THE MARFAN FOUNDATION

Personalized External Root (PEARS) Procedure: What You Need to Know

The Personalized External Aortic Root Support (PEARS) procedure is an alternative to the traditional valve-sparing and composite graft surgery for aortic root aneurysms. Currently performed mainly in Europe, Britain, Australia, Singapore and New Zealand, the procedure is a novel surgical technique designed to prevent the aorta from rupturing or dissecting in individuals with aortic aneurysms, such as those with Marfan syndrome or other connective tissue conditions.

What is the PEARS Procedure?

The ExoVasc® graft and PEARS concept was developed by British engineer Tal Golesworthy who has Marfan syndrome, along with his colleague Tom Treasure. Unlike traditional aortic root surgery, PEARS does not replace the aorta. Instead, it uses a pliable mesh sleeve (the ExoVasc® graft), placed external to the aorta to support it and prevent rupture. Data from the patients' preoperative CT scan is used to manufacture a custom polymeric mesh that matches the size and shape of that person's aorta. The graft can also be made slightly smaller than the person's aorta to address some forms of aortic valve leakage (regurgitation).

The procedure to fit the ExoVasc® PEARS typically takes two to three hours and involves an incision in the breastbone, and hospitalization usually lasts three to five days. As the heart is not opened, the heart-lung machine (cardiopulmonary bypass) is usually not necessary.

How many PEARS procedures have been performed?

As of January 2025, procedures have been performed with 857 males and 335 females from preteen to age 80. Long-term PEARS procedures data include one patient being followed for 20 years, 42 patients more than 10 years, and 281 patients more than 5 years. More than half of the people undergoing this surgery had Marfan, LDS, and bicuspid aortic valve.

Who is eligible to have the PEARS procedure?

The PEARS procedure is suited for people with genetic conditions like Marfan syndrome, Loeys-Dietz syndrome, and those with bicuspid aortic valve as well as other conditions who may develop aortic root aneurysms.

The PEARS procedure may also be beneficial for women with ascending aortic or root aneurysms who are planning a pregnancy. It may be especially suited in people patients with smaller aneurysms and aortic valves that are still working well.

It is not appropriate in the setting of an aortic emergency or dissection, either acute or chronic, or when there is severe aortic valve leakage due to abnormalities of the valve.

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What is the difference between traditional valve-sparing and PEARS procedures?

The PEARS procedure reinforces rather than replaces the diseased aortic root to prevent aortic dissection and rupture. Like valve-sparing aortic root replacement (VSRR), it preserves the native person's own aortic valve, avoiding some of the long-term complications of valve replacement, such as the need for blood thinners for mechanical valves or the need for reoperation for tissue valves (pig or cow) that wear out and may need repeat surgery to replace. PEARS is still a major surgery with risks that are similar to conventional surgery. Recovery may be quicker. More follow-up is needed to be able to compare the long-term results of PEARS with conventional surgery, but results are encouraging.

Where is the PEARS procedure available?

The PEARS device and procedure are not yet available in the US because the ExoVasc® graft is not FDA approved. Given its specificity and the need for expert teams, the PEARS procedure is currently offered in a limited number of centers globally, including the Royal Brompton Hospital in London, University Hospitals Leuven in Belgium, and Amsterdam University Medical Centers among others. Special training and proctoring are required before centers can embark on a PEARS program.

How do PEARS medical teams coordinate with a patient's current healthcare provider?

Most patients coming to London, for example, from abroad will have regular email communication with the medical center or Tal directly. The US provider will carry out a CT scan to the protocol. The manufacturer, eXstent, will then prepare the CAD model and implant prior to shipping it to the hospital. Virtual calls are then arranged with the surgical team. Accommodation can be organized by the hospital. People are provided resources, including information on US health insurers, some of which will pay for PEARS in London.

The trip for surgery is approximately three weeks: a few days pre-op for tests at the hospital, five days for surgery and recovery, and then seven days out of the hospital before being cleared to fly home. Aftercare is determined by the patient's local cardiologist.

The Marfan Foundation can facilitate introductions of interested Marfan patients to the centers and caregivers who are established experts and have good outcomes.

For more information on ExoVasc® PEARS, including participating centers and patient stories, visit exstent.com.