Name of Policy:	**Clinical guidelines for manual titration of positive airway pressure using bilevel**
Policy Number:	3364-171-07-04
Department:	Sleep Disorders
Approving Officer:	Senior Hospital Administrator
Responsible Agent:	Director, Sleep Disorders
Scope:	The University of Toledo Medical Center Pulmonary Services Department

THE UNIVERSITY OF TOLEDO MEDICAL CENTER

Effective Date: 3/17/2023

Initial Effective Date: 3/17/2023

X New policy proposal	_____ Minor/technical revision of existing policy
_____ Major revision of existing policy	_____ Reaffirmation of existing policy

(A) Policy Statement

All qualified and trained Polysomnographic Technologists will be able to set-up and titrate patients using Bilevel Positive Airway Pressure (BPAP).

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.

(B) Purpose of Policy

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.

(C) Overview

The general method for performing bilevel titration is similar to that of CPAP, except the bilevel device has two pressure settings, inspiratory positive airway pressure (IPAP), and expiratory positive airway pressure (EPAP). The IPAP level is used to overcome the obstructive component of sleep-related breathing disorder events, whereas the EPAP level is used to maintain the patency of the upper airway. Therefore, the EPAP level may often be set substantially lower than the IPAP level. This reduction in pressure during exhalation can result in a more comfortable treatment experience for the patient. The decision to initiate bilevel titration during a treatment evaluation with nasal-CPAP may be made by the technician if the patient is exhibiting a high level of difficulty adjusting to the CPAP, complains of excessive discomfort when exhaling, or refuses to continue with a CPAP evaluation. Under these conditions, the technician shall fully document the nature and extent of the patient's difficulty with nasal-CPAP.

(D) Procedure

When a patient is diagnosed with OSA, after receiving an order or if the patient is intolerant to CPAP, the Sleep Lab staff will schedule a Polysomnogram (PSG) to be performed using BPAP. Pressures will be adjusted throughout the PSG to determine the optimal pressure for maintaining upper airway patency. Whenever a sleep study recording is less than 6 hours in length, the sleep study will be billed using a modifier 52 (reduced charge).

American Academy of Sleep Medicine (AASM) definitions for optimal, good, adequate, and unacceptable titration:

1. Optimal titration reduces the Apnea Hypopnea Index (AHI) < 5 for at least 15 minutes' duration and should include supine Rapid Eye Movement (REM) sleep at the selected pressure that is not continually interrupted by spontaneous arousals or awakenings.
2. A good titration reduces the AHI<10 or by 50% if the baseline AHI is <15 and should include supine REM that is not continually interrupted by spontaneous arousals or awakenings at the selected pressure.
3. An adequate titration does not reduce the AHI ≤ 10 but reduces the AHI by 75% from baseline (especially in severe OSA patients) or one in which the titration grading criteria for optimal or good are met with the exception that Supine REM did not occur at the selected pressure.
4. An unacceptable titration is one that does not meet any of the above definitions.

Training – If the patient has been on CPAP, then it is up to the technician to assess whether BPAP training is necessary, although generally it is recommended. Patients with a poor prior experience will typically benefit from training. Patient education and BPAP training shall be performed in the same manner as specified by the **CPAP Titration Procedure**. During training, the EPAP setting shall be maintained at its lowest level (i.e. 4 cm H_2O), while IPAP pressure shall begin at 8 cm H_2O, and be gradually increased to 10 cm H_2O at the end of the training session.

