

Healthcare Innovators

An Interview with **Evan S. Garfein MD,**
Chief of Plastic & Reconstructive Surgery,
and Oren M. Tepper MD, Director of Aesthetic Surgery,
Montefiore Health System



Detailed 3D model of organs created at the Montefiore 3D Laboratory

EDITORS' NOTE *Dr. Evan Garfein's clinical interests are in microsurgical and complex reconstruction of the head and neck, breast, trunk and extremities. In addition to being Chief of the Division of Plastic Surgery, he holds an appointment in the Department of Otorhinolaryngology. Dr. Garfein graduated from the College of Physicians and Surgeons of Columbia University, and received plastic surgical training at Harvard and NYU.*

Dr. Oren Tepper completed his plastic surgery training at the Institute of Reconstructive Plastic Surgery, NYU Langone Medical Center. He graduated at the top of his class at the New York University School of Medicine, and was elected to the prestigious Alpha Omega Alpha society. Dr. Tepper is also an Assistant Professor of Plastic Surgery, Albert Einstein College of Medicine. He has authored more than fifty textbook chapters and journal articles.

INSTITUTION BRIEF *As the academic health system and University Hospital for Albert Einstein College of Medicine, Montefiore (montefiore.org) is nationally recognized for clinical excellence – breaking new ground in research, training the next generation of healthcare leaders, and delivering science-driven, patient-centered care. Montefiore is ranked among the top hospitals nationally and regionally by U.S. News & World Report. For more than 100 years, Montefiore has been innovating new treatments, procedures and approaches to patient care, producing stellar outcomes and raising the bar for health systems in the region and around the world.*

Will you provide an overview of the areas in which you both specialize?

Garfein: I have been at Montefiore for 10 years, and I have been chief of the division of plastic and reconstructive surgery for three years. My clinical focus is on microsurgical reconstruction, largely of the head and neck, but also of the breast and extremities. I also have an interest in virtual surgical planning and 3D printing.

Last year, we debuted the Montefiore Einstein 3D Laboratory, a highlight on our journey to bring this technology into clinical practice at Montefiore, making us one of the first hospitals in the country with industrial grade 3D printing and virtual surgical planning technology. We were fortunate to have had the opportunity to bring some of the first clinically relevant uses of this technology to the operating room at Montefiore.

One of the interesting aspects of innovation across Montefiore is the approach the institution is taking towards next-generation clinical care.



Evan S. Garfein



Oren M. Tepper

Many people think about innovation in healthcare as a high-tech, expensive and capital-intensive endeavor, but one of the most attractive differentiating factors for us is that Montefiore devotes energy and resources to “innovation” in less obvious areas of healthcare, like healthcare delivery in a socioeconomically diverse population.

Tepper: I have been with Montefiore for seven years and my clinical areas of focus are craniofacial surgery, which is complex surgery of the skull and facial bones for kids and adults with birth defects or problems related to trauma, and cosmetic and aesthetic surgery.

From a research perspective, much of my interest is focused on innovative 3D technology which, initially, was most applicable to computer simulation and surgical planning. More recently, our use of 3D technology has evolved into 3D printing and augmented reality.

How critical has it been to have senior leadership committed to this innovative culture?

Garfein: It's incredibly important. At Montefiore, we have redesigned the pathways for innovation in a way that streamlines the process – our leadership welcomes ideas to improve patient care and is invested in the success of each project. When Dr. Tepper separated the twins a few years ago, our hospital leadership, from the C-Suite on down, was supportive and invested in that operation. During the 28-hour procedure, many members of senior leadership spent time in the operating room and were incredibly supportive of what Dr. Tepper, Dr. James Goodrich (the director of pediatric neurosurgery at the Children's Hospital at Montefiore) and the whole surgical team achieved. This unique access to the “decision-makers” helps us implement such innovative projects as our 3D printing lab.

What impact does technology have on the type of surgeries you perform, and is it replacing some of the human touch?

Tepper: One of the things we focus on is technology that is more of an adjunct than

a replacement – a mode to improving and supplementing the care we provide.

We became interested in this research 12 years ago when Dr. Garfein and I met during training at another institution. Years later, we both landed at Montefiore's Division of Plastic & Reconstructive Surgery where we continue to see levels of complexity that are unique to our patient population. These advanced cases call for this type of technological assistance.

Over time, Montefiore has remained supportive, despite any financial or practical roadblocks, because this technology drives better efficiencies. They were open to us pushing the limits and it has been quite successful.

Will you elaborate on how 3D technology made a difference in the amazing surgery you performed to separate the conjoined twin boys?

Tepper: I had never treated a case of conjoined twins, so this surgery was entirely new to me. Starting with a digital surgical plan made from 3D scans and photographs of the boys, to 3D prints of the boys' exact anatomy, this technology enabled me and the plastic surgery team to meticulously plan this operation before even setting foot in the operating room.

The second big advantage of this technology is the ability to use what we learned during planning to dictate the order of events in the operating room. In preparation for the surgery, we printed various guides of the boys' anatomy so we could practice and position different pieces together. Having the boys' exact models helped us work through potential complications and create successful workarounds before beginning the procedure. To my knowledge, Dr. Garfein was the first surgeon in the world to use 3D printed jigs, medical devices that help guide cuts in bone needed for jaw reconstruction. He is a true pioneer in this work.

Dr. Garfein, will you discuss the vision for the 3D lab and how it will be beneficial to Montefiore and its patients?

Garfein: 3D printing is a great example of a commodity that anyone can buy. It's not special to have a 3D lab in and of itself. Any doctor's office can have that if they buy the hardware and the software and develop some expertise.

What is special about our journey in this area of technology is how and where it interfaces with surgery. When we built the first cutting guide for jaw reconstruction, I didn't build it as an academic endeavor; I built it because these guides would allow us to do a complex operation more easily and precisely and, hopefully, that would translate to better results for patients. ●