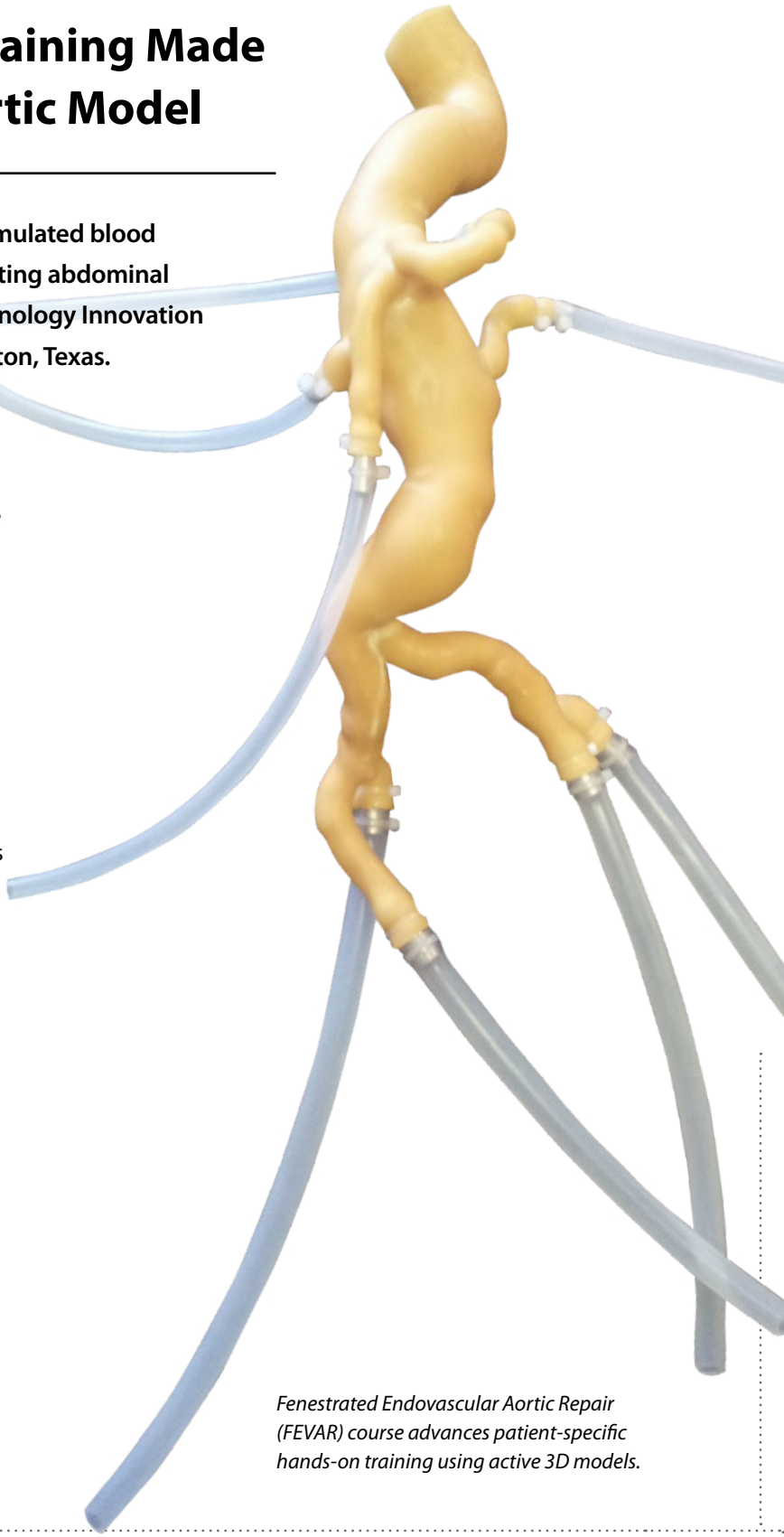
Realistic FEVAR Hands-On Training Made Possible with 3D Printed Aortic Model

3D Systems' pliable patient-specific 3D models with simulated blood flow revolutionized stent deployment training for treating abdominal aortic aneurysms (AAA) at Methodist Institute for Technology Innovation and Education at Houston Methodist Hospital in Houston, Texas.

