

Breathing Problems in Adults with Neuromuscular Weakness

When you have neuromuscular weakness you can develop special problems with your breathing. You will usually first notice difficulty breathing when you are lying flat and problems during sleep. Treating these breathing problems early is important. To get the help you need before you develop serious problems, you should know what to look for and what to tell your health care provider to get the right treatment.



What is neuromuscular weakness?

Neuromuscular weakness happens when the nerves that control your body do not exchange information to your muscles normally. Or, you may have a condition that prevents your muscles from working properly. Some examples of conditions that cause muscle weakness are: ALS (amyotrophic lateral sclerosis, also known as Lou Gehrig's Disease), muscular dystrophy and conditions from genetic abnormalities.

How can neuromuscular weakness affect my breathing?

Many muscles are needed for normal breathing. These include your two diaphragms (muscles that lie between the bottom of your lungs and your belly), the muscles between your ribs, and muscles in your neck and throat. With neuromuscular weakness, these muscles may become tired (fatigued), making it difficult for you to inhale and exhale normally. This weakness may cause you to take shallow breaths and feel short of breath when lying down or sleeping. Shallow breathing from muscle weakness may lower your oxygen and increase the carbon dioxide levels in your blood, causing your muscles to become even weaker.

Your health care provider may check your breathing by ordering breathing tests called pulmonary function studies (see ATS Patient Series <http://patients.thoracic.org/information-series/en/resources/pulmonary-function-tests.pdf>) and measuring the amount of oxygen and carbon dioxide in your blood. These tests are usually done many times over the years both while you are sitting and lying-down. If your respiratory muscle weakness is getting worse (and this may happen *even if you do not feel any differently*), your health care provider will discuss treatment options

with you.

What kind of sleep problems should I look for if I have a neuromuscular condition?

If you have neuromuscular weakness, you may find you have more difficulty breathing when lying flat. This is because your weakened respiratory muscles are unable to move your chest enough to take in a normal sized breath. You may not feel you are getting a satisfying breath. This difficulty breathing is called breathlessness (see ATS Series http://patients.thoracic.org/information-series/en/resources/ATS_Patient_Ed_Breathlessness.pdf). Being overweight can make your breathlessness worse, especially when lying down.

Some people with neuromuscular weakness may have already been diagnosed with **obstructive sleep apnea-OSA** (see ATS Patient Series <http://patients.thoracic.org/information-series/en/resources/obstructive-sleep-apnea.pdf>). OSA is a condition in which the back of your throat becomes severely narrowed and closes off during sleep. This can cause your breathing to stop or "pause" for several seconds or longer. When these pauses occur, your blood oxygen levels often get very low. Neuromuscular weakness can worsen this condition.

Breathing problems during sleep can also be caused by **central sleep apnea**. Normally we do not have to think about out breathing because our brain sends a cue to breathe regularly, both when we are awake and asleep. With central sleep apnea, the normal cue from the brain to breathe is interrupted for a short time. As a result, you may have pauses in your breathing.

Neuromuscular weakness can cause both types of sleep apnea to get worse, preventing you from getting enough oxygen and sometimes make you build up too much carbon dioxide. Signs of sleep apnea include snoring, gasping or choking during sleep, and awakening frequently during the night. During the

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day, this poor-quality sleep may result in you feeling tired or sleepy. Sleep apnea can also result in morning headaches, mood swings and memory problems.

Even if you do not have sleep apnea, neuromuscular weakness can cause low levels of oxygen because of shallow breathing during REM sleep (also known as “dream sleep”). When you are in REM sleep, you rely mostly on your diaphragms to move and draw in air. If your diaphragms are weakened by a neuromuscular disease, your shallow breathing during sleep may lead to low blood oxygen levels and high blood carbon dioxide levels.

Another breathing problem commonly seen with neuromuscular weakness is **nocturnal hypoventilation**. Nocturnal hypoventilation is a condition that also can lower your blood oxygen level and raise your carbon dioxide levels. With nocturnal hypoventilation, you take shallow breaths whenever you are sleeping. This can cause you to feel tired during the day (daytime fatigue) and/or cause you to have morning headaches. It is very important to diagnose and treat nocturnal hypoventilation because it can increase the chance of death if it remains untreated. Pulmonary function studies are a good predictor of whether you are at risk for developing nocturnal hypoventilation.

What can be done to evaluate and treat neuromuscular weakness?

If you have a condition that causes neuromuscular weakness, your health care provider will evaluate if the weakness is affecting your breathing both while awake and asleep. Testing can include pulmonary function studies, arterial blood gases, and an overnight sleep study (ATS Patient Series <http://patients.thoracic.org/information-series/en/resources/sleep-studies.pdf>).

If you are found to have breathing problems during sleep, you may be treated with **non-invasive ventilation**. Non-invasive ventilation means the air (with or without extra oxygen) is delivered thru a mask. Common types of non-invasive ventilators are CPAP (continuous positive airway pressure) and BiPAP (a type of CPAP). These devices keep pressure in your upper airway so that it stays open when your muscles are tired during sleep. The air is delivered through a mask that fits over your nose or mouth. You will be fitted with the size mask that fits your face. These devices can be very successful in treating breathing problems during sleep, but they may take time to get used to because you will be wearing a mask while you sleep.

What can I do to limit my sleep problems?

If you are diagnosed with respiratory muscle weakness or sleep apnea, follow up with your health care provider to discuss the best treatment approach for

you. Since some medications can affect breathing during sleep, be sure to discuss with your provider about any medication you are taking, including illicit drugs and over-the-counter medications. Try to lose weight (if you are overweight), avoid smoking and limit your alcohol intake.

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Resources:

American Sleep Apnea Association

<http://www.sleepassociation.org/index.php?p=hypoventilation>

Medline Plus

<http://www.nlm.nih.gov/medlineplus/ency/article/000085.htm>

National Heart, Lung and Blood Institute

<http://www.nhlbi.nih.gov/health/health-topics/topics/ohs/>

Rx Action Steps

If you have a neuromuscular weakness, talk with your health care provider about your sleep problems and any concerns you may have about your breathing. Let your provider know if you are having any of the following:

- ✓ Difficulty breathing when lying flat
- ✓ Snoring, gasping or choking at night
- ✓ Morning headaches
- ✓ Confusion or “foggy” thinking
- ✓ Others notice that you have breathing pauses or a strange breathing pattern during sleep.

Health Care Provider’s Contact Numbers/ E-mail Address:
