CONDITION

Tracheomalacia - acquired

Acquired tracheomalacia is weakness of the windpipe that allows it to narrow too much during breathing.

WHAT IT IS
Excessive collapse of a weakened windpipe

BODY SYSTEM
Breathing system

MAIN SYMPTOMS
Breathlessness, harsh cough, wheezing, repeated chest infections

WHAT CAUSES IT
Airway injury, prolonged compression, or inflammatory conditions

HOW IT IS DIAGNOSED
Dynamic breathing CT and bronchoscopy

MAIN TREATMENT
Airway support, mucus clearance, cause treatment, sometimes surgery

CAN IT BE CURED?
Sometimes - surgery stabilizes selected severe cases

IS IT AN EMERGENCY?
Sometimes - severe breathlessness or blue or gray lips

LONG-TERM OUTLOOK
Often manageable, though structural weakness may remain

Overview

Acquired tracheomalacia is weakness of the trachea, or windpipe, that develops after birth. The weakened airway becomes unusually narrow or collapses during breathing, especially when you breathe out, cough, or exercise.

A healthy trachea is held open by firm rings of cartilage. Its back wall is softer and can move slightly during breathing. With tracheomalacia, the cartilage may lose strength, or the back wall may move inward too far. This can limit airflow and make it difficult to clear mucus.

If the weakness also affects the main airways leading into the lungs, it is called tracheobronchomalacia. Another related condition, excessive dynamic airway collapse, mainly involves excessive inward movement of the back airway wall. These terms are sometimes used together, but they do not describe exactly the same airway changes.

Acquired tracheomalacia ranges from a small area of weakness to widespread airway collapse. Mild changes may cause few symptoms. More severe collapse can interfere with breathing, sleep, exercise, and mucus clearance. It may also be mistaken for asthma, chronic obstructive pulmonary disease (COPD), or repeated bronchitis.

Symptoms

Symptoms may be present every day or become more noticeable during a respiratory infection. They can worsen with coughing, forceful breathing, physical activity, or lying flat.

Possible symptoms include:

Some people develop a high-pitched breathing sound called stridor. This usually comes from narrowing in a large airway rather than the smaller airways affected by asthma.

Symptoms do not always match the amount of collapse seen on a scan. Some people have marked narrowing without major problems, while others have disruptive symptoms from more limited disease. Other lung or heart conditions may also contribute.

- Shortness of breath, particularly during activity
- A harsh, barking, or brassy cough
- Wheezing or a noisy breathing sound
- Difficulty coughing up mucus
- A feeling that mucus is stuck in the airway
- Repeated chest infections
- Breathlessness when lying down
- Episodes of choking, coughing, or interrupted breathing
- Reduced ability to exercise

Causes and risk factors

Acquired tracheomalacia develops when the windpipe is injured, inflamed, or compressed over time. Sometimes no single cause can be identified.

Possible causes and contributing factors include:

Acid reflux is common among people evaluated for airway collapse and may aggravate coughing or throat irritation. However, it is not always clear whether reflux caused the

tracheomalacia.

A breathing tube can place pressure on the tracheal wall, especially when it is needed for a long time. Most people who require intubation do not develop clinically important tracheomalacia.

Acquired tracheomalacia is different from congenital tracheomalacia, which is present from birth because the airway developed differently.

- Previous prolonged breathing-tube placement, called intubation
- A tracheostomy, which is a breathing opening made through the neck
- Pressure from a large thyroid gland, mass, or abnormal blood vessel
- Chest or airway surgery
- Severe injury to the neck or chest
- Long-term airway inflammation
- Repeated respiratory infections
- Relapsing polychondritis, an uncommon inflammatory condition affecting cartilage
- Long-standing lung conditions such as COPD or severe asthma

Diagnosis

Symptoms alone cannot confirm tracheomalacia because asthma, COPD, vocal cord problems, infection, and other conditions may cause similar difficulties.

Evaluation usually begins with a medical history and breathing examination. It is helpful to describe when symptoms occur, whether you have trouble clearing mucus, and whether previous inhalers or other treatments have helped.

The main diagnostic tests are:

There is no single percentage of airway collapse that determines whether treatment is needed. Some airway narrowing occurs normally during exhalation. Specialists consider the shape and location of the collapse, your symptoms, and its effect on daily life.

Lung function tests may help identify asthma, COPD, or another lung problem. However, normal results do not rule out tracheomalacia. Other tests may look for infection, reflux, swallowing problems, or something pressing on the airway.

- Dynamic airway CT: This is a computed tomography scan taken while you breathe in and forcefully breathe out. It shows how much the trachea narrows and where the narrowing occurs.

- Dynamic bronchoscopy: A thin, flexible camera is passed into the airway so its movement can be watched during breathing and coughing. This allows direct assessment and is often used to confirm significant disease.

Treatment and management

Treatment is based on symptom severity, the location of the weakness, and any underlying condition. Mild tracheomalacia that is not causing significant problems may only need monitoring.

Treating related conditions can reduce the strain on the airway. This may include managing lung disease, infection, reflux, or an inflammatory condition. A mass or enlarged structure pressing on the trachea may need separate evaluation.

Clearing mucus is important because a collapsing airway can make an effective cough difficult. A respiratory physiotherapist may teach breathing and coughing techniques. Some people use airway-clearance devices or nebulized treatments under professional guidance.

Continuous positive airway pressure, known as CPAP, provides gentle air pressure through a mask. The pressure can act like an internal splint to help keep the airway open. Some people use it during sleep, while others need it at particular times during the day. Bi-level positive airway pressure may be considered in certain situations.

