.

**Correspondence**

Elizabeth_Toll_MD@brown.edu
Etoll@lifespan.org