

A Heart Valve Replacement That Barely Leaves a Trace

In a technological first, a team of specialists at NYU Langone uses a pioneering nonsurgical procedure to replace a diseased mitral valve with an artificial device.

AT 73, NANCY Clayton was fitter than most women half her age, despite a congenital defect in her aortic valve that had twice required major surgery. Her daily exercise regimen involved an hour of practice with her competitive rowing team or an hour of CrossFit training—sometimes both. But last January, the marketing specialist began feeling short of breath. Doctors in Southern California diagnosed a new cardiac problem: a severely weakened mitral valve, which was allowing blood to flow in the wrong direction. Without

intervention, she would go into heart failure. In light of her clinical history, however, they were uncertain what to do.

In July at NYU Langone, Clayton made medical history, becoming one of the first people in the world to have a diseased mitral valve replaced with a transcatheter approach. In this technique, the faulty valve is accessed through a vein in the leg, leaving the patient with only a nick in the skin.

Clayton had already undergone two open-heart surgeries. "A third operation, even a minimally invasive one, would



have been very dangerous," says Mathew Williams, MD, director of the Heart Valve Center.

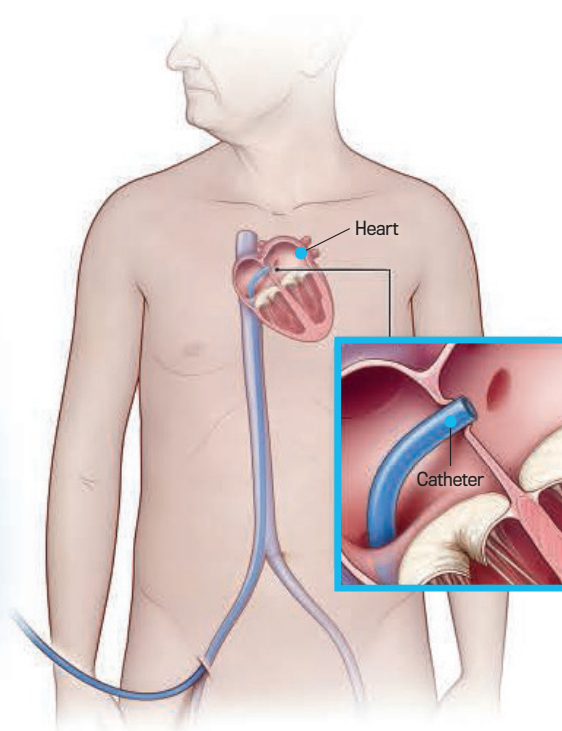
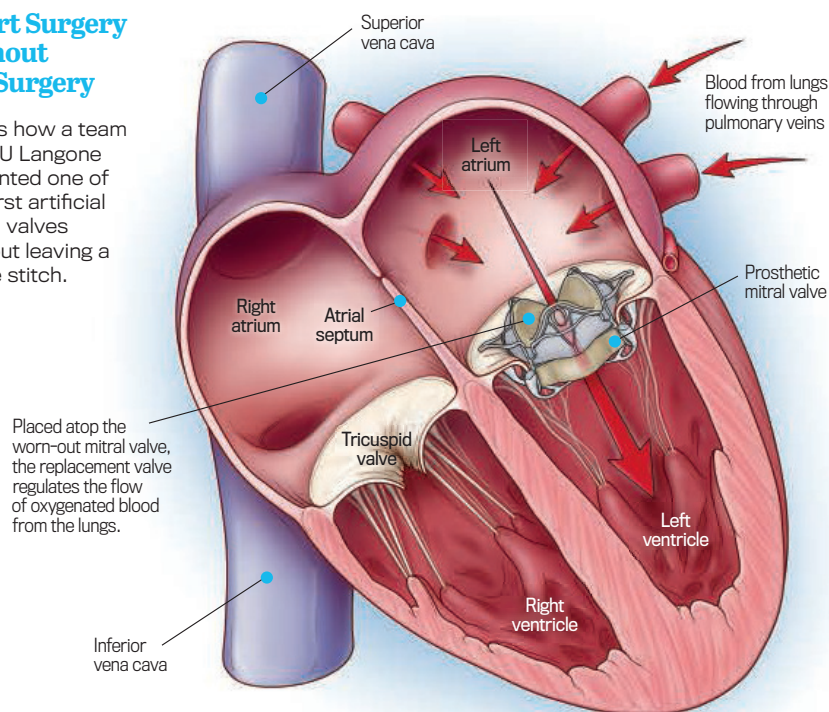
A former New Yorker, Clayton has lived on the West Coast for a decade. But after her diagnosis, she consulted Aubrey Galloway, MD, the Seymour Cohn Professor of Cardiotho-

