

COPD Lung Symptoms, Diagnosis, Treatment

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What is COPD ?

COPD is the abbreviation for chronic obstructive pulmonary disease. COPD is a lung disease that results from obstructions in the airways of the lungs that lead to breathing problems. Although COPD is a progressive disease, early diagnosis and treatment may slow its progression. COPD may be complicated by chronic bronchitis or emphysema; some patients develop both problems that lead to additional breathing problems. Some clinicians consider chronic bronchitis and emphysema as simply further manifestations of COPD.



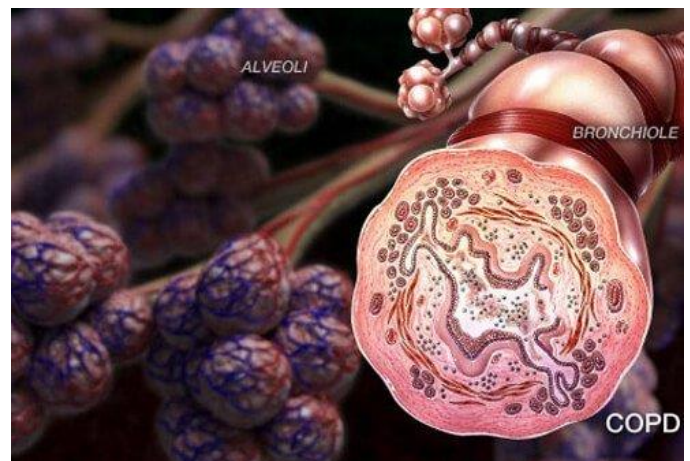
How Does COPD Affect the Lungs?

Damage to the lung tissue over time causes physical changes in the lungs and the airways become clogged with thick mucus. Compliance (the ability of the lung tissue to expand) becomes weakened because of this lung tissue damage. This weakened compliance or elasticity of the lungs means that oxygen cannot get to the air spaces where oxygen and carbon dioxide exchange occurs in the lung. This all leads to coughing to remove the thick mucus and eventually, difficulty in breathing.

COPD Symptoms

Shortness of breath is the primary symptom of COPD. It occurs with daily activities and is caused by blocked or clogged airways and damaged or destroyed alveoli where oxygen is absorbed and carbon dioxide is released. Other COPD symptoms may include wheezing, chest tightness, and a chronic cough. The affected individual may tire easily, have frequent colds and flu infections, and produce excessive mucus or sputum. Symptoms of COPD slowly worsen and people with advanced symptoms of COPD may:

- Be obese from lack of exercise
- Have muscle loss and declining endurance
- Have morning headaches
- Have a bluish or greyish color underneath the fingernails due to decreased oxygen levels in the blood
- Conversely, some patients with COPD and emphysema may lose weight



COPD Causes

Smoking and secondhand smoke plays a significant role in causing COPD. About 85% to 90% of all COPD deaths are related to smoking. The other causes are related to environmental irritants (pollution), and a rare few are genetically passed through family members (for example, people with Alpha-1 antitrypsin deficiency [AAT] are more likely to develop COPD symptoms).



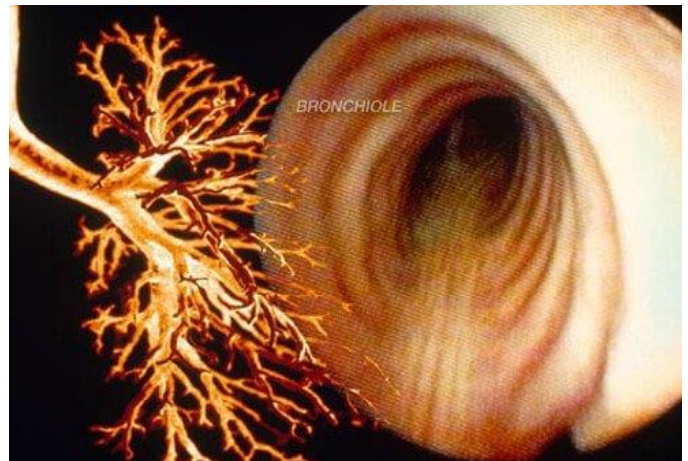
COPD Triggers: What Makes COPD Worse?

