Know Thy Patients!

CPAP, APAP and BiLevel Therapy Success

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Learning objectives

- List the titration goals for OSA management
- Understand the suggested protocols for titrations
- Review the titration process for CPAP and Bi-Level therapies

Note: all protocols listed in the presentation are consistent with AASM clinical guidelines.

How PAP treat Sleep Apnea

- 1) Increase Partial Pressure of oxygen across the alveoli
- 2) Increase FRC
  - Prevent collapse of alveoli on expiration
  - Greater surface area for gaseous exchange
- 3) Reduces work of breathing

Titration Goals

- Keep the upper airway open (airway management).
- Stabilize breathing patterns by monitoring the patient's response to therapy.
- Adjust user-set parameters as needed for optimal therapy efficacy and adherence.

The goals should be individualized to meet the needs of each patient.

Titration protocol

- Acclimation/To Bed Zone
- Titration Zone
- Prescription Zone

PEARL:
Learn the <u>concepts</u> then apply that knowledge for each patient

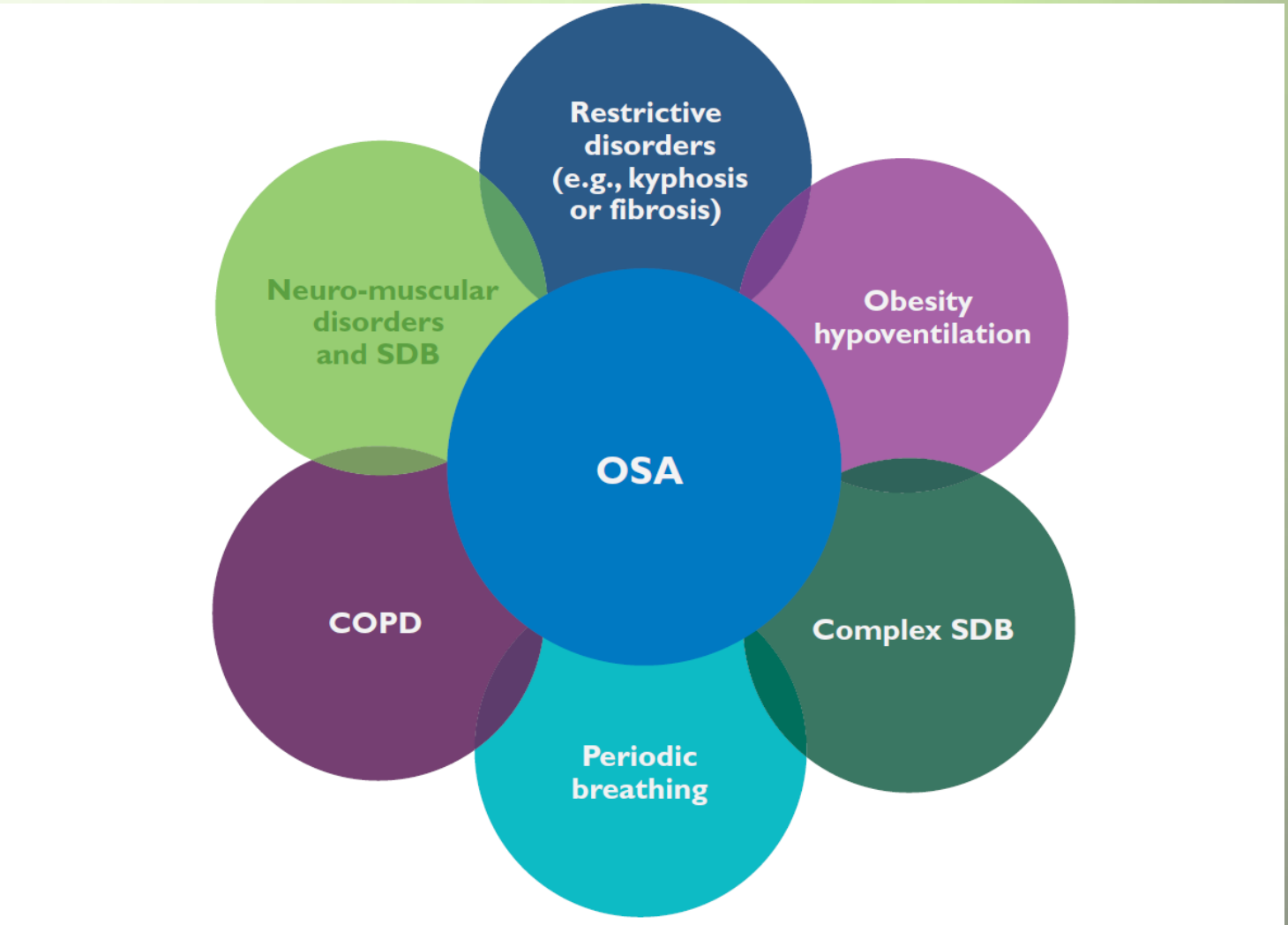
Titration Protocol References

This protocol is consistent with device validation studies and the following AASM clinical guidelines:

