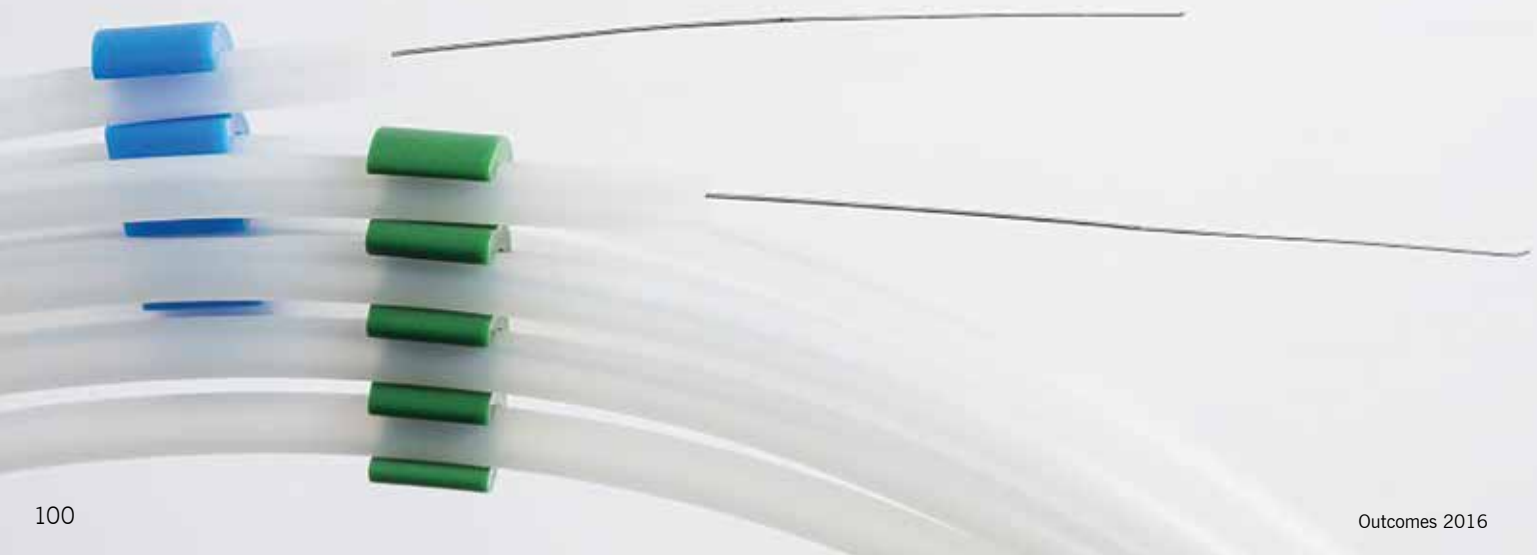
Innovations

Perceval Sutureless Valve

Cleveland Clinic surgeons were the first in the world to perform an in-human implant of a Perceval valve. The valve is a sutureless biological aortic replacement valve that allows patients with aortic valve disease to have more surgical options, including minimally invasive approaches. Use of the valve allows surgeons greater visibility of critical structures during the surgery, and the procedure can be completed faster and more efficiently. The valve also helps reduce recovery time in the intensive care unit, ventilator time, and need for blood transfusions, even for high-risk and complex cases.

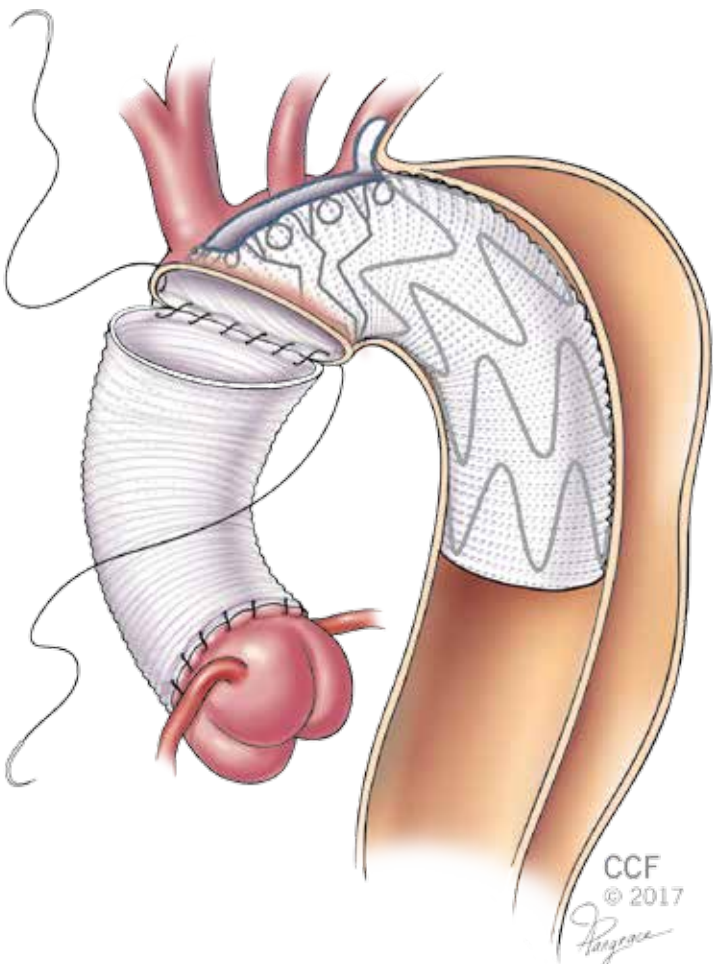
Tatara Vascular

Cleveland Clinic continues to develop a family of preshaped coronary guidewires to facilitate placement of balloon dilation catheters during percutaneous transluminal coronary angioplasty and percutaneous transluminal angioplasty. Cleveland Clinic Innovations office's new product development model received 510(k) regulatory clearance on the guidewires, which allows researchers to further test the product clinically.



