

University of Texas Medical Branch Sleep Disorder Center Policy: 08.06.14 Split Night Induction	Effective Date: June 2013 Revised Date: June 2013 Review Date:
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Split Night Induction

Audience: All personnel in the Sleep Disorder Center.

Purpose: A protocol for combined diagnostic testing and positive airway pressure (PAP) titration that is consistent with AASM practice parameters assures appropriateness and consistency of testing.

Policy: Split-night studies are performed to diagnose sleep apnea and determine effective PAP treatment when ordered by a sleep staff physician or another physician with the approval of a sleep staff physician. Split-night studies require specific criteria to be met during the diagnostic portion of the study before the initiation of PAP. Split-night studies follow AASM practice parameters.

Definitions:

- Apnea-Hypopnea Index (AHI) – refers to the total apneas and hypopneas per hour of sleep.
- Positive Airway Pressure (PAP) – is a standard treatment for patients with obstructive sleep apnea. The PAP delivery system consists of a mechanical air pump which compresses room air to a prescribed level, tubing to deliver the air to the patient, and a flexible, size adjusted mask, which complete the circuit from the device to the patient.
- Continuous Positive Airway Pressure – is performed using a PAP device with one adjustment for both inspiratory and expiratory pressures
- Bilevel Positive Airway Pressure – is performed using a PAP device with two adjustments; one for inspiratory and one for expiratory pressure.

Procedure: Split-night polysomnographies are based on a minimum of two hours of recorded sleep (AHI may not be extrapolated or projected). Sleep latency is considered the time from lights out to the first epoch of any sleep stage. Two hours of recorded sleep begins at that point, not from the beginning of the recording. If, after two hours of sleep, the total number of apneas and hypopneas is greater than or equal to 30 or upon the written order of the Medical Director or his designee to meet clinical needs, you may begin therapy. If the patient has had numerous epochs of wakefulness during these hours, adjust your time accordingly, meaning the technician may need to allow for 2 ½ to 3 hours of recorded sleep.

Indications:

A split-night PAP titration is indicated for patients who are diagnosed with severe Obstructive Sleep Apnea (OSA), which is defined as an AHI of at least 40 documented during a minimum of two (2) hours of diagnostic polysomnography. A split-night study may be considered in a patient with an AHI of 20-40 based on clinical judgment (i.e. apnea >15 seconds, desaturation <85%). The formula for determining the AHI is the following:

$$\text{AHI} = \frac{\text{Total \# Apneas + Hypopneas}}{\text{Total Sleep Time (min)} \times 60}$$

- All patients will be oriented to positive airway pressure (PAP) prior to starting a Split-night study.
- When fitting a patient for a mask and headgear, measuring tools and techniques should be used to ensure a proper fit. Patient discomfort may prevent the patient from being effectively treated; therefore, it is the night technologist's responsibility to utilize all available mask, equipment, and counseling to aid in the patient's compliance during the titration study. Additionally, the comfort and fit of the patient mask should be evaluated throughout the night.
- If significant (as determined by effect on sleep quality) leak is present during the titration, the technician is responsible for repairing the leak as soon as possible and as frequently as necessary. Actions may include, but are not be limited to, the following:
 - Adjusting mask
 - Adding humidification
 - Adding chinstrap
 - Changing mask type
- Patients should be encouraged to sleep in the supine position during the titration study. Sleeping in an inclined position (i.e. inclined >30 degrees with pillows/wedge or sleeping in a recliner) should be strongly discouraged.

Split-Night CPAP Titration

Minimum starting CPAP pressure: 4 cmH₂O

Maximum CPAP pressure: 20 cmH₂O

Obstructive Events:

CPAP should be increased in 1-2cmH₂O increments until obstructive respiratory components are eliminated. The patient will be monitored for a minimum of 15 minutes between incremental CPAP pressure adjustments for obstructive respiratory events.

