Continuous positive airway pressure (CPAP) use, home care

Revised: December 11, 2023

Critical Notes!

Staff should follow the RCHSD policies, procedures, and competencies. ***Lippincott Procedures*** *are intended as an additional reference and staff should use critical thinking when reviewing and applying the content.*

Introduction

Continuous positive airway pressure (CPAP) is a type of noninvasive positive pressure ventilation that provides a constant stream of pressurized air into the airways and functions as a pneumatic splint to help hold the airway open. CPAP helps maintain airway patency from the nares to the alveoli, thereby increasing functional residual capacity and improving gas exchange. In the home, it's primarily used to treat obstructive sleep apnea by reducing the frequency of respiratory events (partial or complete airway collapse) during sleep, thereby decreasing daytime sleepiness, improving systemic blood pressure, lowering the risk of motor vehicle collisions, and improving the patient's quality of life.[1] [2] CPAP may also lessen the symptoms of gastroesophageal reflux, improve heart failure outcomes, and reduce the risk of arrhythmias.[1] [2]

A CPAP system consists of a flow-generating pump, connection tubing, and an interface device (an airtight mask or nasal pillows) with associated headgear.[3] The practitioner may also order humidification and supplemental oxygen depending on the patient's clinical needs.[3]

The effectiveness of CPAP therapy depends on the frequency and amount of time the patient uses the device. However, nonadherence to therapy is common due to adverse effects (such as discomfort or irritation from the mask, nasal dryness or congestion, and claustrophobia), noise, and inconvenience.[1] [4] [5] [6] In the home, you may set up the CPAP device and administer therapy, identify barriers to adherence, and provide education, support, and interventions to address issues that may interfere with adherence to therapy.[4] [5]

Contraindications to noninvasive positive airway pressure include the need for emergent intubation, acute life-threatening nonrespiratory organ failure, recent facial surgery or trauma, significant airway

obstruction, inability to protect the airway, and recent esophageal or gastric anastomosis.[7]

Equipment

- Appropriately sized patient interface (nasal mask, nasal pillows, or face mask) with headgear
- CPAP machine with connection tubing
- Gloves
- Permanent marker
- Soap and water
- Washcloth
- Written educational materials
- Optional: astringent, distilled water, fluid-impermeable pad, humidification device, humidification tubing, other personal protective equipment, oxygen delivery tubing, oxygen source, water-soluble lubricant

Preparation of Equipment

Inspect all equipment and supplies. If a product is expired, is defective, or has compromised integrity, remove it from patient use, label it as expired or defective, and report the expiration or defect as directed by your agency.

Follow the manufacturer's recommendations for use and care of the CPAP machine.

Implementation

- Review referral information, the plan of care, and prior visit documentation, if available.[8]
- Verify the practitioner’s order. Note the prescribed level of positive pressure and whether humidification or supplemental oxygen are ordered.[6] [9] [10] [11]
- Gather and prepare the necessary equipment and supplies.
- Introduce yourself and state the purpose of your visit.
- Confirm the patient's identity using at least two patient identifiers.[12]
- Ask the patient and family (if appropriate) about any recent changes in the patient's health status, including practitioner visits, tests, or changes in medications, diet, fluid intake, or activity

level.[8]