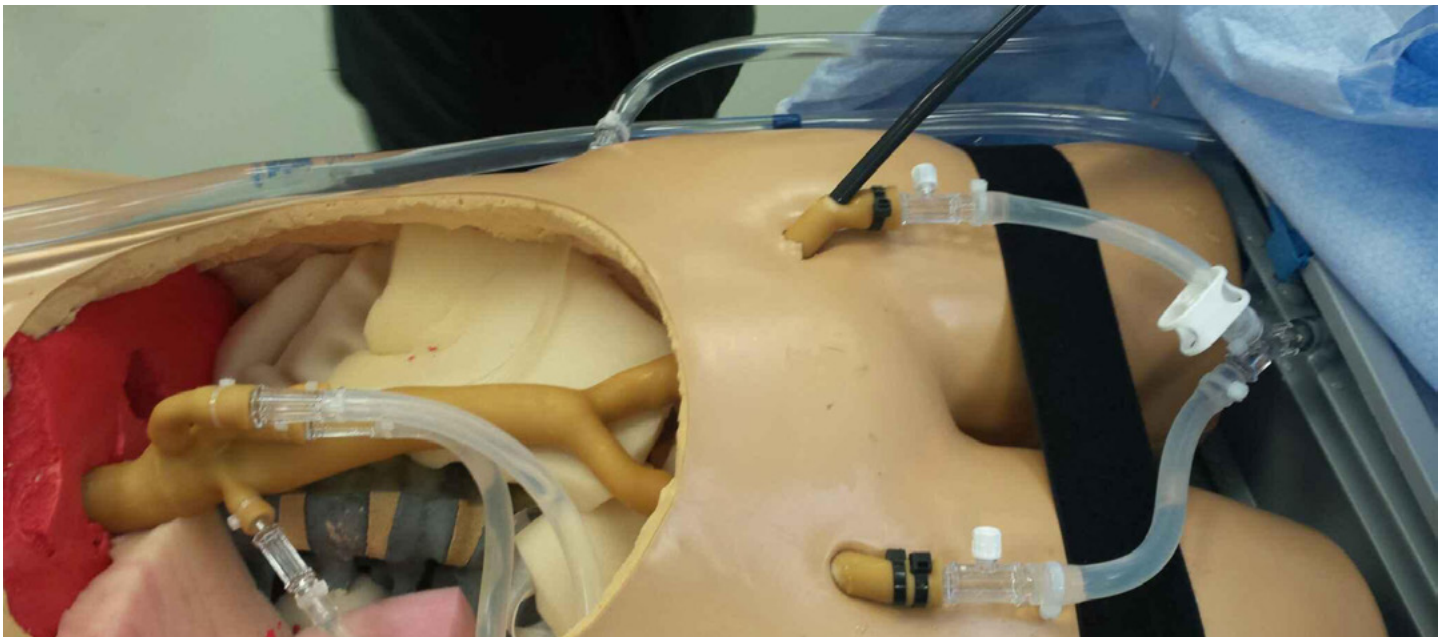
AAA refers to a ballooning in the lower part of the aorta, the major blood vessel that supplies blood to the body. Depending on size and aneurysm growth rate, treatment ranges from close monitoring to an emergency procedure in case of rupture. Aneurysm repair can be done as an open operation or using a minimally invasive technique where surgeons introduce tools through the femoral arteries in the groin and eventually place a stent-graft to repair the aneurysm. During the course of stent-graft implantation surgeons must pay great attention to maintain blood flow to vital arteries that originate from the abdominal aorta. The procedure becomes more complex when the aneurysm involves arteries to the kidneys and intestines. In such cases, stent-graft repair requires the use of custom devices tailored to a patient's anatomy.

Dr. Jean Bismuth from the Houston Methodist Hospital in Houston, Texas, and Dr. Jason Lee from Stanford University Medical Center in Palo Alto, California, have long been collaborating on the education and teaching of vascular surgery trainees. Their insight and experience were key to develop the complex training course which was brought to life by the 3D printed model created by 3D Systems.

Part of the training course was dedicated to instruction on using a fenestrated stent graft to treat complicated aneurysms. The course covered all aspects of stent-graft implantation, including understanding precise measurements, procedural anatomy and cross-sectional imaging. A unique approach to hands-on training was facilitated by 3D printed models and allowed course attendees to perform the procedure as it would be done in the operating room.



Fenestrated Endovascular Aortic Repair (FEVAR) course advances patient-specific hands-on training using active 3D models.



Course attendees practiced the procedure, as it is performed in the OR, using a 3D printed model based on patient CT.

Prior to the event, CT scans of two patients were sent to 3D Systems for 3D reconstruction and printing. The models were converted to a latex material to impart flexibility and simulate arterial behavior as expected in an actual procedure. During the course, the models were connected to a circular flow pump to better simulate physiologic conditions to enable trainees repetitive true-to-life practice of actual fenestrated stent-graft implantation.

Dr. Lee, who taught the course, said that "The model was quite accurate in its feel and how it interacted with the actual delivery systems of the fenestrated stent-graft. The flexibility of the model mimicked real life in terms of how the devices tracked through the vessels, making it one of the most usable complex aneurysm training tools currently available".

Dr. Bismuth further commented that "In the future, we hope to train and practice these procedures using pre-operative CT information as a tool for deciding how to most efficiently operate on a particular upcoming patient. We look forward to continue our collaboration with 3D Systems in pursuing our educational missions moving forward."

The combination of 3D printed models with 3DS' virtual reality medical simulators creates a one-of-a-kind blended reality experience for surgical training and planning that can be personalized based on patient-specific data. Surgeons may practice their upcoming procedures and are able to create specialized tools for their patients. Having the printed models is also helpful in providing a detailed explanation of the procedure to the patient. 3D Systems' healthcare solutions are designed to change the future of personalized medicine.

Learn more about 3D Systems' commitment to manufacturing the future today at www.3dsystems.com.