Patient Guide to
Chest Wall Deformities
Pectus carinatum occurs four times more often in boys as in girls.

The cause of pectus carinatum is unknown. It may be genetic because it tends to run in families.

What are pectus carinatum symptoms?
- Chest pain.
- Shortness of breath with activity.
- Chest wall trauma.

How is pectus carinatum fixed?
The first line of treatment for pectus carinatum is bracing. The brace used for patients with pectus carinatum at American Family Children’s Hospital is called the dynamic compression brace.

Generally, bracing is very effective because the chest is still flexible during childhood and adolescence.

This bracing system corrects the abnormal chest shape and allows remodeling. It works by applying external compression (similar to the way braces correct crooked teeth). The pectus brace uses the least amount of pressure needed to fix the chest in order to maximize comfort. It will need to be adjusted (tightened) every few months until the chest shape looks normal.

More About the Brace
- We recommend that the brace be worn as much as possible (20 out of 24 hours a day) every day for the best results. The brace only works when it is worn as prescribed. Wearing the brace as often as possible throughout the day and night (excluding showers and sports) will allow the best correction outcome.
- The length of time your child wears the brace for complete correction varies. It is common to wear the brace for 6 to 18 months. After the chest becomes a more normal shape, the brace still needs to be worn about 8 hours a day for a short period of time (retainer mode).
- Most children say their chest is slightly sore after the first brace fitting. This can be treated with ibuprofen (Motrin®) or acetaminophen (Tylenol®).
- It is easy to wear the brace under clothes. A thin, tightly-fitting shirt may
be worn under the brace for comfort.

- Your child may have slight redness and pain at the site of the outward protrusion of the chest from the brace. This is normal. If the brace causes a scratch or sore that is open, it is not normal. Take off brace and contact your doctor if this happens.

- If you take off the brace and the reddened area on the chest does not "blanche," call your doctor. "Blanching" is when you press on the red area and it temporarily turns white and then back to red. Do not put the brace back on until the reddened area blanches. If the problem continues, do not put the brace back on until your child can be seen in the clinic for adjustments.

- If your child has trouble sleeping with the brace on, try using memory foam or a similar-type padding over the mattress.

- Girls should not use the brace with an underwire bra. It may cause pain and a pressure sore.

What if the brace doesn’t work?
If your child has worn the brace as prescribed for at least one year, we may consider surgery. Surgery involves reshaping and removing the abnormal rib cartilages while keeping their outer layer. This outer layer is left to provide the foundation for new cartilage to grow. An incision is made in the center of the chest or along the lower edge of the ribs to repair this abnormality. After the operation, drains (soft, flexible tubes) will be in place for 3-6 days, and will be removed when the volume of drainage decreases. Children are usually in the hospital for 3-5 days after the operation. Expect strict activity restrictions for 2-3 months after surgery.

Pectus Excavatum
What is pectus excavatum?
Pectus excavatum is the most common congenital abnormality of the chest in children. It is also known as “sunken chest” or “funnel chest” because it can look like a sunken area of the sternum (breastbone). Sometimes it is so deep the sternum nearly touches the spine. Abnormal growth of the rib cartilage causes the breastbone to be pushed inward. This sunken area in the breastbone may be even, or it may be more inward on one side than the other. The breastbone may be straight or rotated. As with pectus carinatum, some children and their parents report that they have significant social and physical concerns about the configuration of the chest wall. Often, they will not remove their shirt, swim or participate in other activities.

Pectus excavatum is diagnosed in some children when they are babies. In others, it is not noticed until a rapid growth spurt, usually during puberty. The cause of pectus excavatum is unknown. It tends to run in families, with 25% of patients reporting a family history of chest wall abnormality.

What are the symptoms of pectus excavatum?
- Shortness of breath that increases with exercise.
- Decreased endurance with exercise.
- Asthma-like symptoms treated with asthma medicines without relief.
- Chest pain that increases with exercise.

How is pectus excavatum fixed?
- Non-surgical remedies: Not all patients with pectus excavatum need surgery. Some very mild forms can be improved with upper-body strengthening exercises and improvement in posture.
- Surgical remedies: Patients with a moderate to severe sunken area of the chest, or significant symptoms, may need a minimally-invasive surgery. The surgeons make a small incision on each side of the chest, and another incision beneath the breastbone. A stainless steel bar that is curved to fit around the front of the chest is placed under the breastbone from one of the side incisions and passed to the other side. The incision beneath the breastbone is used to guide the bar under the breastbone. The bar is then rotated, which pushes the breastbone out into a more normal shape.

Surgery takes about 1-1 ½ hours. The bar is left in place for 2-3 years to allow the chest to re-shape. After the chest has remodeled, the bar will be removed in a same-day surgery procedure.

Before and During Pectus Excavatum Surgery
What can I expect before surgery?
- Before surgery, your child will have a CT scan to measure the chest and the sunken area in the breastbone. This is to see if the sunken area is crowding the heart or lungs.
• Your child is given a list of exercises to help strengthen the chest and shoulder muscles. Deep breathing and posture exercises to improve and maintain correct posture (shoulders back with back in straight alignment) will also be recommended.

• Most of the patients who have this surgery are in their pre-teen or teenage years. Acne is common in this age group. It can present a problem if there is acne on the chest or back as it may increase the risk for bar infection. If your child has acne, or has a breakout before surgery, it is important to call and tell your surgeon as soon as possible. This is to prevent your child's surgery from being cancelled when you arrive.

• If your child has trouble swallowing pills, practicing is a good idea before surgery. A good exercise to practice swallowing pills is to try TicTacs® and a cup of water.

• Most families try to schedule their child's surgery around a school break. Expect your child to be in the hospital for 4 to 5 days, and home for a week after discharge. If your child has surgery during the school year, it may help to notify your child's school of this extended absence. You will receive a letter excusing your child from school and sports activities during your child's hospital stay.

Starting Medicine before Surgery
It is very important for your child to start taking MiralAX® before surgery. MiralAX® is taken daily with liquids. It has no taste and dissolves easily and completely in drinks such as water, juice or tea. Your child should take 1 capful, twice a day, for 3 days before surgery.

MiralAX® is available in 7-, 14-, and 30-dose sizes plus in pre-measured single dose packets. You can get them at national drugstore chains or supermarkets. There are also generic versions. Please see your pharmacist at your local pharmacy for more information and for possible substitutes.

After Pectus Excavatum Surgery
Care of Incisions after Surgery
Your child’s incisions will be dressed with white steri-strips covered by a type of tissue glue. Do not pull these off. The strips will curl up and fall off on their own as the incisions heal. If steri-strips are still on after one week, you may gently remove them.

All surgical incisions are closed using dissolving stitches that are under the skin. The incisions are pink at first, then gradually fade over the next year. You should inform your child’s doctor if there is any redness, increased swelling or drainage from the incisions. Your child will need prescription pain medicine for up to 3 weeks. After this time, you should be able to control your child’s pain with ibuprofen (Motrin®/Advil®) or acetaminophen (Tylenol®).

Going Back to School
• Usually children need to be home for 1-2 weeks after surgery. Your child may return to school when energy level and pain control permits.

• Your child may not participate in gym class or recess for the first 2 months or carry heavy books because of pain. You may want to arrange for books to be placed in the classroom or use a rolling backpack.

• Walking up or down stairs is ok anytime.

Activity after Surgery
• Activity is very limited during the 2 months after the surgery, so the bar is not dislodged.

• Your child is not allowed to lift anything that weighs more than 25 pounds during this time.

• Contact sports is not allowed for at least 2-3 months. After that, any activity restrictions are directed by your surgeon.

• After your child has recovered, chest strengthening exercises should be restarted.

• Good posture is very important.

Pain and Constipation
One of the main side-effects of prescription pain medicine is constipation. Though they may not like to talk about it, it is important that children are aware of this common and troublesome side effect. Children may report nausea and trouble eating and drinking 4-5 days after surgery. If your child is not able to eat, it will be hard to tolerate the pain medicine. This usually happens in children who were not able to have a bowel movement since before surgery.

The best way to promote a bowel movement at this stage is an enema. If your child is in the hospital, the nursing staff will help give the enema. If your child has been discharged, you can buy a Fleets® enema over-the-counter.

Follow-up
We see your child 2-4 weeks after the surgery. Your child is seen every year until the bar is removed.
Call your child’s surgeon if:
• The incision is red, swollen, very painful, or has drainage.
• You think the bar has become dislodged (chest changes shape, your child has been hit forcefully in the chest).
• Your child is still having trouble having bowel movements after an enema.
• You have questions or concerns.

Additional Post-surgery Information
• You may want your child to wear a medical bracelet or necklace. The inscription should state: “Steel bar in chest, CPR more force, cardiac defibrillation ant/post pad placement.”
• No chest or thorax MRIs are allowed. If an MRI of the lower body is needed, talk with the radiologist first to make sure it is safe to do an MRI with the steel bar in place.
• Antibiotic prophylaxis is not needed for dental procedures unless your child has a history of mitral valve prolapse.
• We will provide a medical travel letter which your child may need in passing through security devices at airports, etc.

More information
Please call us with your questions or visit us on the web for more information at uwhealthkids.org
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References