Workflow

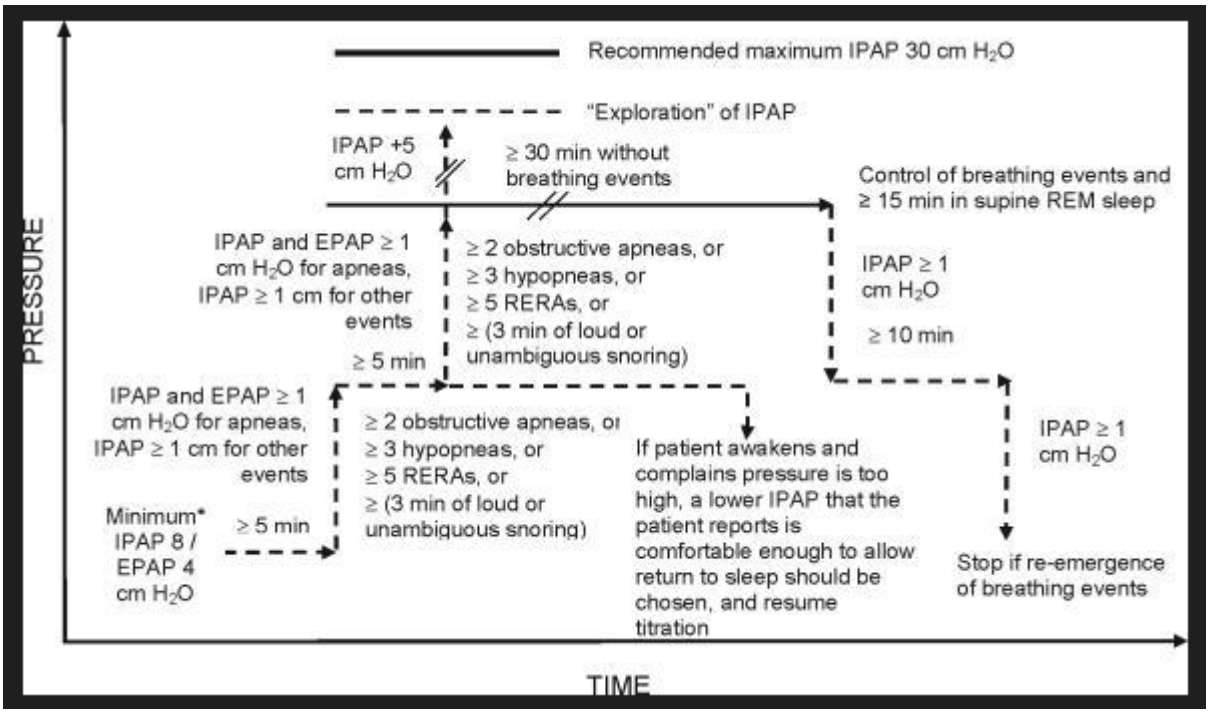
1. Explain test/expectations to the patient.
2. Fit the patient with an interface and headgear.
3. Allow patient to test/feel pressure prior to starting hook-up.
4. Refer to the attached algorithm, AASM Bi-Level titration for patients greater than or equal to 12 years of age.
   NOTE: time on pressure may be 20-30 minutes as needed to assess the tolerance and effectiveness of pressures.
   - Recommended minimum starting IPAP should be 8 centimeters of water pressure (cm/H2O)
   - Recommended minimum starting pressure EPAP should be 4 cm/H2O
   - Recommended maximum IPAP 30 cm/H2O
   - Recommended minimum IPAP-EPAP differential is 4 cm/H2O with the maximum differential being 10 cm/H2O
5. But the patient's room air **baseline SaO_2 level is 88% or below** for a cumulative 10 minutes **in the absence of sleep disordered breathing events (including snoring)**,
   - Increase EPAP and/or IPAP by 1 cm H_2O every ≥ 5 minutes until SpO2 of ≥ 90% is achieved. Pressure increases to improve baseline SpO2 levels may be performed twice during the titration process and should be guided by the technician's assessment of the patient's ability to tolerate the increased pressure.
   - If PAP pressure increase of 1 or 2 cm H_2O does not sufficiently improve the baseline SpO2 level, gradually return the pressure to the levels that controlled the obstructive events, and apply oxygen. Refer to the Sleep Lab policy titled Oxygen Administration.

6. If the patient complains that the pressure is too high, reduce the pressure, choosing a pressure that will allow the patient to fall back asleep.

Components:

1. Patient education
2. Patient hook-up
3. Patient hook-up
    a. International 10-20 hook-up
    b. Chin Electromyograph (EMG)
    c. Eye Electrooculogram (EOG)
    d. Anterior Tibialis leads right and left
    e. Chest Respiratory Inductance Plethysomgraphy (RIP) belts
    f. Abdomen RIP belt
    g. Oximeter
    h. Snore microphone
4. Patient to bed
5. Lights out
6. Impedance check
7. Machine calibration
8. Patient calibration
9. Machine calibration
10. Lights on
11. Disassemble PAP device and remove all electrodes and process each for disinfection or disposal per policy.

Reference:
Journal of Clinical Medicine Vol. 4, No. 2 2008



See Procedure Clinical Guidelines for Manual Titration of Positive Airway Pressure using Bilevel

Approved by:		**Review/Revision Date:** 03/23
/s/ Michael Taylor Director, Pulmonary Services	3/20/2023 Date	
/s/ Andre Aguillon, M.D. Medical Director	3/19/2023 Date	
/s/ Russell Smith Senior Hospital Administrator	3/20/2023 Date	
Review/Revision Completed By: *Director, Sleep Disorders Center*		**Next Review Date: 03/26**
Policies Superseded by This Policy:		

It is the responsibility of the reader to verify with the responsible agent that this is the most current version of the policy.