

BILEVEL PAP APPLICATION AND TITRATION PROTOCOL

PURPOSE

In order to provide the highest quality care for our patients, our sleep disorders facility adheres to the *AASM Standards of Accreditation*. The accompanying policy and procedure on bilevel titrations follows the spirit of the *Clinical Guidelines for the Manual Titration of Positive Airway Pressure in Patients with Obstructive Sleep Apnea*. We recognize that the guidelines from this 2008 consensus paper are non-binding, and that there may be some minor deviations found in our policy.

POLICY

All individuals who record sleep studies must follow best practices for bilevel titrations in order to attain the ideal pressure setting for their patients. Too low of pressures may cause patients to either be sub-optimally treated or to wake up in a panic. Too much pressure may cause the patient to experience bloating or mask leakage. Determining the appropriate pressure setting for each patient will lead to improved adherence and outcome. Bilevel titrations are not an exact science, and it is understood that technologists may need to make minor changes for individual patients. The procedure below is meant as a guideline.

PROCEDURE

1.0 Review the patient's clinical notes for pertinent history.

2.0 Review the patient's previous sleep study or studies to assess the severity of sleep-disordered breathing, the type of respiratory events, and the position and stage at which the events were most severe. This will help to attain a better titration.

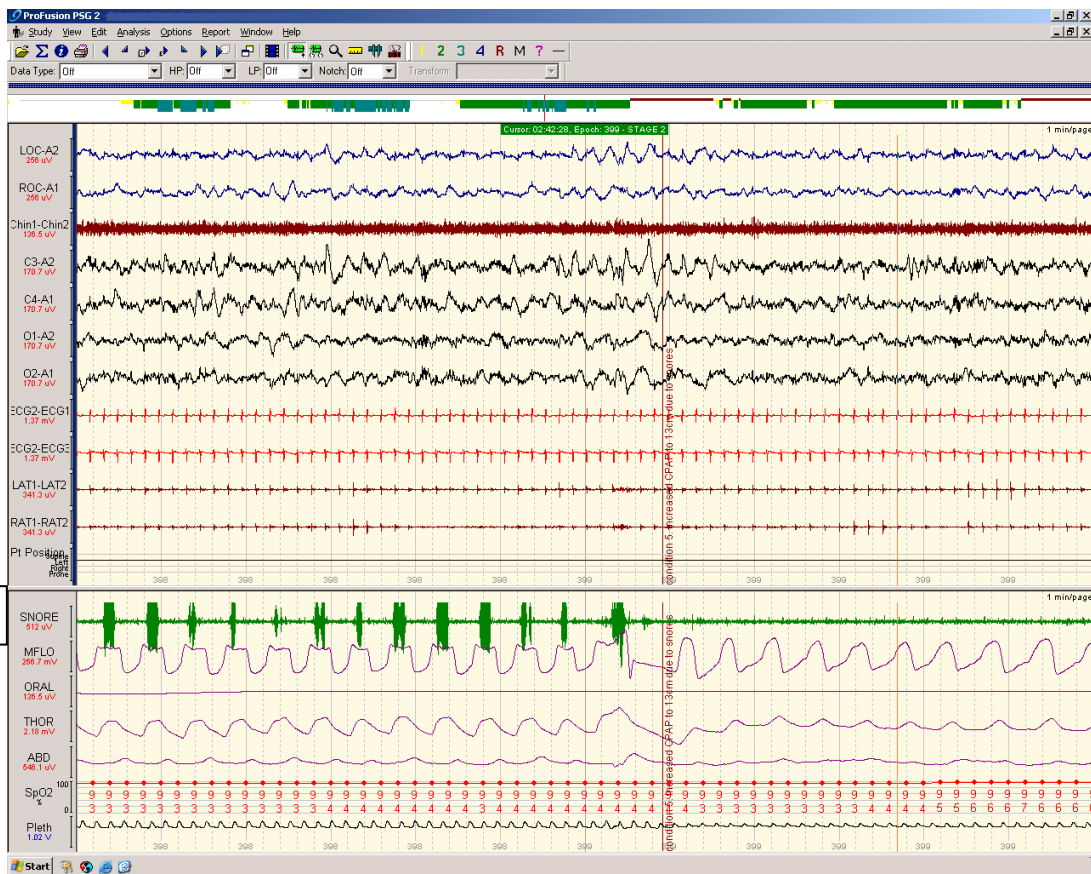
2.1 Example: If the patient's sleep-disordered breathing was worse in the supine position, you would want to make sure the patient stayed in the supine position as much as possible; or, if it was worse during REM sleep, you would want to minimize sleep disruption so that they can achieve and maintain REM sleep.

3.0 Application of electrodes, montages, filters, sensitivities, and scoring will be performed according to the most current version of the *AASM Scoring Manual*.

4.0 If the patient has not previously been on CPAP, begin the patient on a bilevel setting of 8/4 cm of water. If the patient is morbidly obese or unable to fall asleep on the setting of 8/4 cm of water, higher starting pressures may be needed. If the patient has previously been successfully treated on CPAP, place the expiratory pressure at the therapeutic CPAP setting and the inspiratory pressure at four cm of water more. The standard differential pressure utilized during bilevel titrations typically ranges from three to five cm of water, with four cm of water being the most common. There is little difference from CPAP at differentials of less than three cm of water. Higher differential pressures are uncomfortable to some patients but may be needed in patients who are morbidly obese or who have neuromuscular diseases.

