

How to Troubleshoot a CPAP Machine

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Objectives

- Recount the mechanical elements of a CPAP/bilevel device (mask, strap, tubing, blower)
- List potential problems that a clinical will encounter when they check CPAP machines
- Troubleshoot a mock machine

Among adult patients with obstructive sleep apnea syndrome (OSAS), adherence to continuous positive airway pressure (CPAP) treatment is 40-90%, according to recent well-designed studies that evaluated outcomes as a primary end point. Clinical reports suggest that physician and patient understanding and reinforcement of CPAP utility as a major reason for the improvement of adherence to CPAP treatment (1, 2). Technologic advances have allowed for the development of new treatments for OSAS that include automatic CPAP, bilevel, and innovative airway procedures (3-5). These technologic advances can be viewed as possible improvements over the existing treatment approach only if the risks and benefits of each new treatment are well understood by OSAS patients and their physicians. This presentation will emphasize the elements of CPAP/bilevel therapy and involve a practical test of knowledge.

References

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CPAP Therapy

Keys to Success

Adapted from The Lung Association (Canada)

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CPAP

- ◆ Continuous positive airway pressure or CPAP is a prescribed pressure delivered to the throat to keep it open during sleep
- ◆ The CPAP unit is plugged into an electrical outlet and the pressure is delivered through tubing attached to a mask and held in place by a headgear

BiLevel

- ◆ Bilevel uses an expiratory pressure (like CPAP) to keep the pharynx open but also increases flow (and pressure) during inspiration.
- ◆ As a consequence, the pressure is lower during breathing out and higher when breathing in and provides a ventilatory assist.
- ◆ Some units have a timed mode that will give a breath if there is no inspiratory effort in a preset time

What is the leading factor in complying with CPAP or Bilevel therapy?

- ◆ The mask!
- ◆ Other Elements
 - Strap attachments
 - Size, placement, and noise of the “leak”
 - Swivel type
 - Tubing weight and location
 - Noise of the machine



Mask Fit: Key to Success

- ◆ Masks must fit properly for a patient to keep using CPAP
- ◆ People stop using CPAP when they have mask related problems
- ◆ Early (first week) problem solving improves CPAP compliance.

Masks

- ◆ The following are examples of various masks available.
- ◆ Newer, more comfortable masks come on the market
- ◆ Before buying or replacing a mask the patient may shop around to see which one is best.

Examples of Masks

- ◆ ©Respironics Profile Lite Custom nasal mask contains a soft gel that can be heated in boiling water for a custom fit. A soft, but detachable, cushion conforms to the contour of the forehead.



Examples of Masks

- ◆ ©Respironics
Comfort Classic has a soft envelope shape to reduce pressure and improve fit. A (detachable) soft gel cushion conforms to fit the forehead



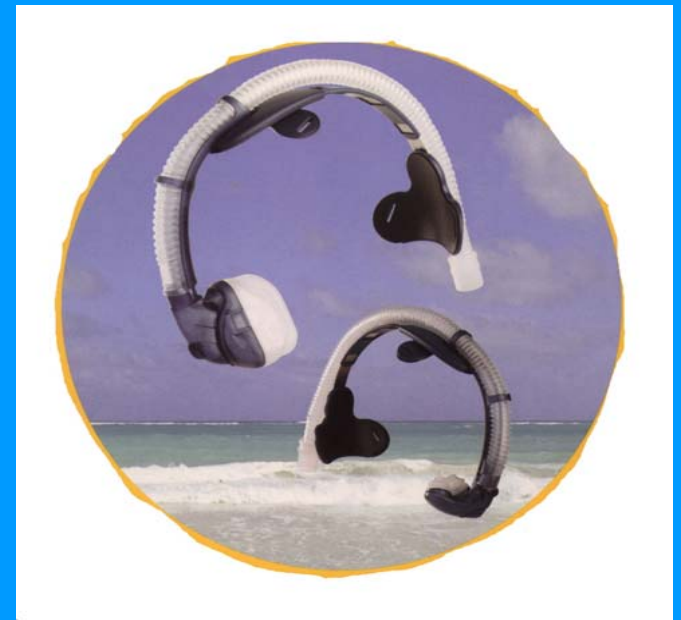
Examples of Masks

- ◆ ©ResMed Ultra Mirage is a comfortable fitting mask with adjustable forehead support and quiet operation.