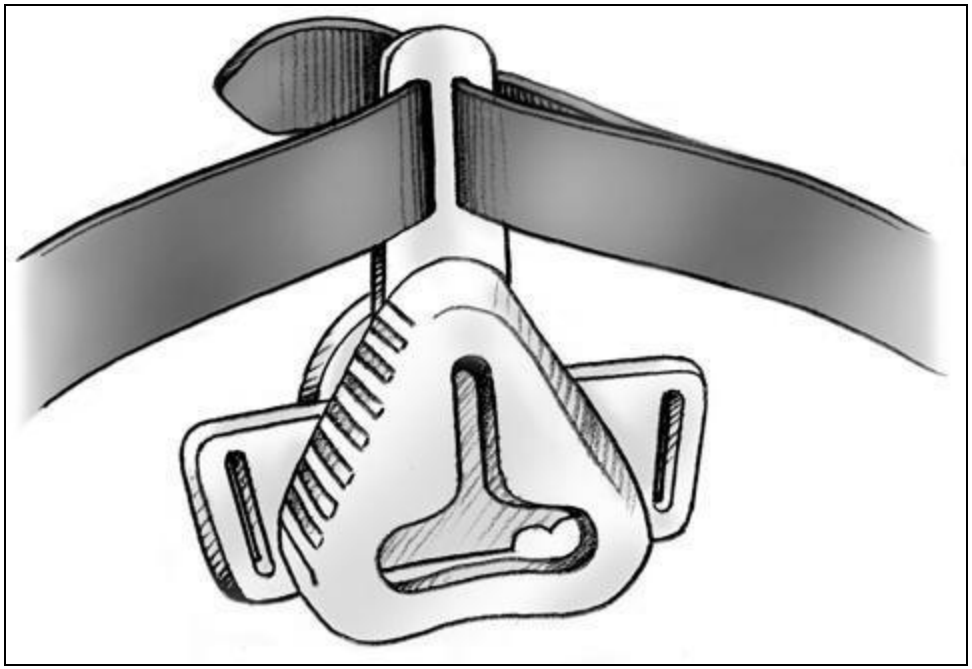
- Explain the procedure to the patient and family (if appropriate) according to their individual communication and learning needs *to increase their understanding, allay their fears, and enhance cooperation*.[13] [14] [15] [16]
- Organize the equipment and supplies on a clean surface. Place a fluid-impermeable pad between the environment and equipment and supplies, if needed.[17] [18]
- Perform hand hygiene.[17] [19] [20] [21] [22]
- Put on gloves and, as needed, other personal protective equipment *to comply with standard precautions*.[17] [23] [24] [25] [26]
- Instruct the patient to wash the face with a washcloth and soap and water *to remove facial oils and help achieve a better fit*. Alternatively, the patient may use an astringent *to clean the skin and reduce skin irritation*.[27]
- Set up the CPAP machine on a stable surface according to the manufacturer's instructions. Ensure that the CPAP machine is within arm's reach of the patient's bed *for easy patient access* and away from drapes, bedding, heating vents, and radiators *to prevent restricted airflow to the machine*.[27]
- If prescribed, fill the fluid reservoir with distilled water to the indicated mark *to provide humidification*. Ensure that the humidifier is below the level of the CPAP machine and the patient's sleep surface *to prevent condensation from flowing back into the CPAP machine or onto the patient's face*.[27]
- Connect the tubing to the CPAP machine's outlet port (or humidifier outlet if humidification is used) at one end and to the patient's interface device (nasal mask, nasal pillows, or face mask) at the other end.[27]
- If prescribed, connect the supplemental oxygen delivery tubing to the oxygen source at one end and to the patient's interface device at the other end.[27]
- Assess all connections for a tight fit and inspect the tubing for cracks or other damage *because these can produce air leaks.* Tighten any connections as needed. Replace tubing if integrity is compromised.[27]
- Plug the CPAP machine into a properly grounded outlet. Avoid using an extension cord to reach the outlet. *Because of the electrical consumption of a CPAP machine, it shouldn't share outlets with other equipment and shouldn't be plugged into an extension cord*. If the CPAP machine

turns on automatically when plugged in, turn the machine off by flipping the ON/OFF switch until ready for use.[27]

