

Positive Airway Pressure in Sleep Apnea

Cal Knowles

Biomedical Engineering at the University of Rhode Island

Obstructive sleep apnea (OSA) is a sleeping disorder in which a person will stop breathing for a span of seconds. OSA is more commonly seen older persons whom are obese and/or are active smokers. Some of the symptoms of OSA are loud snoring, restless sleep, and sleepiness during the day. A common treatment for OSA is the use of a continuous positive airway pressure machine (CPAP).

In obstructive sleep apnea, the airway narrows as the muscles relax while sleeping. This causes the amount of oxygen in the blood to be reduced. Sleep apnea can lead to more severe health problems such as cardiovascular disease, high blood pressure, diabetes, and/or a stroke. An estimation is that 1 out of every 15 Americans have sleep apnea, and the majority of those affected aren't even aware that they have sleep apnea, and therefore go untreated.

The components of a CPAP are a flow generator, a hose, and an interface. The flow generator is the part of the machine that provides the airflow to the person. The hose connects the flow generator to the interface. And the interface is the facial mask that the person wears while they are sleeping.



The CPAP works by providing the user with a constant stream of compressed air. The pressure of the air causes the breathing airway to remain open enough so that the person does not have a sleep apnea episode (or at least reduces the amount of them). When the machine is turned on, the air flows out through the mask, once the mask is put on however, the air does not flow through the airway, but instead the pressure from the air accomplishes the desired task.

The pressure of the air is measured in cm per water, and most patients use the machine in a range from 6 to 14 cm per water. The machines can usually go up as high as 20-30 cm per water.

The journal article I used for reference took a look at some other alternative methods of treatments and graded their effectiveness.

Maurer, Joachim. "Update on surgical treatment for sleep apnoea" *Swiss Medical Weekly* 132 (2009): 624-629

<http://www.sleepapnea.org/>

http://www.nhlbi.nih.gov/health/dci/Diseases/SleepApnea/SleepApnea_WhatIs.html

http://www.medicinenet.com/sleep_apnea/article.htm