

What Is Paradoxical Breathing?

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Paradoxical breathing occurs when the chest wall or the abdominal wall moves in when taking a breath and moves out when exhaling. This is the opposite of normal breathing movement. Seen in children and adults, it is a sign of respiratory distress associated with damage to the structures involved in breathing.

Paradoxical breathing, also called paradoxical respiration, can be a symptom of trauma or a medical condition. It can also lead to other symptoms, like shortness of breath, weakness, rapid heart rate, and dizziness. Treatment may vary but typically involves managing the underlying condition.

Learn more about the symptoms, causes, diagnosis, and treatment of paradoxical breathing.

Symptoms

When you're breathing normally, your chest rises when you inhale and contracts when you exhale. In paradoxical breathing, your chest contracts while inhaling and expands while exhaling.

If you have paradoxical breathing, you may also have other symptoms, including:

- Feeling short of breath or like you can't breathe deeply
- Involuntary gasping
- Feeling dizzy or weak
- Difficulty talking
- Pain in the neck, shoulders, or chest
- Weakness in the chest muscles
- Faster than normal heartbeat

Always seek immediate medical attention for chest pain.

Causes

The presence of paradoxical breathing points to various types of respiratory distress or respiratory failure. Almost any cause of shortness of breath, if severe enough, can lead to paradoxical breathing.

Trauma

A blunt injury to the chest can cause a condition known as "flail chest." Flail chest occurs when multiple rib fractures cause pieces of broken rib to detach from the chest wall and interfere with normal breathing. In flail chest, a minimum of two or more consecutive ribs are broken in two or more places.

Flail chest is a very rare condition. In one study of 25,467 trauma patients admitted over a six-year period, only 85 patients had flail chest, or about 1/3 of a percent.

The movement of a large detached section of bone makes it difficult for the chest to move air in. This is because the segment moves in and reduces the change in overall chest volume. The same thing happens during exhalation.

The amount of force needed to cause flail chest is significant. Such force is likely to damage much more than just the chest wall. Many people with flail chest also have associated internal injuries.

With flail chest, paradoxical breathing can lead to complications such as pneumothorax and pneumonia.

The larger an area the section of bone covers, the more severe the patient's shortness of breath will be.

Nerve or Muscle Problems

Damage to nerves or weakened muscles can disrupt your breathing. This can happen through trauma or because of a medical condition such as:

- Multiple sclerosis
- Muscular dystrophy
- Guillain-Barre syndrome
- Lung cancer

The diaphragm is the muscle most involved in expanding and contracting the chest cavity to change volume with inhalation or exhalation. When the diaphragm is weak, the muscles of the chest wall must do all the work of breathing.

If the diaphragm is too weak, chest movement can pull abdominal organs toward the chest when you inhale and push them away from the chest when you exhale.

Paradoxical breathing from a weak diaphragm is often most noticeable when you lie flat on your back (supine).

Paradoxical breathing during weakness or paralysis of the diaphragm is described as a "seesaw" motion between the chest wall and the abdominal wall.

Obstructive Sleep Apnea

People with this condition have a blockage in the airway that causes them to stop breathing during sleep. The condition is characterized by many breathing stops and starts during the night. Over time, it can cause the chest wall to turn inwards, leading to paradoxical breathing.

Electrolyte Disorders

Electrolyte disorders can also cause paradoxical breathing. Electrolytes are important minerals such as potassium, magnesium, and calcium that your body needs to perform certain functions.

You may develop an electrolyte imbalance if you are severely dehydrated from vomiting or diarrhea if you are taking certain medications or if you have chronic health conditions such as kidney disease. Malnourishment can also cause an electrolyte imbalance.

A deficiency in electrolytes such as potassium can cause muscle weakness, including weakness in the respiratory muscles. This can lead to dysfunction of the diaphragm and paradoxical breathing.

Hormonal Imbalance

Certain hormones help regulate your respiration. Thyroid hormone, for example, affects lung strength and function. When you have hypothyroidism, you have lower- than-normal amounts of thyroid hormone. This can lead to weakness in the respiratory muscles.

Deficiencies in parathyroid hormone can also lead to paradoxical breathing. Parathyroid hormone helps regulate the amount of calcium in your blood.

Blockage of the Airway

When you have an airway blockage, inhaling creates negative pressure that pulls your chest wall inward. This causes your abdomen to rise and your chest to fall as you attempt to breathe.

Causes of airway blockage include severe allergic reactions, severe respiratory infection, or choking.

Respiratory Failure

If you have severe shortness of breath for long enough, fatigue of the intercostal muscles or diaphragm can lead to the seesaw type of paradoxical breathing.

Respiratory failure is defined as fatigue from shortness of breath. It is also known as respiratory distress. Without treatment, respiratory failure is likely to worsen. Paradoxical breathing develops as one of many signs of increased work to breathe and decreased effectiveness of breathing.

It's crucial to get medical care when you recognize these symptoms so a proper diagnosis can be made and the underlying condition can be treated.

Paradoxical Breathing in Infants and Children

Infants often breathe paradoxically, especially during REM sleep. This is because the rib cage is still soft and can pull in when a baby inhales.

An infant's breathing may look different than an adult's because the chest moves more easily. As long as the stomach expands as the lungs fill with air, they are breathing normally.