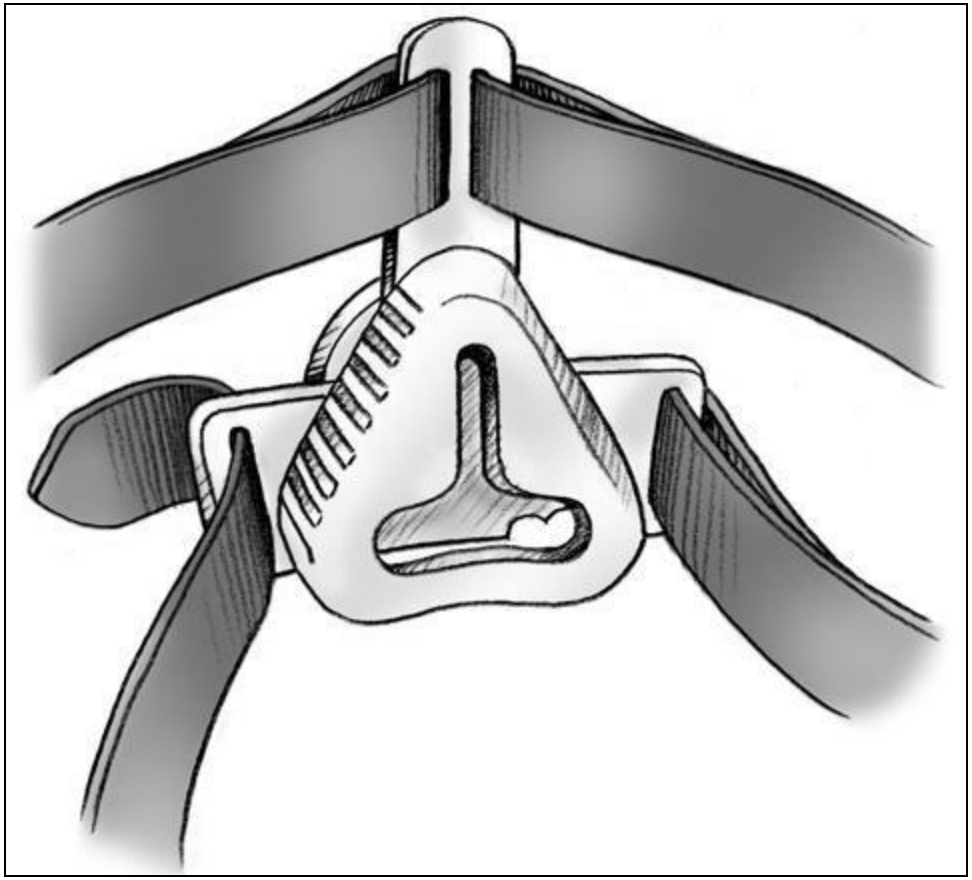
- Inspect the patient interface *to make sure that the cushion isn't hard or otherwise compromised*. If it is, replace it.

Applying a nasal mask

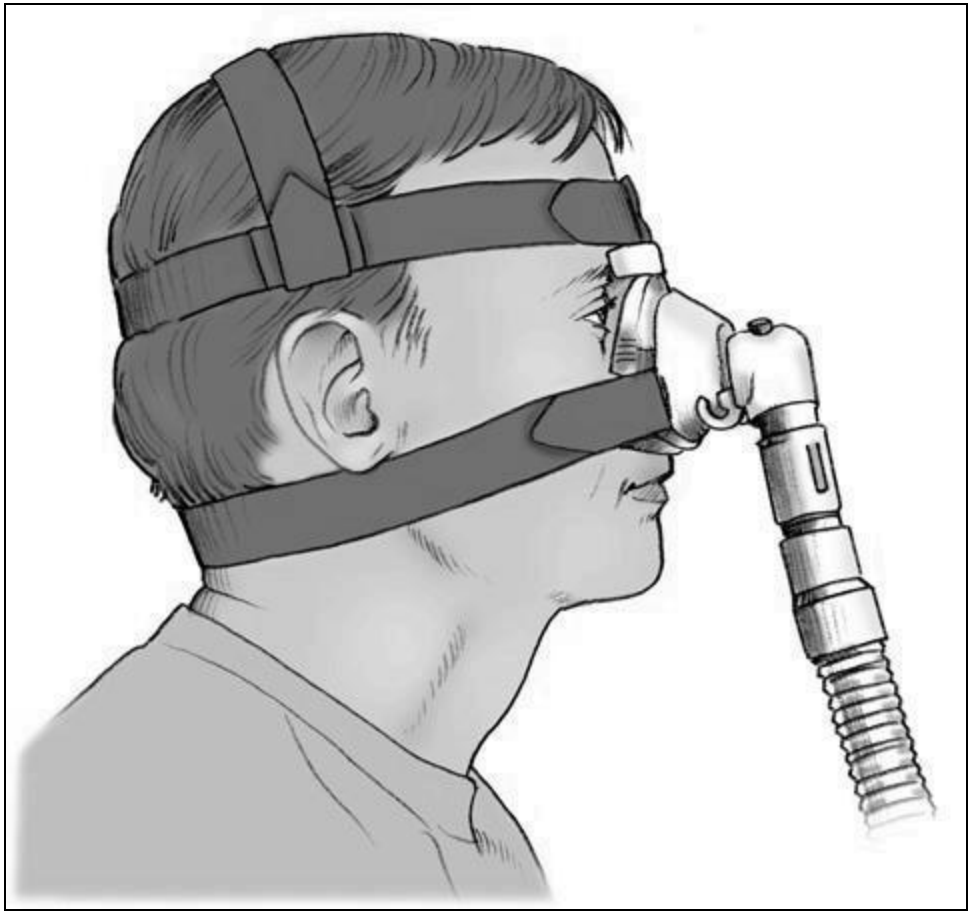
- Place the nasal mask so that the longer straps are located at the top of the mask (as shown below).