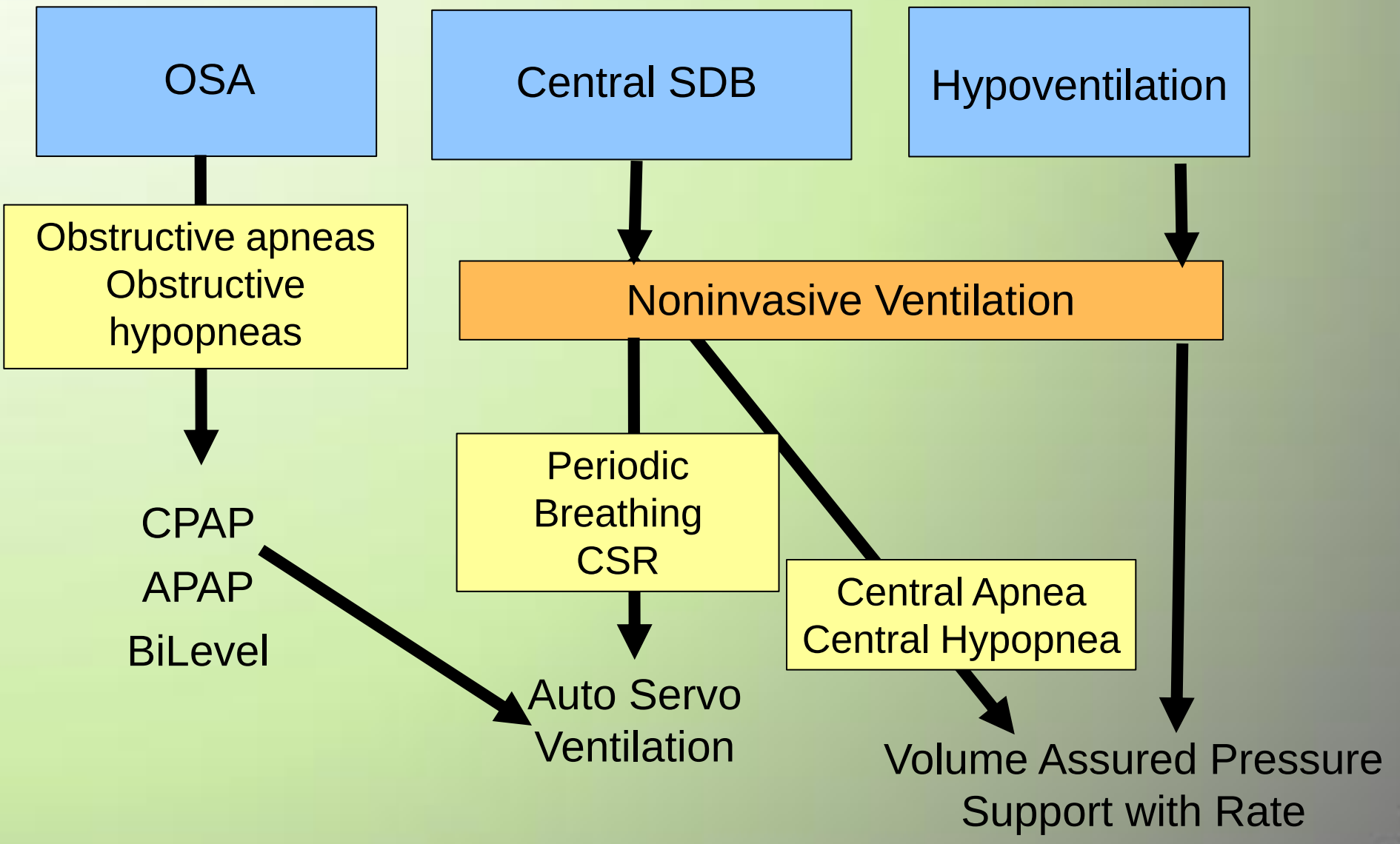
1. Clinical Guidelines for the Manual Titration of Positive Airway Pressure in Patients with Obstructive Sleep Apnea; J. Clin. Sleep Med 2008, 4(2)157-171
2. Clinical Guideline for the Evaluation, Management and Long-term Care of Obstructive Sleep Apnea in Adults; J. Clin. Sleep Med 2009, 5(3)263-276
3. Best Clinical Practices for the Sleep Center Adjustment of Noninvasive Positive Pressure Ventilation (NPPV) in Stable Chronic Alveolar Hypoventilation Syndromes, J.Clin.Sleep Med 2010, 6(5)491-509