Inhalers do not strengthen weakened tracheal cartilage. They may still help when asthma, COPD, or another small-airway condition is also present.

An airway stent is a tube placed inside the trachea to hold it open. A temporary stent may be used to see whether supporting the airway improves symptoms before surgery is considered. Stents are not suitable for everyone and can move, become blocked with mucus, or irritate the airway.

For carefully selected people with severe, disabling symptoms, tracheobronchoplasty may be an option. This operation supports the weakened back wall of the trachea and sometimes the main bronchi. It can improve symptoms and quality of life, but it is major chest surgery and does not treat unrelated lung damage.

Other procedures, including removal and reconstruction of a short damaged section or use of a tracheostomy, are reserved for particular patterns of disease.

Complications

Poor mucus clearance can allow secretions to collect in the lungs. This can contribute to repeated chest infections or pneumonia. Parts of a lung may occasionally lose air and collapse, a problem called atelectasis.

Severe airway collapse can cause low oxygen levels or difficulty moving enough air in and out. Respiratory failure is uncommon but may occur with advanced tracheomalacia, a major infection, or another serious lung condition.

Frequent coughing, disturbed sleep, and reduced activity can also affect daily life. Some people limit exercise because they fear breathlessness, which may lead to loss of fitness.

Procedures have their own possible complications. Airway stents can move, develop mucus blockage, or lead to tissue growth around the stent. Surgery can cause bleeding, infection, breathing complications, or a need for further treatment. These risks are assessed before a procedure is offered.

Prevention

Not every case of acquired tracheomalacia can be prevented. Some people need prolonged intubation, tracheostomy, or chest surgery for reasons that cannot safely be avoided. In other cases, airway weakness develops despite appropriate care.

Healthcare teams use careful breathing-tube and tracheostomy management to reduce pressure-related airway injury. Treating a condition that is inflaming or compressing the trachea may help limit further damage, although it cannot guarantee prevention.

Avoiding smoking and second-hand smoke will not reverse tracheomalacia, but it can reduce additional airway irritation and protect overall lung health. Keeping recommended respiratory vaccinations up to date may lower the risk of some infections that could worsen symptoms.

Living with it and what to expect

The course of acquired tracheomalacia is different for each person. A short, mildly weakened section may remain stable for years. More extensive collapse may continue to cause cough, breathlessness, or infections, especially when another lung condition is present.

The structural weakness often does not disappear on its own. Symptoms can still change over time. They may improve when an underlying cause is treated or when mucus clearance and breathing support are effective. They may temporarily worsen during colds, chest infections, or periods of increased coughing.

Regular follow-up may include reviewing symptoms, infections, activity levels, airway-clearance needs, and breathing support. Repeat scans or bronchoscopy are not automatically needed for everyone. They may be used if symptoms change or a procedure is being considered.

Many people manage the condition without surgery. Planning rest breaks, using prescribed breathing support, and following an airway-clearance routine can make daily activities easier. Physical activity may remain possible, although its type and intensity may need to reflect your breathing ability and other health conditions.

Surgery can provide meaningful improvement for selected people, but it does not guarantee that every cough or breathing problem will disappear. Recovery takes time, and other lung conditions may still require long-term care.

When to get medical help

Arrange a routine appointment if you have an ongoing harsh cough, unexplained noisy breathing, difficulty clearing mucus, or repeated chest infections. These symptoms have many possible causes and need proper assessment rather than self-diagnosis.

Contact your healthcare team promptly if your usual symptoms are worsening, you develop fever with increased or discoloured mucus, or your CPAP or airway-clearance plan is no longer working well. Coughing up blood also needs prompt medical assessment.

Seek emergency help if you:

These signs may reflect serious airway obstruction, low oxygen, or another urgent breathing problem.

- Are struggling to breathe or cannot speak in full phrases
- Develop blue or gray lips, skin, or fingertips
- Become confused, very drowsy, or difficult to wake
- Have sudden severe breathlessness or a feeling that the airway is blocked
- Cannot clear mucus and your breathing is rapidly worsening

Common questions

Can acquired tracheomalacia go away?

The weakened airway often remains structurally different. Symptoms may improve if the

cause is removed or treated, and supportive treatment can help keep the airway open. Surgery can stabilize the airway in selected severe cases.

Is tracheomalacia the same as tracheobronchomalacia?

Not exactly. Tracheomalacia affects the trachea. Tracheobronchomalacia affects the trachea and one or both main bronchi, which are the large airways entering the lungs.

Can tracheomalacia cause low oxygen?

It can, especially during severe airway collapse, a mucus blockage, or a chest infection. Many people with mild or moderate disease maintain normal oxygen levels between episodes.

Will an asthma inhaler fix tracheomalacia?

An inhaler does not make the tracheal wall stronger. It may help if you also have asthma, COPD, or narrowing of the smaller airways. Persistent symptoms despite inhaler treatment may lead to testing for another cause.

Can I exercise with tracheomalacia?

Many people can remain active, but coughing or breathlessness may limit intensity. A supervised pulmonary rehabilitation program can help some people build fitness and learn breathing strategies. Stop and seek help for severe or rapidly worsening breathing difficulty.

Does everyone with tracheomalacia need surgery?

No. Many people are managed by treating related conditions, improving mucus clearance, and using breathing support when needed. Surgery is generally considered only when severe symptoms are clearly linked to airway collapse and less invasive measures have not provided enough relief.

Sources

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