- Making sure that the Velcro faces away from you, thread the four tabs through the slots on the sides and top of the mask (as shown below).



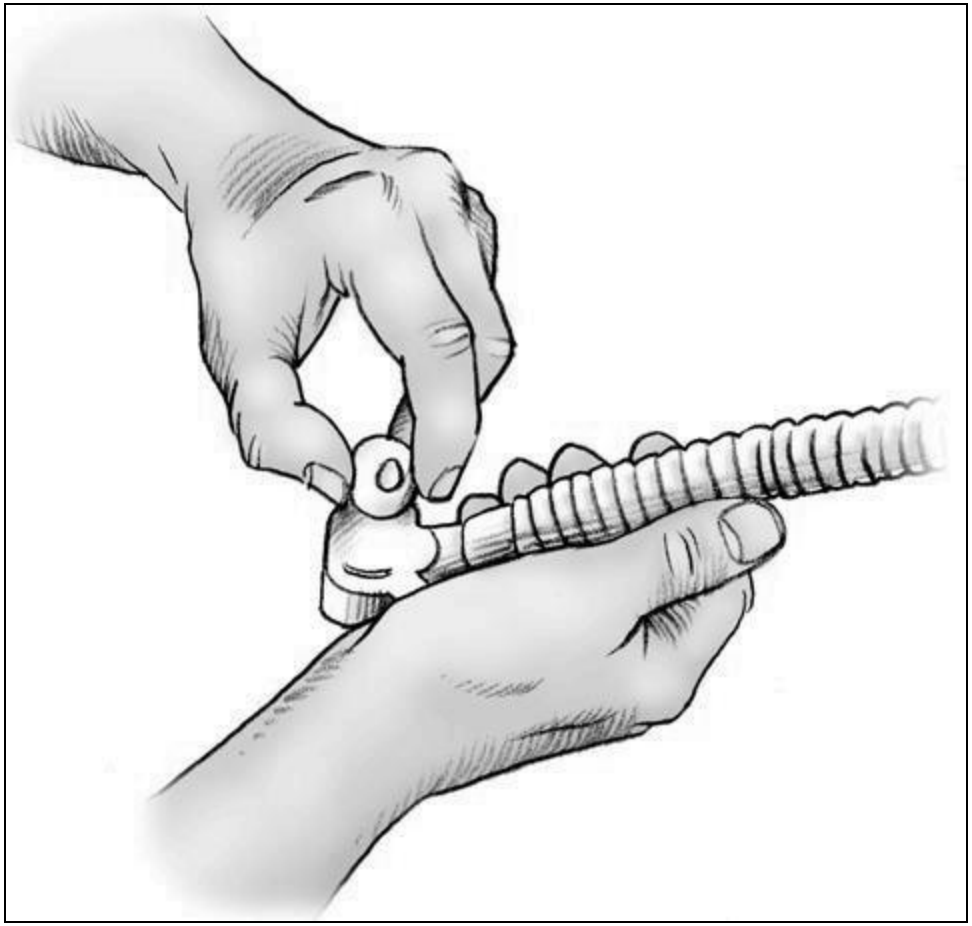
- Pull the straps through the slots and fasten them using the Velcro.
- Place the mask over the patient's nose and position the headgear over the patient's head.
- Gradually tighten all the straps on the mask until you obtain a seal. The mask doesn't have to be very tight to fit correctly, it just has to have a seal (as shown below).