CPAP
Titration Protocol

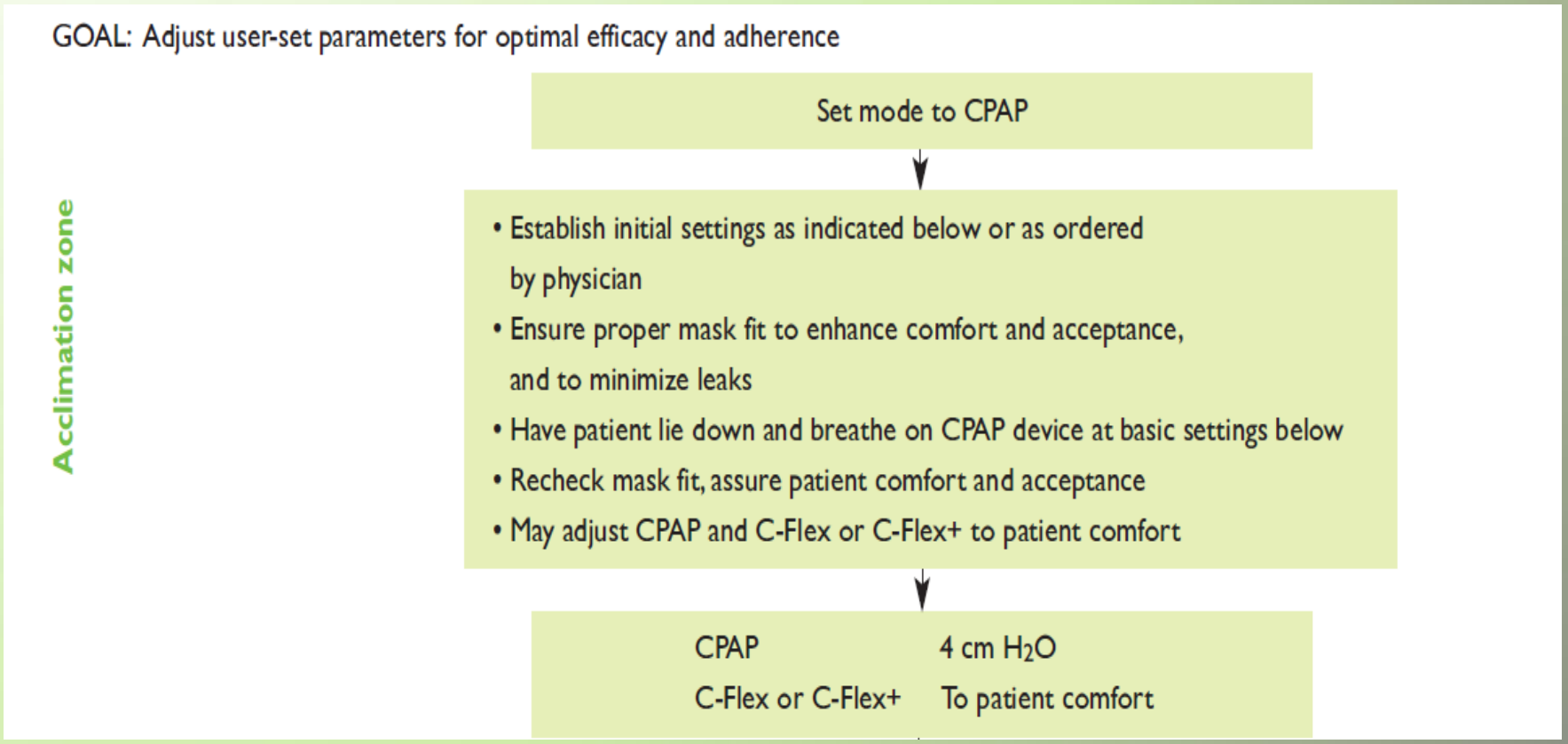
CPAP patient types



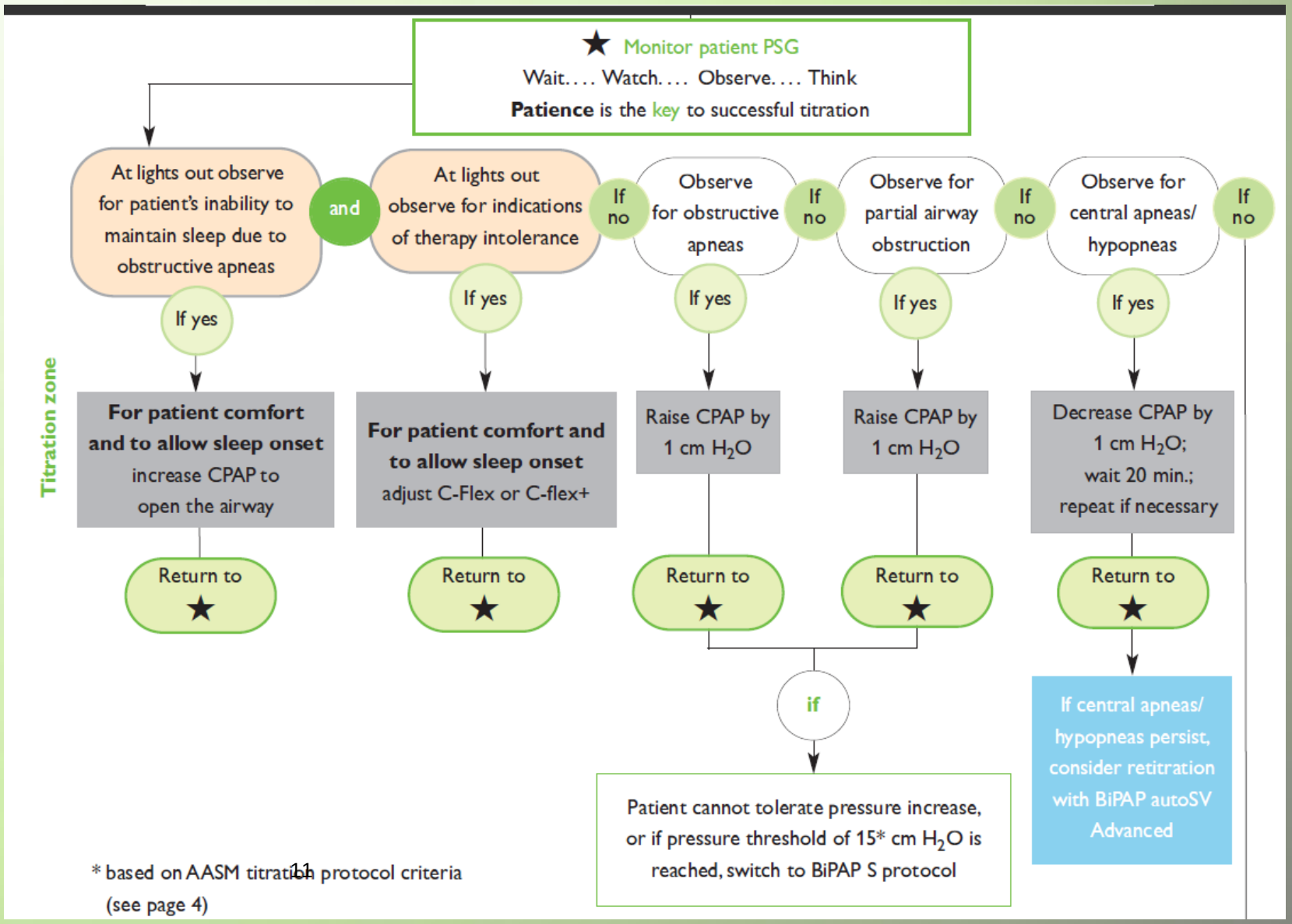