Half of all COPD exacerbations are triggered by bacterial or viral infections, whereas the rest of the triggers are caused by environmental factors. Minimizing exacerbations and avoiding COPD triggers can slow the progression of COPD. The following are common indoor and outdoor COPD triggers:

- Tobacco smoke
- Dust
- Pet dander
- Pollen
- Stronger odors: perfumes, scented candles, and air fresheners
- Chemical fumes: cleaning products, paints, and solvents
- Pollution: outdoor pollution (vehicle exhaust, gas station fumes) indoor pollutants (fumes and odors from cooking, fireplace, dirty air filters)
- Extremes in temperatures: extreme heat or cold

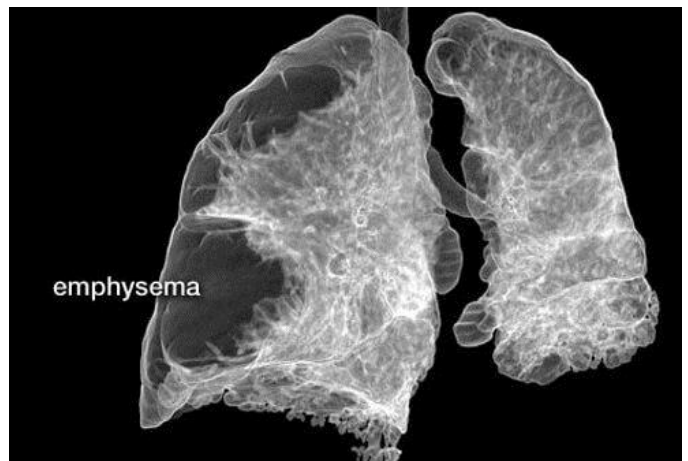
COPD: Chronic Bronchitis

Many patients with COPD also develop chronic bronchitis. Chronic bronchitis is a cough that occurs every day and causes inflammation of the airways, mucus overproduction, and frequent viral or bacterial infections. Since smoking is often the cause of chronic bronchitis, the "smoker's cough" is a likely sign of COPD and chronic bronchitis. Treatment for chronic bronchitis can include bronchodilators, steroids, and oxygen therapy. Quitting smoking and avoiding air-borne bronchial irritants is also suggested.



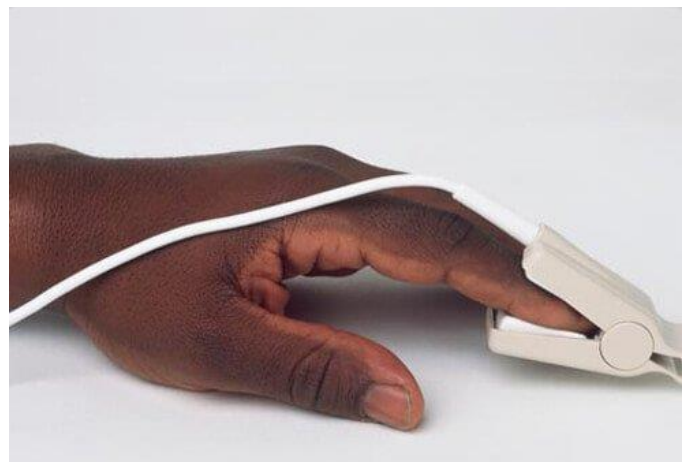
COPD: Emphysema

Emphysema is a disease of the lungs. In emphysema, the alveoli (small air sacs in the lungs that facilitate the exchange of carbon dioxide and oxygen) are damaged and die. Carbon dioxide and oxygen is not exchanged, and eventually the alveoli die leaving holes in the lungs that result in lost lung tissue and increased symptoms of COPD. Symptoms of emphysema usually include shortness of breath and sometimes cough and wheezing. Treatment for emphysema may include bronchodilating medications, steroids, antibiotics, and oxygen. Quitting smoking is also strongly suggested.