Examples of Masks

- ◆ The Breeze™ is an alternative to nasal masks and may be preferred by those with a moustache or who feel claustrophobic. Soft nasal pillows are inserted in the hard plastic shell and may be rotated to fit the nostril. The Breeze also has a small nasal cushion as an alternative to the pillows.



Examples of Masks

- ◆ Mouth Mask

Fisher & Paykel Oracle™ provides an alternative to nasal or full face masks. The Oracle fits in the mouth and seals around the lips requiring no headgear. This is not a dental appliance and does not require orthodontic fitting. Use with humidifier



Common Mask Related Problems

- ◆ Pressure Points
- ◆ CPAP masks, if fastened too tight or sized improperly, may cause blisters or sores on your skin
- ◆ Most common spot is the bridge of your nose
- ◆ Blisters may break open and become infected

Common Mask Related Problems

- ◆ Leaks

 - Most CPAP units compensate for a small leak

- ◆ Leaks near your eyes can cause irritation and dryness

- ◆ It may be difficult to get a seal with a beard or moustache

- ◆ Use correct size mask to eliminate extra surface area (anything more than what is needed for a seal)

Worn Masks

- ◆ Check for
 - increased leaking
 - tears or rips in the mask membrane
 - change in texture of the membrane
- ◆ Gel masks may become soft and lose shape
- ◆ Silicone masks may become hard, change colour or stretch

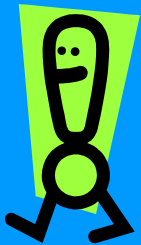
Replacing Your Mask

- ◆ Annual replacement is recommended by most manufacturers of CPAP masks
- ◆ Check with your health insurer to see if you have coverage for annual replacement

Prevention of Pressure Sores

- ◆ Never over-tighten your mask
- ◆ Always have your mask as loose as possible without having it leak

Remember



Gravity works in your favour to seal the mask

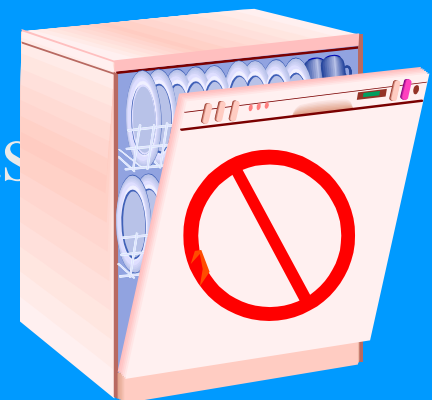
Treatment of Pressure Sores

- ◆ Contact your supplier to check the fit of your mask
- ◆ Try duoderm or moleskin (ask your pharmacist) on the red area as long as the skin is not broken Avoid creams as it may cause seal problems
- ◆ If you have followed the hints for preventing sores and still have problems please consult your doctor



Care and Cleaning Daily

- ◆ Hand wash mask each morning with mild soap and warm water
- ◆ Rinse well and air dry
- ◆ Dust CPAP unit with a soft damp cloth
- ◆ Avoid using harsh chemicals and bleach
- ◆ Most masks are not dishwasher safe



Weekly Care and Cleaning

- ◆ Tubing and headgear should be cleaned in warm soapy water at least once weekly
- ◆ Rinse in cool water and hang to dry
- ◆ Clean headgear and tubing more often during hot weather or when the patient has a cold or respiratory infection

Allergies

- ◆ Masks are designed using various products
- ◆ Most common: silicone and polyethylene
- ◆ Inform your supplier at time of purchase if you are sensitive to these products
- ◆ Most products are now latex-free

Allergies

- ◆ Are you allergic to dust, pollen or molds?
- ◆ Talk to your doctor about your allergies and get the allergies under control so you can use your CPAP

Mouth Breathing a Problem?

- ◆ Note: Air pressure will always follow the path of least resistance

If your mouth is open, that becomes the path of least resistance. The pressure will cause flow to rush out of the mouth.



