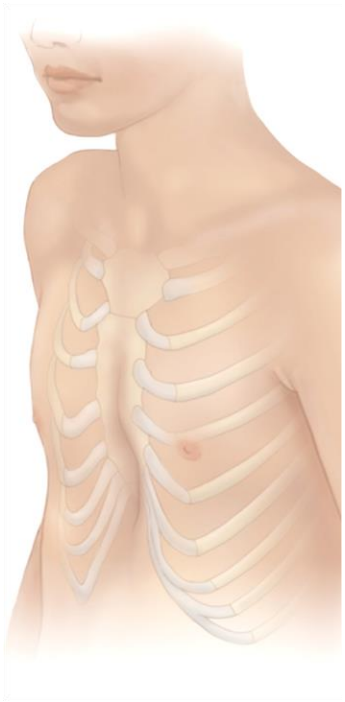
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Children's Health

Pectus Excavatum

Pectus excavatum, also called sunken chest, means the chest curves in when it should lay flat. Each patient's needs are different, and the Stanford Chest Wall Care Team works with patients to help them reach their greatest health and improve their chest wall shape. This handout is a guide to understand how this is done.

Pectus excavatum

People can be born with pectus excavatum, but it may not be noticed until their body starts to grow quickly, such as during puberty. The curving in of the chest may be seen in the middle of the chest, or it may be seen on one side of the chest.



The Stanford Chest Wall Care Team

The **Stanford Chest Wall Clinic** works with other health care providers and caregivers or parents to create the best results for people that have chest wall problems. Having patients see the expert team **Chest Wall Clinic Providers at Stanford** will help them reach their greatest health to change their chest wall to have better health or appearance.

Tests after the first chest wall visit

Patients may need to do tests after their first visit depending on their treatment options. These tests may be an:

- **X-ray,** to see the shape of the bones in the chest, also called the **chest structure**.
- **MRI,** to see a more detailed image of the chest structure.
- **Echocardiogram of the chest,** a test to take pictures of the beating heart.
- **Pulmonary function testing, or Spirometry**, to measure lung space.

Things to know about testing

Based on the tests ordered, it may take **1 to 2 months** to have these tests finished. Appointments may be delayed due to schedule time availability, insurances, and because the treatment for pectus excavatum is not usually urgent. The care team wants to work with patients to get these tests done in the best way to support their patient's families.

If possible, patients should use Stanford's clinic services to do these tests. Doing this helps the care team:

- Communicate with the testing locations to make sure that the correct tests are done.
- Schedule test appointments that are easier for patients to get to.
- Get the test results back to them quickly.

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It may not be possible for all patients to come to a Stanford location for testing because of different insurances, or how far away they may live from the hospital. If patients do tests at a location different than Stanford, then the care team must have all images and test results sent to them. Test results can be given to the **pediatric surgery office** by:

1. **Sending test results electronically.** If patients would like to do this, they can talk with the care team to know how this can be done.
2. **Fax.** The office fax number is **(650) 725-5577.**
3. **Bringing a copy.** Test results can be brought to an appointment with the care team or dropped off at the **Department of Pediatric Surgery clinic.**
   OR
4. **Mail.** Mail test result to the **Department of Pediatric Surgery** at Stanford.

The address to drop off, or mail test results and images is below.

Department of Pediatric Surgery
730 Welch Road
Palo Alto, CA **94304**

Once these tests are done, the care team reviews with patients the best way to treat their pectus excavatum. The most common nonsurgical and surgical treatments are described below.

Nonsurgical treatment

If patients have **mild to moderate pectus excavatum**, it may be possible to be treated in a nonsurgical way.

Vacuum Bell

The **vacuum bell** is a **nonsurgical** way to treat sunken chest. The vacuum bell patch pulls the curve of the chest out over time.



How does the vacuum bell work?

A vacuum bell is a rubber bowl-shaped device that is placed on the chest and is connected to a pump every day. The pump creates a suction that pulls the chest wall forward.

Consistently using vacuum bell will help the chest wall eventually stay forward on its own. Each patient is different. The vacuum bell may work better for some patients than others.

It may take **3 to 6 months of use** to have a noticeable correction of pectus excavatum. It can take **1 to 2 years** of using the vacuum bell regularly to have the correction last.

The vacuum bell is normally used for **2 hours in the morning and 2 hours in the evening**. The care team will show patients how to use the vacuum bell.

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Surgical Treatments

There are 2 different kinds of surgical treatments to correct pectus excavatum. It is best to have these corrective procedures during early adolescence, or early teenage years, but they can also be done with great results in adults. These treatments are described below.