If your child has paradoxical breathing, look for other signs of respiratory distress such as:

- Difficulty breathing or very rapid breathing
- Grunting or wheezing
- Blue skin color

If your child has any of these symptoms, contact a healthcare provider right away. Seek emergency medical care if your child's chest contracts into the ribs while breathing or they appear to be struggling to breathe.

Diagnosis

Paradoxical respiration can usually be spotted visually and recognized by its characteristic opposition to normal breathing patterns. You can see the chest/stomach move in or toward the body upon inhalation, and out or away from the body upon exhalation.

Your healthcare provider may order tests to help find the underlying cause of your paradoxical breathing. These may include:

- Pulmonary function test to see how well your lungs are working
- Maximal static inspiratory pressure, to measure the strength of your diaphragm
- Sniff nasal inspiratory pressure, which measures pressure in your nostril when you sniff
- Vital capacity test, which measures the amount of air you can exhale
- Blood tests to look for hormone or electrolyte imbalances
- Imaging tests such as ultrasound, chest X-ray, CT scan, or MRI
- Fluoroscopy, an X-ray that produces multiple images of your chest movement
- Electromyography, which records the electrical activity in your diaphragm

How Is Paradoxical Breathing Treated?

Paradoxical breathing can be corrected by treating the underlying condition. For example, broken ribs may need to be surgically repaired. If you have a weakened or paralyzed diaphragm, you may need a type of surgery called surgical plication. During this procedure, your diaphragm is flattened so your lungs can expand more easily.

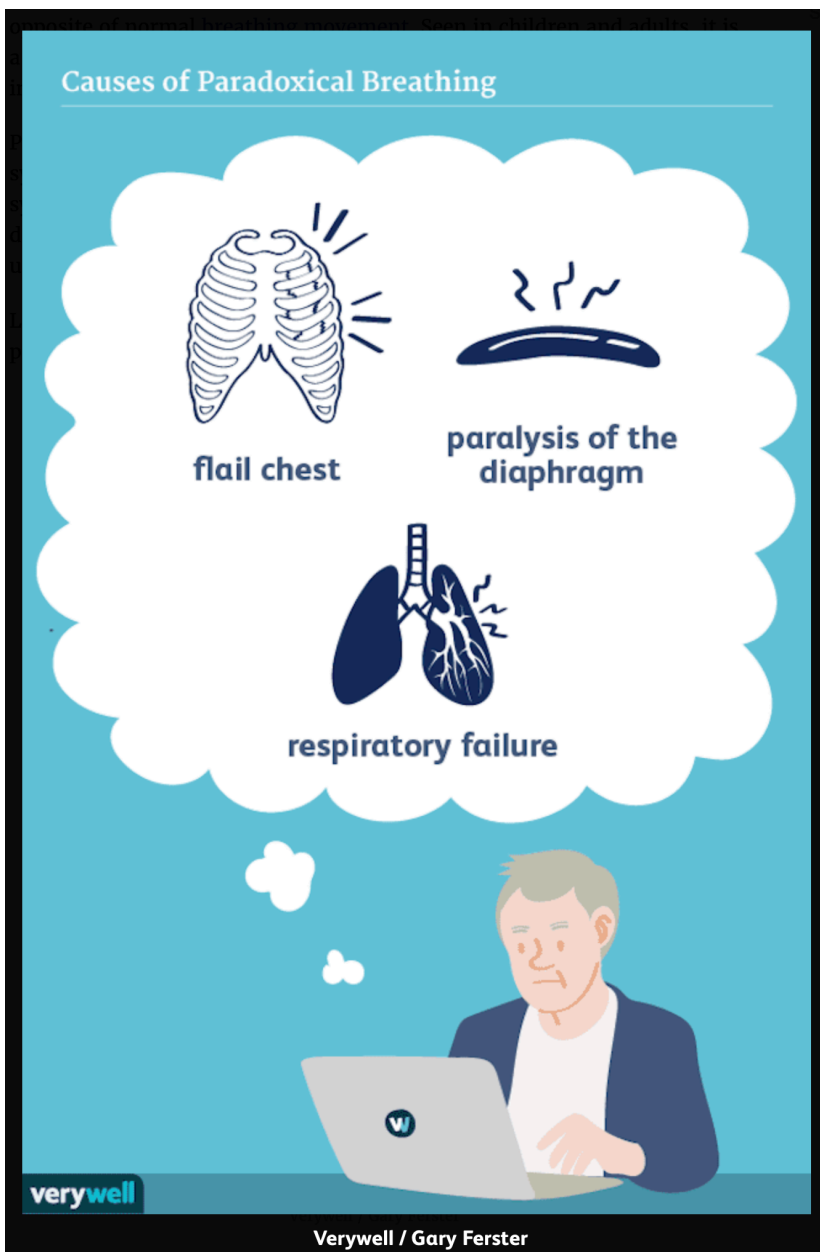
You may also be given treatments that will help you take in oxygen. Ventilation or continuous positive airway pressure (CPAP) can help you breathe better while you are sleeping.

If you are put on a ventilator, you may also benefit from a phrenic pacing machine, which sends signals to the nerves that contract your diaphragm.

Summary

Paradoxical breathing happens when your chest contracts when you inhale and expands as you exhale. It is a sign of respiratory distress.

Paradoxical breathing can have a number of causes, including trauma and weakness of the diaphragm from a medical condition such as multiple sclerosis or muscular dystrophy. It is diagnosed through physical exam, imaging tests, and/or breathing tests. Treating the underlying cause is the only way to correct paradoxical breathing.



14 Sources

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