COPD Diagnosis: Physical Exam

An important part of the diagnosis of COPD is the physical exam, the patient's breathing history, smoking history, and family history of COPD. The first simple, non-invasive test performed is usually with a pulse oximeter (shown in the picture on this slide). Oximetry measures the amount (% saturation) of oxygen in your blood. It is a way to test how much oxygen is being sent to parts of your body furthest from your heart, such as the arms and legs. The pulse oximeter is placed on a body part (finger, ear lobe) and uses light to measure the oxygen levels.



Spirometry Breath Test

Spirometry is a test that measures how much air you can move in and out of your lungs over a short period of time, and is used to test for COPD. Spirometry involves breathing into a large hose connected to a machine, called a spirometer. The test can identify early COPD, and even help determine the stage of COPD in the patient. The test also shows how well certain medicines improve a person's COPD symptoms.



Chest X-Ray

A chest X-ray may be able to show enlarged lungs that can occur in some patients with COPD (due to hyperinflation). However, X-ray is more useful to help rule out or rule in other problems that may cause symptoms similar to COPD, such as pneumonia.



COPD Treatment: Bronchodilators

Bronchodilators are medications that are commonly used to treat COPD by relaxing bronchial muscles. By relaxing these muscles, the airway becomes larger and allows air to pass through the lungs easier. Some are short-acting (4 to 6 hours) and are used when symptoms increase sharply, while longer-acting bronchodilators are used daily to treat more chronic COPD symptoms. People with COPD may use both types, depending on their symptoms.



Once-Daily Inhaler

There are many different inhalers available that may contain one or more medications to reduce or relieve COPD symptoms (bronchodilators, corticosteroids or combinations of both medications). For example, Spiriva contains tiotropium while Stiolto Respimat contains tiotropium bromide and olodaterol and is a once-daily inhaler available to COPD patients. This treatment relaxes muscles in the airways to improve breathing, but it should not be used to treat asthma. Stiolto Respimat is proven to be more effective than Spiriva or olodaterol alone.



Before using a once-daily inhaler, check with your doctor to help you choose the inhaler that is the best choice for your condition.

Corticosteroids

Corticosteroids reduce the inflammation in airway tissues and thus allow the airway to open. This medicine is often taken by inhaler, but also may be administered by pills and/or injection. Oral corticosteroids are used to treat COPD when symptoms get rapidly worse. Inhaled corticosteroids are used to treat stable symptoms of COPD or COPD symptoms that are slowly getting worse. Both corticosteroids and bronchodilators are often prescribed to patients with COPD.



COPD Treatment: Lung Training

It is possible to significantly slow COPD progression and to improve breathing with pulmonary rehabilitation classes. Part of this rehabilitation includes stress management and breathing control techniques. Pulmonary rehabilitation classes are taught by specialists who help improve one's physical condition as well as how to manage COPD after completing the course. Pulmonary rehabilitation will educate clients on breathing techniques, medications, nutrition, relaxation, oxygen, travel, and how to stay healthy and avoid COPD exacerbations.



Breathing Exercises for COPD

Having COPD makes it harder to breathe, which can lead to avoiding activities that leave you breathless. Here are some breathing exercises for people living with COPD:

Pursed-Lips Breathing

This exercise involves breathing in through the nose (as if smelling something) for about two seconds. Then, purse the lips (like you are whistling or kissing) for two to three times longer than when you inhaled. Repeat as needed. This exercise makes exhaling easier for the person, and they also are able to extend exhalation, which provides improved oxygen and carbon dioxide gas exchange.

Pursed-lips breathing offers the following benefits:

- Slows down breathing
- Keeps airways open longer so your lungs can get rid of more stale, trapped air
- Reduces the work of breathing
- Increases the amount of time you can exercise or perform an activity
- Improves the exchange of oxygen and carbon dioxide



Diaphragmatic (Abdominal/Belly) Breathing

The diaphragm is supposed to do most of the work when breathing, but COPD prevents the diaphragm from working properly. Instead the neck, shoulders, and back are used while breathing. Diaphragmatic breathing may seem more difficult than pursed-lip breathing and seeking help from a health care professional is recommended.