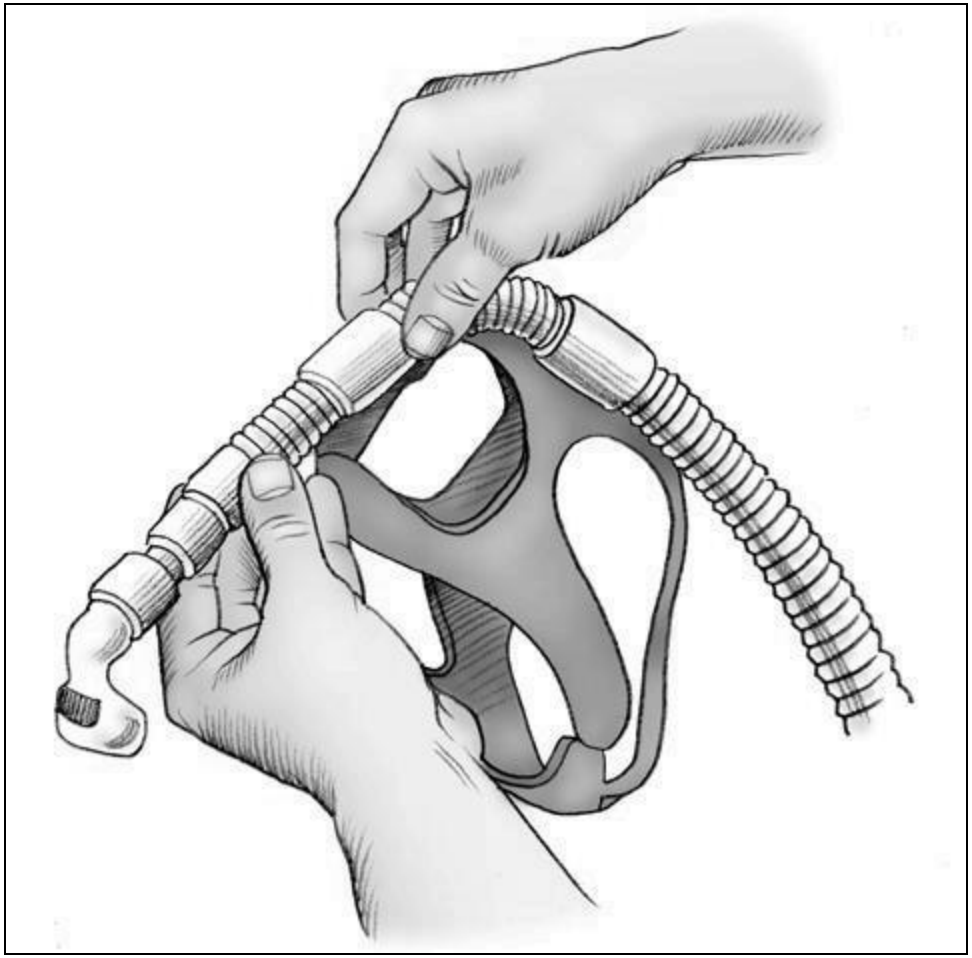
- Use the permanent marker to mark the straps with the final position *to eliminate having to fit the mask each time the patient wears it*.

