

Positive Airway Pressure for Obstructive Sleep Apnea

Positive airway pressure (PAP) devices provide pressurized air via a nasal or full face mask in order to keep the upper airway open during sleep in patients with obstructive sleep apnea syndrome.

PAP Machines

1. CPAP
These machines provide a fixed pressure at a steady rate with the option of a slight drop in pressure during exhalation (CFlex or EPR). The proper pressure level for each individual is determined in the sleep lab.
2. Auto PAP
These machines adjust the pressure automatically depending on whether they detect breathing blockages or not. These can be useful in patients who have difficulty tolerating the constant pressure of a CPAP machine, in patients for whom an optimal pressure could not be determined in the lab, and in patients who have a need for higher pressures at only certain times of the night (REM sleep or sleeping on their back).
3. Bilevel PAP (BiPAP)
These machines allow for use of 2 different pressure levels – a higher pressure while you breathe in, and a lower pressure when you breathe out, often making it more comfortable to breathe at higher pressure levels. These can be useful in patients who have difficulty breathing out against the continuous air pressure of CPAP, and in patients who require very high pressures for adequate treatment of their sleep apnea.

Possible Side-Effects

1. **Nasal Congestion/Discomfort**
Approximately half of patients experience difficulties with stuffiness/congestion which is usually due to a nasal reaction to the airflow. These symptoms often decrease with continued use. Other symptoms include: itching, runny nose, nose bleeds, and nose dryness.
Potential treatments include:
 - Use of **heated humidification** which adds moisture to the air minimizing the irritation to the nasal lining. **Saline nasal spray or gel** can further help with moisturizing the nasal passages.
 - **Nasal/Sinus Irrigations** using prepackaged solutions and irrigation bottles (such as SinuRinse), or using nasal irrigation cups (Neti pots) with home made solutions (1 heaping teaspoon of kosher or canning salt and ½ teaspoon of baking soda mixed in 1 pint of lukewarm water). These can be particularly helpful in patients with chronic sinus problems.
 - **Nasal steroid sprays** (eg: Flonase, Nasacort, Rhinocort, Nasonex) which have anti-inflammatory effects and can reduce swelling and congestion.
 - **Nasal Atrovent spray** which functions as a drying agent and can help dry out a runny nose

- **Oral antihistamines** such as Claritin, Benadryl (found in over-the-counter allergy medications), or prescription medications such as Allegra, Zyrtec and Clarinex. These can be especially helpful in individuals with allergies.
- **Oral Decongestants** such as Sudafed.

** Of note, over the counter decongestant nasal sprays such as Afrin and Neosynephrine should not be used for more than 2-3 days since regular use can be habit-forming and lead to worsening congestion. **

2. Mouth Dryness/Discomfort

Mouth dryness when using a nasal mask is usually caused by air escaping through an open mouth (referred to as “mouth leak”). This can be helped by using a chin strap, or if this is not effective, switching to a full face mask (which covers the nose and mouth).

In patients using a full face mask, some mouth dryness can also be felt especially at higher CPAP levels. This can be alleviated by use or increase in the heated humidification, and ensuring that there is not excessive mask leak.

3. Mask Air Leaks

Some air leak is to be expected from all masks primarily due to head movement during the night which causes shifting of the mask and break in the seal. However, frequent leaks can lead to sleep disturbance, eye irritation, and recurrence of snoring and are most often caused by a poorly fitting mask. If adjustment of the positioning of the mask and tightness of the straps does not resolve the problem, a different mask size or mask style may be necessary.

4. Skin Irritation

Mild redness or pressure marks along the areas of contact with the mask and straps is normal, and generally disappears after mask removal. However, excessive redness or development of sores is usually related to excessive tightness of the mask. Adjustment of the mask/straps may eliminate the problem. Washing the face every night before placing mask on, and washing the mask every day can also reduce skin irritation and acne-like rashes. If this does not solve the problem, a different mask size or style may be necessary. Rarely, allergic reactions can occur that require a change to a mask made of different material (although most masks are made with hypoallergenic materials).

5. Discomfort From the Pressure

This is usually most prominent when you first start CPAP, and tends to improve with continued use. Measures that can help with this discomfort include:

- Using the **ramp** - a feature that allows the pressure to start very low, and then gradually increases it up the proper level (you can set the time period over which the pressure rises)
- Using **CFlex/EPR** – a feature which allows the pressure to drop slightly during exhalation, but returns it to the required level prior to the next inspiration (it has 3 settings that you should try and choose the most comfortable).

- Allowing for a **desensitization period** during which you start out wearing the CPAP during the day/evening while awake for gradually longer periods, prior to trying to sleep with it.
- If the above are not effective or sufficient, please let us know and we can discuss reducing the pressure or using alternative modes of PAP (such as autoadjusting or Bilevel).

6. Dry Eyes

This is usually related to air leak in the area around the eyes. If repositioning of the mask does not solve the problem, a different mask size or style (nasal pillows can be particularly useful) may be necessary.

7. Machine Noise

Usually very mild, but if it is problematic, placing the machine on the floor, or inside a bedside drawer can be helpful.

8. Water Condensation in Tubing

Usually due to cooling of the humidified air in the tubing; can be seen when using higher humidification settings and in the winter when room temperature tends to be lower. Reducing the amount of humidification can help, or sometimes using a fleece sleeve for the tubing can help by decreasing heat loss in the tube (can be made or purchased).

For patients requiring high levels of humidification, a CPAP machine with heated tubing is available which delivers more humidification without the problem of condensation.

9. Bloating

Less common side-effect, related to swallowing of air during the night (aerophagia), and seen more frequently at higher pressures. Measures used to help this include: minimizing use of higher pressures by using either reducing set pressure, or using an AutoPAP or BiPAP machine. Use of a nasal mask, and slight elevation of the head of the bed can also help.

10. Claustrophobia

Not uncommon when first starting CPAP, especially when using larger full face masks. The key is usually gradual desensitization – start out using CPAP for a few minutes only while awake, and gradually increase time used progressing use during a nap, and eventually to nighttime use. A mild sleeping pill or anxiety medication at bedtime can also ease in the adjustment and transition – please discuss with us if this is problematic.

Other Issues with PAP

1. Traveling with CPAP

Most CPAP machines are portable and come with carrying cases to make travel easy, and are becoming common enough as to not be problematic when going through security at airports, etc. They are also equipped with transformers which allow for use in countries with 220 voltage.

Finally, there are battery pack options for camping and other situations when you are going to be removed from power sources.

1. **What to do When You Have a Cold**

CPAP use can be problematic when you have a cold if the nasal congestion and/or cough are severe. Decongestants can be helpful temporarily, but if symptoms are severe and refractory, then going without CPAP for a few days may be the only option.

2. **Cleaning the Equipment**

Careful and regular cleaning of both the machine and accessories (mask, tubing, etc) is very important to preserve function as well as reduced potential side-effects such as nasal congestion. Please refer to the manufacturer's instructions regarding specific cleaning requirements of your equipment. Detergent used should generally be mild and **not** antibacterial as most antibacterial detergents can damage silicone in masks. Also note the need for cleaning and regular replacement of filters that cleanse the air of particulate matter and dust.

3. **Dentures**

Patients with dentures often find that sleeping with these allows for better mask fit (upper dentures when you have a nasal mask, and lower dentures when you use a full face mask). If the original mask was fitted with you dentures and you subsequently decide to sleep without them, then a different mask may be necessary.

Resources

www.sleepeducation.com

www.cpap.com

www.talkaboutsleeeep.com

www.sleepquest.com