Nuss procedure

This is the most common surgery to treat pectus excavatum.

The basic steps of the Nuss procedure are:

1. **Surgery is done to place a metal support bar underneath the breastbone,** or chest bone, to lift the chest wall forward.
2. **The bar is left in place** for **3 years**.
3. **Surgery is then done to remove the bar.** The recovery for the surgery to remove the bar is normally a much easier than when the bar was placed.



Modified Ravitch procedure

In rare cases, a surgery called the Modified Ravitch procedure can be an option to talk about with the chest wall care team.

The Modified Ravitch procedure removes the deformed rib cartilage from the chest wall. The cartilage then grows back in a flatter position. The cartilage heals during the **4 months after surgery.**

When surgery is recommended

Patients will be given information about when and where to come to Stanford for appointments and surgery.

Preparing for surgery

Some things to do before surgery are:

- **Speak with the anesthesia team.** The anesthesia department will call patients to talk about their anesthetic plan and answer any questions they may have.
- **Take medicines as prescribed before the surgery.** Patients will be given instructions for taking medicine the day before their surgery to help them not have any problems pooping, which can sometimes happen after surgery.
- **Wipe down the chest with special cleaning wipes.** Patients will be given wipes to clean their chest the night before and the morning of their surgery to help reduce their risk of infection.

After surgery

For most pectus excavatum surgeries, patients stay in the hospital for **1 to 4 days.** Patients can often eat and move around right after surgery. During their time in the hospital, the care team will work with patients to help them learn how to:

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- **Manage their pain.** The care team will help patients learn how to safely give themselves pain medicine as prescribed.
- **Work with physical therapy.** The physical therapy team will teach patients how to move and exercise to help them get recover.
- **Check incision sites.** This will help patients notice any signs of infection.
- **Practice taking deep breaths using an incentive spirometer.** This is a breathing device that helps patients to exercise their lungs after their surgery to keep their lungs healthy.

Leaving the hospital after surgery

Patients will leave the hospital when their pain is well managed, and they can move around on their own. They will need caregivers to help them:

- **Manage their pain at home.**
- **Do exercises** that the physical therapy team gave them in the hospital.
- **Look at their incisions every day** to make sure there is no infection.

Follow-up after surgery

Patients will need to **return to the Stanford Wall Clinic** to be seen by their care team for the following visits:

- **1 month after the surgery** to make sure they are healing well.
- **1 year after the surgery** to check the correction of their pectus excavatum. After the 1st year
  - **Nuss Procedure patients** will have follow-up visits **1 time a year,** for **2 more years.** They will then talk with the care team to schedule a time to remove the Nuss bars.
  - **Modified Ravitch procedure patients** will have follow-up visits after 1 year only if they are needed.

Travel Information

Many patients must travel long distances to reach the Stanford chest wall care team. If patients need help to know where to stay, the **Lucile Packard Children's Hospital Stanford** has a **Housing Office** that works with them to help find housing near the hospital. Please call the Housing Office to be given information about possible housing, which may include the:

- **Ronald McDonald House.** The Ronald McDonald House at Stanford gives a home and offers support to the caregivers of children or patients being treated at Lucile Packard Children's Hospital Stanford. They help families feel less stress so their focus can be the patient's recovery.
- **Corporate apartments.** There are a few local business apartments that give a lower, daily rate to families who have patients getting treatment at Lucile Packard Children's Hospital.

Housing services can be given to patient's families for only **1 night**, or **many months,** depending on the patient's need. For questions or more information about getting help to find housing by the Lucile Packard Children's Hospital Stanford please talk to the Housing Office:

Housing Office

Monday to Friday from **9:00 a.m. to 6:00 p.m.** at **(650) 498-7971.**
The housing office is located at **the Ronald McDonald House 520 Sand Hill Road, CA 94304.**
Translation services are available if patients do not speak English.

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Clinic Locations

Stanford Medicine Children's Health tries to give the best care, even in the neighborhood where their patients live. To better serve their patients, Stanford Medicine Children's Health has clinic settings throughout the San Francisco Bay Area.

You can scan the QR code to get a map, the addresses, and the contact information for these clinics. Follow the directions below:

a. Open the camera on your phone.
b. Hold your phone over the QR code so that you can see it on your phone screen.
c. The QR code will take you to the website.

On some phones, you may need to click a link or banner pop-up that appears when you scan the QR code.

You can also get to this information by going to the following website:
Contacts & Locations - Chest Wall Program - Stanford Medicine Children's Health

Click on the words **contacts & locations** to see clinic maps and information.

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