Applying nasal pillows

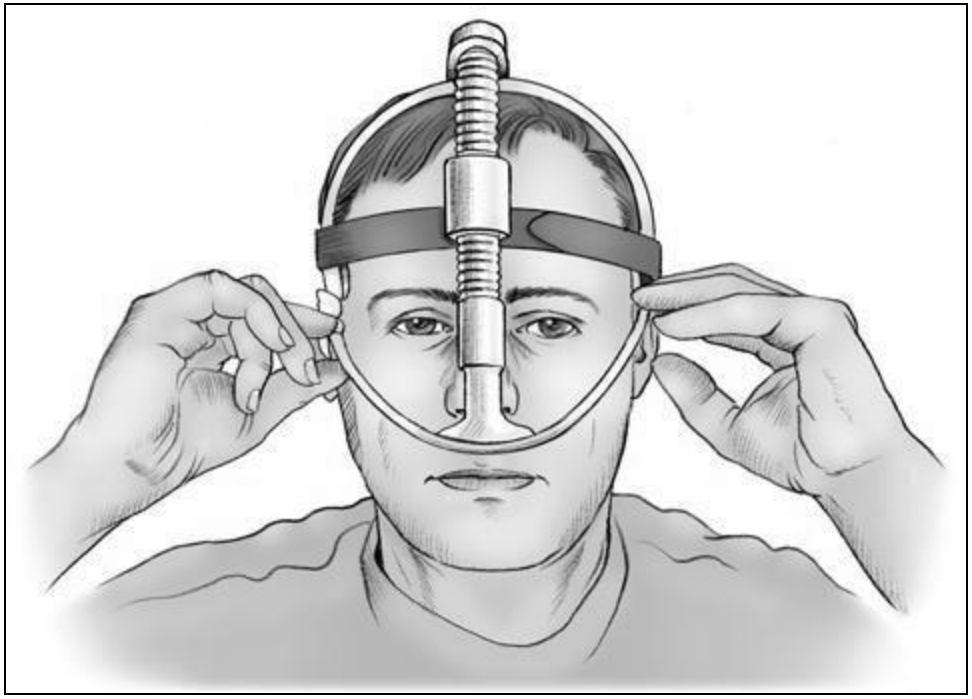
- Insert the nasal pillows into the shell, making sure that they fit correctly (as shown below). Lubricate the nasal pillows with water-soluble lubricant, if needed.[27]



- Place the headgear around the patient's head and use the Velcro straps to achieve the proper fit. After the straps are in the correct place, remove the headgear without undoing the straps.
- Attach the nasal pillow to the headgear by wrapping the Velcro around the tubing, leaving room for rotation (as shown below).



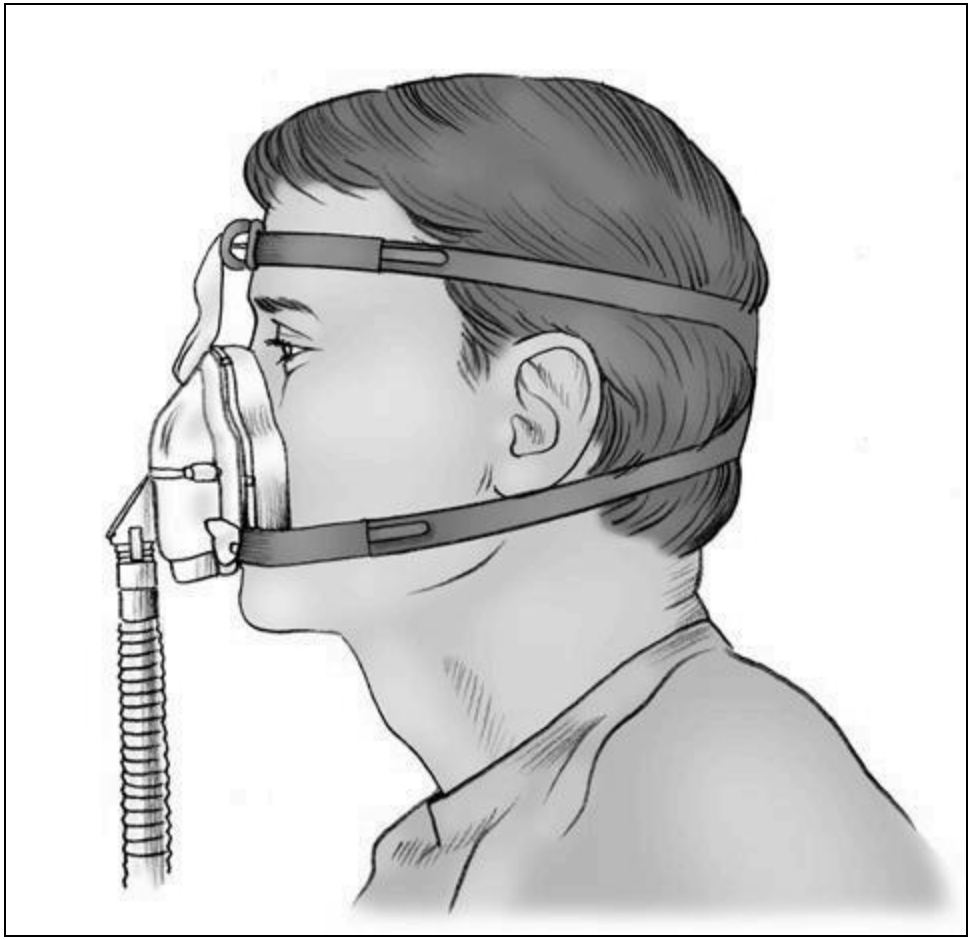
- Place the completely assembled headgear back on the patient and position the nasal pillows comfortably.
- Attach the shell strap across the shell and adjust the tension of the strap until both nostrils are sealed (as shown below).