Begin by sitting back or lying down. Relax your shoulders and place one hand on your chest and the other on your belly. Inhale through the nose for two seconds. During inhalation, your belly should move outward and more than your chest. Exhale slowly through pursed-lips and gently press on your belly. This helps get the air out by pushing on the diaphragm. Repeat as needed.

Diaphragmatic breathing offers the following benefits:

- Increases total air volume exchange
- Trains the diaphragm
- Easier breathing

Coordinated Breathing

Shortness of breath may cause you anxiety and you might hold your breath. Coordinated breathing helps to prevent this from happening. Before you are able to begin an exercise, inhale through the nose. Exhale, through pursed-lips, during the most strenuous part of the exercise. Coordinated breathing can be practiced during exercise or when feeling anxious.

Deep Breathing

Shortness of breath can be caused by air getting trapped in your lungs and deep breathing can prevent this from happening. This exercise will also allow you to breathe in more fresh air. Begin by sitting or standing with your elbows slightly back, allowing your chest to expand more. Inhale deeply and hold your breath for a count of five. Exhale slowly and deeply until all the air has been released. Repeat as needed.

Huff Cough

The huff cough helps you cough up mucus that had built up in your lungs. COPD can make it difficult to cough without getting tired, but the huff cough makes it easier to cough up mucus. Begin by sitting in a comfortable position and inhale slightly deeper than normal. Exhale while making a "ha, ha, ha" sound, as if you are trying to steam up a mirror. This allows you to become less tired when coughing up mucus. Repeat as needed.

COPD Treatment: Oxygen Therapy

COPD lowers oxygen in the blood. As COPD progresses, many people have oxygen levels so low that they get short of breath doing simple, everyday tasks like walking a few steps or just standing up for a few minutes. These people with COPD usually get some relief with supplemental oxygen administered through nasal tubing. Using oxygen at home for more than 15 hours a day can increase quality of life and help COPD patients live longer. Care must be taken when near someone using supplemental oxygen because it is flammable. Smoking, lit candles, or other open flames or sparking items (such as sparklers or gas cooking flames) should not be near someone using supplemental oxygen.



Antibiotics

Unfortunately, partially or completely blocked airways full of mucus are good places for pathogens (agents that causes disease such as viruses and bacteria) to occupy and multiply. People with COPD are at a higher risk for infections because they have partially or completely blocked airways. If fever accompanies an increase in shortness of breath, people with COPD should see their doctor to avoid serious infections. Antibiotics may be prescribed for bacterial infections.



Surgery

Surgery is not often used to treat people with COPD, but some people may benefit from certain procedures. Here are three surgeries that may be beneficial:

Bullectomy

Typically, a bullectomy is meant for patients with COPD related to emphysema. When the air sac walls are destroyed, larger air spaces (bullae) will form. A bullectomy will remove the bullae and allow some lung expansion.

Lung Volume Reduction

Lung volume reduction surgery (LVRS) takes place in patients who suffer from COPD related to emphysema. This procedure reduces the lung size by removing damaged tissues. The remaining lung and surrounding muscles are able to work more efficiently and allow functional airways to do better gas exchange.

Lung Transplant

A lung transplant is typically performed in patients with very severe COPD. During a lung transplant, the damaged lung is removed and replaced with a healthy lung. The procedure improves COPD symptoms and the quality of life for some select patients (average survival is about 5 years after transplant). However, a lung transplant can cause infections and possibly death if the body rejects the new lung.



COPD and Exercise

All people with COPD are usually advised to exercise, even those on supplemental oxygen. Walking is considered by most clinicians as the best form of exercise to begin with and to develop endurance. Patients can start slowly and gradually increase their endurance.