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5.0 If apneas or frequent hypopneas are present, inspiratory and expiratory pressure settings should be increased by two cm of water. If occasional hypopneas, snoring, or mask flow limitation (see below) are present, inspiratory and expiratory pressure settings should be increased by one cm of water and maintained for at least five minutes to determine if events improve or resolve. Pressure settings may need to be increased more quickly during REM sleep given the limited amount of REM during sleep and the need to treat events during this stage.

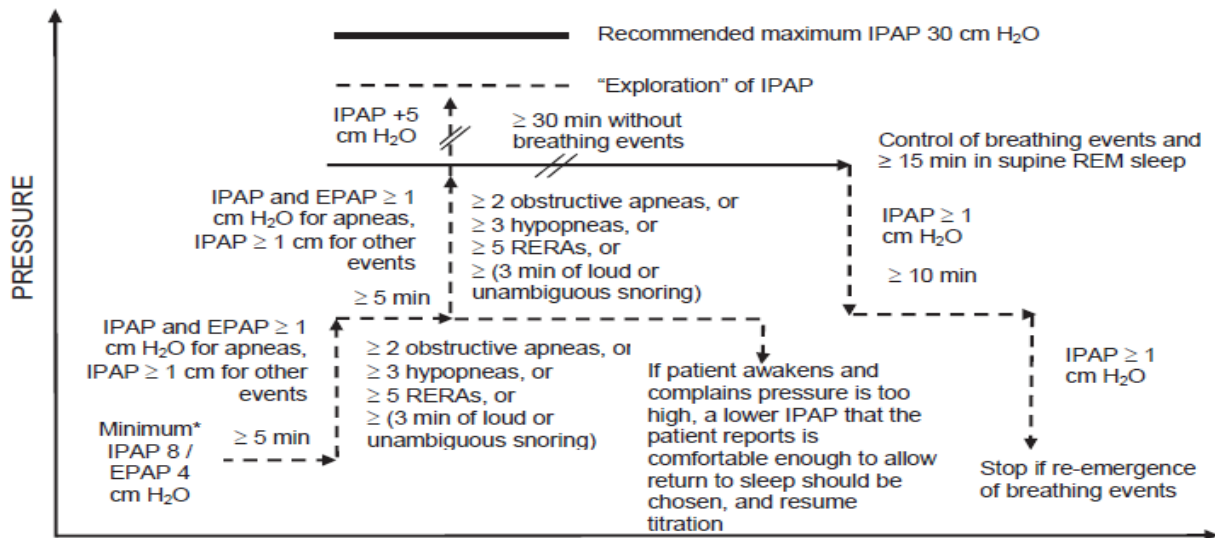


- 6.0** If a mask leak occurs, the tech should first fix the leakage before raising the pressure. Otherwise, the final pressure setting chosen for the patient may be too high. Once the mask leak has been fixed, decrease the pressure to the last setting where mouth breathing and/or mask leakage was not present, and then re-titrate as indicated. Make sure to document directly on the study the steps taken to resolve the leak and the type of masks used. Pressure settings usually do not need to be set as high with a nasal-mask than with a full-face mask.
- 7.0** The recoding technologist should document directly on the study at least every 30 minutes.
- 8.0** If the patient takes a break from wearing the mask, do not decrease the bilevel pressure on attempted return to sleep unless the patient remains awake for 15 minutes or the patient specifically requests that the pressure be lowered.

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- 9.0** Do not raise pressure settings for central apneas. If the patient develops central apneas, pressure setting may need to be lowered. If the patient has central apneas on bilevel, the use of spontaneous timed (ST) mode may be indicated. Make sure to document directly on the study why ST mode is being utilized.
- 10.0** Ensure that supine sleep has been seen on the chosen setting. Increasing the inspiratory and expiratory pressures by one or two cm of water to show range may be helpful to ensure that the correct bilevel pressure has been established.

Positive Airway Pressure Titration Protocol/Algorithm for BPAP Administration:



BPAP Titration Algorithm for Patients ≥12 years During Full- or Split-Night Titration Studies. Note: Upward titration of IPAP and EPAP ≥ 1 cm H₂O for apneas and IPAP ≥ 1 cm for other events over ≥ 5-min periods is continued until ≥ 30 min without breathing events is achieved. A decrease in IPAP or setting BPAP in spontaneous-timed mode with backup rate may be helpful if treatment-emergent central apneas are observed.

* A higher starting IPAP and EPAP may be selected for patients with an elevated BMI and for retitration studies. When transitioning from CPAP to BPAP, the minimum starting EPAP should be set at 4 cm H₂O or the CPAP level at which obstructive apneas were eliminated. An optimal minimum IPAP-EPAP differential is 4 cm H₂O and an optimal maximum IPAP-EPAP differential is 10 cm H₂O.

Reference: Kushida CA, Chediak A, Berry RB, et al. Clinical guidelines for the manual titration of positive airway pressure in patients with obstructive sleep apnea. *J Clin Sleep Med.* 2008;4(2):157-71.