- 2 cmH₂O CPAP increase will be done with the presence Obstructive Apneas
- 1-2 cmH₂O CPAP increase will be done with the presence of Obstructive Hypopnea
- 1 cmH₂O CPAP increase will be done with the presence of RERAs
- 1 cmH₂O CPAP increase will be done with the presence of Snoring associated with arousals.
- The patient will be monitored for a minimum of 25 minutes between incremental CPAP pressure adjustments for snoring.

Central Events:

- 1 cmH₂O CPAP increase will be done with the presence of Central/ Periodic Breathing Events.

- If central events worsen or do not improve after you increased pressure 3-4 cmH₂O, return to pressure where obstructive component eliminated.
- If CPAP pressure increases were ineffective in treating centrals a trial of O₂ or BiPAP can be considered if desaturations and/or arousals are present.

Desaturation with Respiratory Related Events:

- If desaturations $\geq 4\%$ are associated with centrals you can proceed to O₂ initiation and titration procedure
OR
- If arousals and/or desaturations $\geq 4\%$ are associated with centrals you can initiate a trial of BiPAP if deemed appropriate. (see BiPAP titration procedure)
- The patient will be monitored for a minimum of 20 minutes between incremental CPAP pressure adjustments for a central component.

Desaturation in the absence of Respiratory Related Events:

- 1cmH₂O CPAP increases will be done with the presence of a sustained SaO₂ < 87% for a period ≥ 2 minutes in the absence of Apnea, Hypopnea and RERA.
- If SaO₂ is not able to be maintained at $\geq 87\%$ after increasing CPAP 2cmH₂O return to pressure where Apnea, Hypopnea and RERA were eliminated and initiate O₂.
- The patient will be monitored for a minimum of 20 minutes between incremental CPAP pressure adjustments for a SaO₂ < 87%.

Split-Night BiPAP Titration

Minimum starting BiPAP pressures: 8 cmH₂O IPAP / 4 cmH₂O EPAP

Maximum BiPAP pressures: 30 cmH₂O IPAP / 25 cmH₂O EPAP

Bi-level PAP titration should be considered when pressures >15cmH₂O are required or the patient complains for back pressure (see Bi-Level Positive Airway Pressure Titration).

Obstructive Events:

IPAP and EPAP should be increased in 1-2cmH₂O increments until obstructive apnea and hypopnea are eliminated. The patient will be monitored for a minimum of 15 minutes between incremental PAP pressure adjustments for apnea and hypopnea.

- In the absence of apnea and hypopnea, 1 cmH₂O IPAP increases will be done for the presence of RERAs, snoring with associated arousals, and saturation deficiencies
- The patient will be monitored for a minimum of 25 minutes between incremental CPAP pressure adjustments for snoring and saturation deficiencies.

Central Events:

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- 1 cmH₂O IPAP increase will be done with the presence of Central/ Periodic Breathing Events. If centrals worsen after pressure is increased 2-3 cmH₂O, return pressure where obstructive component eliminated.
- If IPAP pressure increases were ineffective in treating centrals, a trial of O₂ is indicated if desaturations are present

Desaturation Events:

- 1cmH₂O IPAP increases will be done with the presence of a sustained SaO₂<87% for a period \geq 2 minutes in the absence of Apnea, Hypopnea and RERA.
- If SaO₂ is not able to be maintained at \geq 87% after increasing IPAP 4 cmH₂O return to pressure where Apnea, Hypopnea and RERA were eliminated and initiate O₂. (See O₂ administration procedure)
- The patient will be monitored for a minimum of 25 minutes between incremental BiPAP pressure adjustments for an SaO₂ < 87%.

The titration model above is a guide and does not include all scenarios that will be encountered in the sleep laboratory during a titration. If you have questions during a titration contact the Medical Director or his designee or Denise McElyea, Program Manager.

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If SaO₂ Sustained <70% for > 2minute during a titration procedure initiate O₂ Administration procedure and as appropriate titrate pressures down as adjustments are made (see O₂ Administration procedure).

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Medical Director