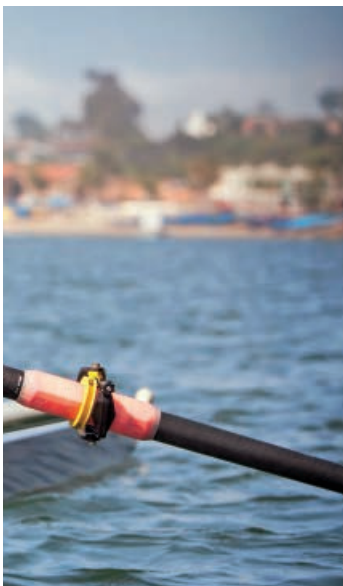
racic Surgery and chair of the Department of Cardiothoracic Surgery, who had replaced her aortic valve and implanted a pacemaker when she was 58. "We may have something for you," Dr. Galloway told her. He recommended a transcatheter mitral valve replacement, or

TMVR, and referred her to Dr. Williams, one of just a handful of doctors worldwide selected to test the new approach. The first physician in the country to receive training in both cardiac surgery and interventional cardiology, Dr. Williams is a veteran of over 2,200

Heart Surgery without the Surgery

Here's how a team at NYU Langone implanted one of the first artificial mitral valves without leaving a single stitch.





Several months after having her mitral valve replaced with an artificial device at NYU Langone, Nancy Clayton is back to her daily rowing and CrossFit regimen.

transcatheter aortic valve replacements (TAVRs), more than any other cardiac surgeon in the country. TAVRs were developed first because the aortic valve is a simpler structure and easier to access. TMVRs are more difficult; to reach the mitral valve, the catheter must

be pushed through a wall of the heart, creating a host of technical challenges for device designers and operators. At the moment, TMVR is offered primarily to patients deemed too elderly or frail to sustain the rigors of open heart surgery. "TMVR is still experimental and thus not without risks," explains Dr. Williams.

To help plan the procedure, Dr. Williams used a 3-D model of Clayton's heart. An exact anatomical replica created from CT scans not only enabled Dr. Williams to puncture the septum at just the right angle to deliver the catheter into the left atrium, but it also made it possible for the team to do a dry run the day before. He began the procedure by putting a catheter into place, establishing a clear route to the mitral valve. Then, guided by Muhamed Saric, MD, PhD, director of echocardiography and clinical director of noninvasive cardiology, Dr. Williams used live X-ray and echocardiographic images to position an anchoring ring inside the diseased valve. This piece of engineering wizardry, which would secure the replacement valve, consists of a metal scaffold and natural tissue that can collapse to the width of a pencil and spring open when properly positioned. Once the new valve was in place, the leakage from Clayton's mitral valve stopped completely.

"One nice thing about this device is that we can withdraw it if it's not working correctly," explains Dr. Williams. "As it turned out, we got a perfect result."

Since the procedure had minimal impact on Clayton's body, she was awake within minutes and out of bed within hours. The day after being dis-

charged, she was on a treadmill, and within two weeks, she was logging two miles a day. Three months later, she's back to rowing and CrossFit, functioning at what she gauges to be 80% of her former capacity. Clayton, however, is not typical of patients who would be candidates for TMVR, most of whom are too weak or frail for open-heart surgery to be an option. Yet she may well represent the future of this approach, which will become available to younger and healthier patients in need

of a mitral valve replacement as advances are made in both the device and the procedure.

"I'm getting stronger every week," says Clayton, "and I absolutely expect to get back to where I was before. That's the whole point. I don't want to give up all the things I do." ■

TO FIND A PHYSICIAN who treats heart valve disease, call 646-501-0264 or visit nyulangone.org/heartvalvecenter.

Nancy Clayton made medical history, becoming one of the first people in the world to have a diseased mitral valve replaced with a transcatheter approach. The entire procedure is performed through a vein in the leg, leaving the patient with only a nick in the skin.