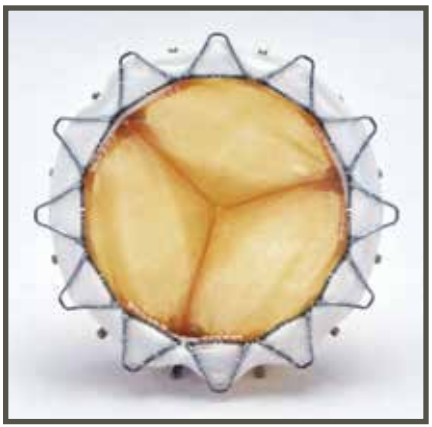
PHASTER

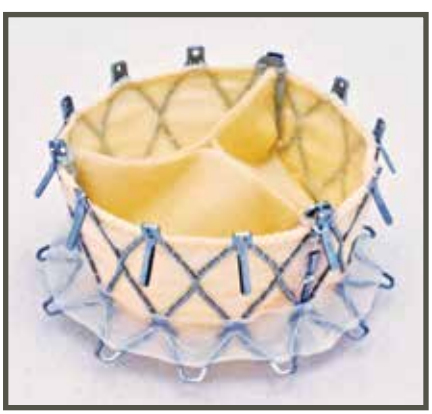
The Proximal Hybrid Aortic Stent graft for Thoracic Extended Repair (PHASTER) is a novel technology developed by Cleveland Clinic's cardiothoracic surgeons for use in hybrid repair procedures. Cleveland Clinic has developed a model and is working with the FDA to obtain regulatory classification for a Class II device.



First-In-Human Catheter-Delivered Tricuspid Valved Stent

The world's first transcatheter tricuspid valved stent was implanted at Cleveland Clinic in a patient presenting with massive incompetence of the tricuspid valve. The stent is based on seminal research conducted and intellectual property developed at Cleveland Clinic. Cleveland Clinic implanted the valved stent with catheter-guided technique under a compassionate plea from the patient. After the implantation, the valve demonstrated excellent valvular function, indicating correction of the massive regurgitation problem. The novel device is designed in the form of a diffuser, resulting in a low-height profile which allows it to reside in the native valve without protrusion into either of the adjacent chambers (atrium or ventricle) for mitral or tricuspid valves. In addition, the valve is prepared using tissue-preservation techniques that remove the toxic tissue fixatives and allow for the device to be shipped in the "dry form."





MATADORS Dissection Collaboration Project

The Multidisciplinary Study of Ascending Tissue Characteristics and Hemodynamics for the Development of Novel Aortic Stentgrafts (MATADORS) is a novel partnership involving the FDA, Cleveland Clinic surgeons, industry engineers, medical device experts, and research and development leadership from the top 5 endovascular stent graft medical device companies. With this newly forged relationship, the team has the unique ability to better understand connective tissue disease that causes aortic dissection and to develop improved verification and validation measures for innovative devices undergoing regulatory testing.

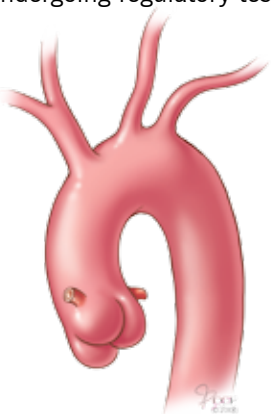
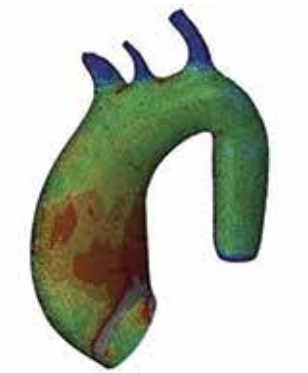
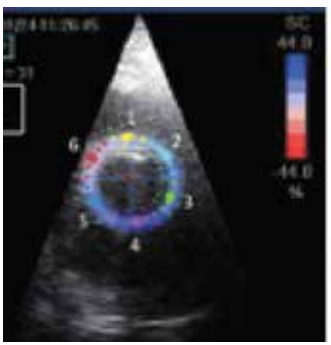


Illustration of project's target area – the ascending aorta, which is the landing zone for TEVAR devices



Computational modeling of simulated flow and compliance of the ascending aorta



In vivo compliance data is obtained (IRB # 16-900) in 3 target areas of the ascending aorta

Uniaxial testing of extracted specimens to compare the in vivo and ex vivo mechanical properties of ascending aortic tissue in acute dissection vs nondissected tissue

Resected samples obtained from aortic dissection and aneurysm patients to evaluate histopathology and biomechanical properties of regions within the ascending aorta

Histopathology slide of histopathologic features of dissected aortic tissue to look at proteoglycan/ glycosaminoglycan content and ratio within treatment groups, as well as within regions of the aorta