- Be careful not to block the exhalation port on the back side of the shell.

Applying a face mask

- Hold the mask against the patient's face and position the headgear over the patient's head.
- Using the Velcro straps, adjust the straps (as with the nasal mask) until you obtain a seal (as shown below).



- Use the permanent marker to mark the straps with the final position *to eliminate having to fit the mask each time the patient wears it*.

Administering CPAP

- After fitting the administration device on the patient, turn on the CPAP machine.
- Turn on the supplemental oxygen to the prescribed level, if ordered.
- Assist the patient into a comfortable sleeping position.
- Assess the patient interface for air leaks while the patient is in a normal sleeping position *because the degree of contact between the patient's face and the device changes with the*

patient's position. Readjust the patient interface or apply a water-soluble lubricant to the edges of the mask, as needed, *to ensure a proper seal*.[27]

- Assess the patient for adverse effects that may affect adherence to therapy, such as discomfort or skin breakdown from the patient interface, nasal congestion and dryness, air leaks from the patient's mouth or air ingestion, claustrophobia, and intolerance of the noise of the CPAP machine. Intervene, as appropriate, and reassess the patient. (See *Troubleshooting continuous positive airway pressure therapy*.)[1][4][27][28][29]

TROUBLESHOOTING

TROUBLESHOOTING CONTINUOUS POSITIVE AIRWAY PRESSURE THERAPY

Various problems with continuous positive airway pressure (CPAP) therapy may affect adherence to therapy. If the patient experiences adverse effects, troubleshoot the CPAP system and obtain the practitioner's orders, as appropriate.[27] If you can't correct problems with the CPAP system, collaborate with the practitioner, a respiratory therapist, or the device manufacturer, as needed.

Problem	**Possible solution**
Nasal congestion or dryness	• Administer nasal spray (saline, antihistamine, or steroid), if ordered. • Add humidification if ordered and not already in use. • Switch from a nasal interface to a facial interface.
Facial irritation, abrasion, or pressure injury	• Loosen the straps of the patient interface. • Apply a skin barrier to the affected skin. • Switch the type of patient interface.

Air leaks from the patient's mouth or air ingestion	• Apply a commercially available chin strap. • Place a terry cloth headband over the crown of the patient's head and under the chin.
Claustrophobia	• Switch the type of patient interface. • Teach the patient relaxation techniques.
Intolerance to the noise of the CPAP machine	• Move the CPAP machine farther away from the patient. • Cover the CPAP machine with an object that muffles its sound (such as a Styrofoam or cardboard box) while ensuring that the air intake vents aren't obscured. • Insert earplugs into the patient's ears.