Mouth Breathing Solutions

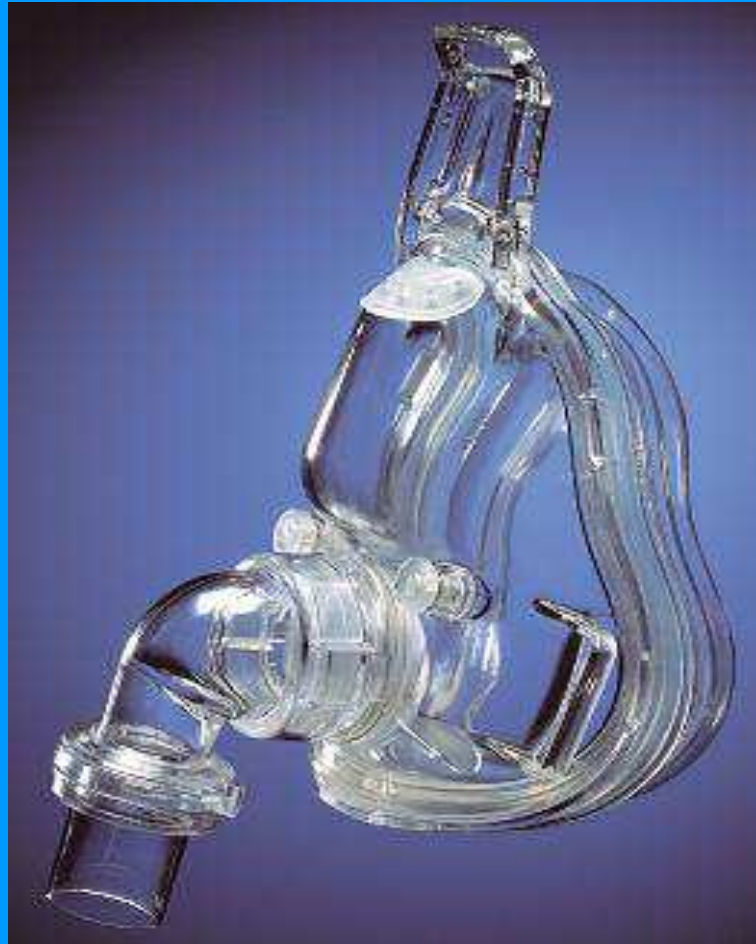
- ◆ Try Using a Chin Strap

Various models available. Some attach to headgear while others go around the head

- ◆ Full Face Mask

If you unable to use a chin strap your doctor may order a full face mask that covers both nose and mouth. This type of mask may be needed if the nose is blocked for any reason

Example: Full Face Mask



Dryness and Congestion

- ◆ The high flow generated from your CPAP or Bilevel removes moisture from your nasal cavity leaving a feeling of dryness and congestion
- ◆ Dryness is UNCOMFORTABLE
- ◆ May prevent you from using CPAP

Solutions for Dryness

- ◆ Water soluble lotion or spray for the nose
- ◆ Humidifiers attached to the CPAP unit
Note: Must be attached (not a room humidifier)

Humidifiers are available from a supplier in either cold or heated models. The newest models of CPAP can be purchased with a built-in heater.

Medications for Nasal Congestion

- ◆ Prescribed medications are available to decrease the nasal stuffiness or congestion associated with CPAP
- ◆ Examples are nasal steroids*, with or without nasal decongestants

*Off label unless the patient has allergic rhinitis

Heated Humidifiers

- ◆ Increases humidity by heating the water chamber so as air passes through the chamber the relative humidity increases
- ◆ Most effective way to add moisture to CPAP
- ◆ Adjustable from low to high range for optimal comfort
- ◆ Safety feature to prevent overheating

Care and Cleaning of Humidifier

- ◆ Daily
 - empty humidifier daily
 - wash humidifier chamber and tubing in warm soapy water
 - rinse thoroughly and air dry
 - refill with distilled water
- ◆ Regular cleaning prevents growth of bacteria. To reduce bacteria soak chamber and tubing in 50/50 vinegar solution for 20 minutes and rinse thoroughly

CPAP Headgear

- ◆ Masks are usually sold in sets including headgear
- ◆ Most common fabrics used are neoprene, spandex, nylon and cotton
- ◆ Fabrics improve comfort by allowing more stretch
- ◆ Velcro tabs allow for adjustment and better fit of the mask



Care and Cleaning of Headgear

- ◆ Hand wash weekly in warm soapy water
- ◆ Rinse well and press out excess water with dry towel
- ◆ Air dry
- ◆ Replace headgear when it is overstretched or retains an unpleasant odour
- ◆ “Quick release clips” can be used to preserve the velcro

Care of CPAP Unit

- ◆ Inspect filters monthly and replace regularly. Filters are inexpensive and clean the air you breathe in
- ◆ Do not place liquids on top of CPAP unit as spills may damage the inside of the machine.
- ◆ Yearly preventative maintenance by trained personnel is recommended.

Key to Success

- ◆ CPAP is effective in reversing the symptoms of sleep apnea
- ◆ Many people give up before they reach acceptance and the feeling that they cannot do without it
- ◆ Perseverance is the key to succeeding with CPAP