Types of Exercises for COPD Patients

- **Stretching:** start by stretching the arms and legs before and after exercising in order to prepare the muscles for activity and prevent injury and muscle strain
- **Cardiovascular or aerobic:** walking, jogging, jumping rope, bicycling, cross-country skiing, skating, rowing, and low-impact aerobics
- **Strengthening:** repeated muscle contractions until the muscle becomes tired



Benefits of Exercise with COPD

- Improve circulation and help the body better use oxygen
- Improve COPD symptoms
- Build energy levels so you can do more activities without becoming tired or short of breath
- Strengthen heart and cardiovascular system
- Increase endurance
- Lower blood pressure
- Improve muscle tone and strength; improve balance and joint flexibility
- Strengthen bones
- Help reduce body fat
- Help reduce stress, tension, anxiety, and depression
- Boost self-image and self-esteem
- Improve sleep
- Make you feel more relaxed and rested

Check with your doctor about exercising before you begin any exercise program.

COPD Prognosis

The prognosis for people with mild COPD is very good, but the prognosis worsens as the severity of staging increases. The average life expectancy of a COPD patient who undergoes a lung transplant is about five years. Patients diagnosed with COPD have a much better outlook if they quit smoking. COPD prognosis is dependent on the stage of the illness and the health of the patient.

The BODE Index

The BODE Index is a way to measure a patient's COPD prognosis. This test considers the patient's body mass index (BMI), airway obstruction (measured by FEV1), dyspnea (measured by the MMRC dyspnea scale), and exercise tolerance (measured by a 6-minute walk). The BODE Index can assess a COPD patient's life expectancy.



COPD Stages

There are four stages of COPD and each stage has different symptoms. Patients will usually participate in a pulmonary function test (PFTS) when being diagnosed with their stage of COPD.

Stage I (Mild COPD) Symptoms

- Shortness of breath when hurrying or walking on a slight incline
- No cough or mucus
- PFT results are usually 80% or more

Stage II (Moderate COPD) Symptoms

- Walking slower
- Become breathless when walking
- Possible cough or mucus
- PFT results are 50%-80%

Stage III (Severe COPD) Symptoms

- Stopping to regain breath after a few minutes of walking
- Possible cough and/or mucus
- Increased fatigue
- PFT results are 30%-50%

Stage IV (Very Severe COPD) Symptoms

- Too breathless to leave the house
- Breathless during everyday tasks
- Reduced quality of life
- PFT results are less than 30%



COPD and Diet

A healthy diet can help lessen symptoms of COPD. Obesity can make breathing and daily chores more difficult, while being too thin may cause weakness. Your doctor or a nutritionist can give you some guidance about a healthy diet for you. The following are some general dietary suggestions:

- Avoid under and over eating
- Monitor calories
- Limit salt intake
- Drink water, not caffeinated or carbonated drinks
- Eat high fiber foods (bran, fresh fruit)
- Avoid gas-producing foods (fried foods, beans)
- Eat small meals (3) with healthy snacks (2-3) every day



COPD: Smoking and Cancer

As mentioned previously, smoking, the leading cause of lung cancer, is also a major cause of COPD. Consequently, it is not surprising that many people with COPD also develop lung cancer. What is the best thing you can do to prevent COPD and lung cancer? Stop smoking, now. People who are diagnosed with COPD and who continue to smoke will have COPD progress faster. Smokers who quit will have COPD progress slower. Smoking cause the airway tissues to become damaged or destroyed. In addition, the many toxins in cigarette smoke can increase blood pressure, heart rate, and increase the risk for lung cancer.



Living With COPD

Living with COPD can be very difficult, but there are ways that can help you diminish symptoms and slow the progression of COPD. Although several have been described in the preceding slides, here is a list of ways to improve your daily life:

- Stop smoking
- Eat a healthy diet
- Stay active (exercise to improve your endurance)
- Use your medications as directed
- Get the flu vaccine every year and get vaccinated against pneumococcal pneumonia
- • Use sanitary hand washing techniques and avoid people with respiratory infections or those that have symptoms (cough, sneezing, nasal drip); avoid crowds and stay home as much as possible during any epidemic or pandemic caused by a respiratory pathogen – the CDC cautions patients with COPD on the use of face masks or coverings



Contact your doctor immediately if you develop increasing symptoms of COPD and develop a fever.

Sources:

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