



Improving Inadequate Breathing

The lungs primarily do two things. The first is to get oxygen into the blood stream. As we breathe air into our lungs, it is rich in oxygen and this oxygen is transferred from the tiny air sacs in our lungs (called alveoli) into the blood and carried throughout the rest of the body.



The second function of the lungs is to get rid of the carbon dioxide. As our body creates energy for muscle movement and other body functions, carbon dioxide is a “waste product” that is produced. Carbon dioxide is carried by the blood back to the lungs where it is exhaled. If we were unable to get rid of carbon dioxide, it would build to dangerous levels and could even cause death.

Many conditions that affect breathing can eventually lead to a state where the lungs are no longer ventilated well enough to clear the carbon dioxide from the body. This is a condition referred to as **chronic respiratory failure**.

Several conditions can lead to chronic respiratory failure. The most common is Chronic Obstructive Pulmonary Disease (COPD), which includes emphysema and chronic bronchitis. Neuromuscular diseases such as amyotrophic lateral sclerosis, muscular atrophy or dystrophy, post-polio syndrome, multiple sclerosis, spinal cord injuries, and myasthenia gravis can lead to chronic respiratory failure. Diseases that affect the movement of the chest cavity can also cause chronic respiratory failure such as kyphoscoliosis (abnormal curvature of the spine) and obesity hypoventilation syndrome (poor breathing due to severe obesity).

Some patients may under ventilate just during sleep, a condition referred to as **nocturnal hypoventilation**. These patients may have poor sleep quality, be sleepy or fatigued during the day, wake up short of breath during the night, or experience morning headaches.

Symptoms of Chronic Respiratory Failure or Nocturnal Hypoventilation

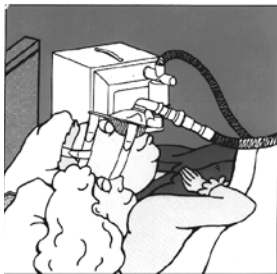
- Shortness of Breath at Rest or With Activity
- Poor Sleep Quality
- Daytime Fatigue or Sleepiness
- Altered Mental Status or Personality
- Confusion, Reduced Alertness, or Forgetfulness
- Shortness of Breath when Lying Down or when Waking Up
- Morning Headaches

Patients with these conditions may benefit from a therapy called Noninvasive Positive Pressure Ventilation or NPPV. NPPV is typically used only at night while the patient is sleeping. A small mask is placed over the nose and is connected to a device that senses the patient's breathing. During inhalation, the machine provides a "pressure boost" through the mask which causes the patient to breathe deeper and more effectively while decreasing the work of breathing. The device also applies a low pressure during exhalation, which helps to keep the airways open and get rid of more stale air that is normally trapped in the lungs. If the patient stops breathing for a period of time, the machine will also automatically deliver a breath.

By providing more effective ventilation of the lungs during sleep, the goals are to decrease excess carbon dioxide, increase oxygen levels, improve sleep quality, decrease symptoms (shortness of breath, daytime fatigue, morning headaches, etc.) and improve the patient's overall quality of life.

Several clinical studies have demonstrated the potential benefits of NPPV. At a recent international conference of the American Thoracic Society, fourteen new papers were presented on the potential benefits of NPPV. These studies looked at several patient groups, but eight of the fourteen looked at patients with COPD. Improvements noted in these studies included:

- Decreased Hospitalizations
- Improved Oxygen and Carbon Dioxide Levels and Exercise Capacity
- Decreased Risk of Death
- Reduced Air Trapping in the Lungs
- Unload Work on Respiratory Muscles
- Improved Nighttime Oxygen Levels, Symptoms, & Function
- Improved Patient Quality of Life (Sleep, Activity, Mental Status, and Energy)



If you feel you are a candidate for NPPV, contact your doctor, or feel free to call or contact us for more information.