Completing the procedure

- Discard used supplies in appropriate receptacles.[24] [25] [28] [29]
- Remove and discard your gloves and, if worn, other personal protective equipment.[25]
- Perform hand hygiene.[17] [19] [20] [21] [22]
- Review progress toward goals in the care plan with the patient and family, as appropriate.[8] [30]
- Make arrangements for the next visit, as appropriate. Ensure that the patient and family have adequate supplies for self-care until then.
- Provide and review written educational materials, the visit schedule, and contact information in case concerns arise between visits.[31] [32] [33] [34]
- Report changes in the patient’s condition and progress toward goals to the practitioner, as appropriate.[35] [36] [37] [38]
- Coordinate care with other services, such as respiratory therapy, as appropriate.[39] [40] [41] [42]

- Document the procedure.[43][44][45][46]

Special Considerations

- When applying the mask for the first time, allow the patient to hold the mask in place *so that the patient can remove it quickly if the patient needs to communicate or feels claustrophobic*.[47]
- If the patient isn't familiar with CPAP, start with lower pressure settings and adjust them in small increments over several minutes *to help the patient adjust to CPAP*.[47][48]
- Supportive interventions, such as frequent follow-up with health care workers with expertise in sleep disorders, motivational interviewing, education, and participation in support groups, have been shown to increase adherence to CPAP therapy.[4]
- Use a nasal pillow for a patient with facial hair *because leaks may occur with a nasal mask or face mask.*[48]

Patient Teaching

Teach the patient and family how to use the CPAP machine, including fitting the mask and care of the equipment. Stress the importance of cleaning the equipment according to the manufacturer's instructions *to avoid contamination and reduce the risk of infection* and of replacing components on a regular schedule *to prolong the life of the equipment.* Allow the opportunity for a return demonstration *to ensure competency*. Make sure that the patient has the name and contact information of the device manufacturer and respiratory therapist, as appropriate.

Complications

Complications associated with CPAP use may include:

- skin or nasal tissue erosion
- nosebleeds
- sore throat
- abdominal bloating
- headaches
- nightmares

- decreased cardiac output due to increased intrathoracic pressure.

Documentation

Documentation associated with CPAP use includes:

- make and model of the CPAP machine
- type of patient interface
- whether humidification or supplemental oxygen is used with the system
- tolerance of CPAP
- adverse events
    - interventions performed
    - response to those interventions
- practitioner contact (if applicable)
    - name of the practitioner
    - time and date of contact
    - reason for the contact
- teaching provided to the patient and family (if applicable)
    - understanding of that teaching
    - follow-up teaching needed.

This procedure has been co-developed and reviewed by the National Association for Home Care & Hospice.

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Related Procedures

- Continuous positive airway pressure (CPAP) use
- Continuous positive airway pressure (CPAP) use, neonate
- Continuous positive airway pressure (CPAP) use, pediatric
- Continuous positive airway pressure (CPAP), bubble, respiratory therapy
- Mechanical ventilation, positive pressure
- Mechanical ventilation, positive pressure, neonatal
- Mechanical ventilation, positive pressure, neonatal, respiratory therapy
- Mechanical ventilation, positive pressure, pediatric
- Mechanical ventilation, positive pressure, pediatric, respiratory therapy
- Oxygen administration, long-term care

Related Lexicomp and UpToDate Patient Teaching Handouts

- Continuous Positive Airway Pressure, Preterm Infant

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(Rating System for the Hierarchy of Evidence for Intervention/Treatment Questions)

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Rating System for the Hierarchy of Evidence for Intervention/Treatment Questions

The following leveling system is adapted from *Evidence-Based practice in nursing & healthcare: A guide to best practice,* Fifth edition, by Bernadette Mazurek Melnyk and Ellen Fineout-Overholt (2023).

Level I	Evidence from a systematic review or meta-analysis of all relevant randomized controlled trials (RCTs)
Level II	Evidence from well-designed single RCTs (experimental)
Level III	Evidence from well-designed nonrandomized controlled trials (quasi-experimental), systematic reviews of a complete body of evidence, and intervention studies using mixed methods

Level IV	Evidence from well-designed case-control and cohort studies (observational)
Level V	Evidence from systematic reviews of qualitative and descriptive studies
Level VI	Evidence from single descriptive and qualitative studies, evidence-based practice implementation, and quality improvement projects
Level VII	Evidence from expert opinion, expert committee reports, and literature reviews

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