Complex Sleep Apnea Components



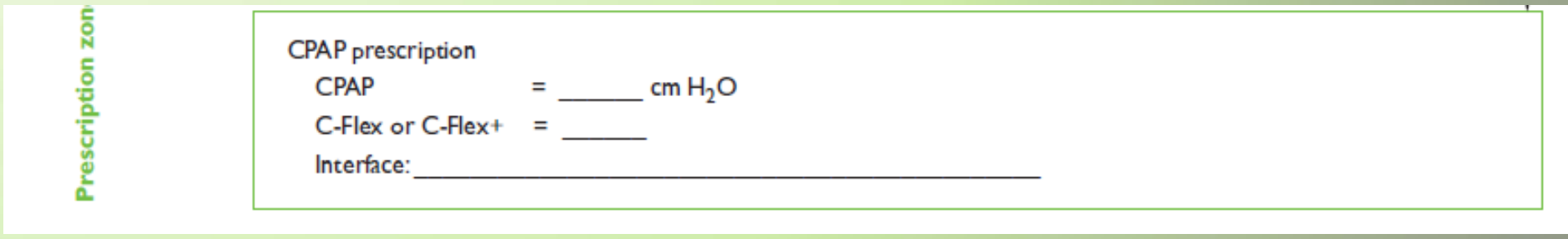
Acclimation zone



Titration zone

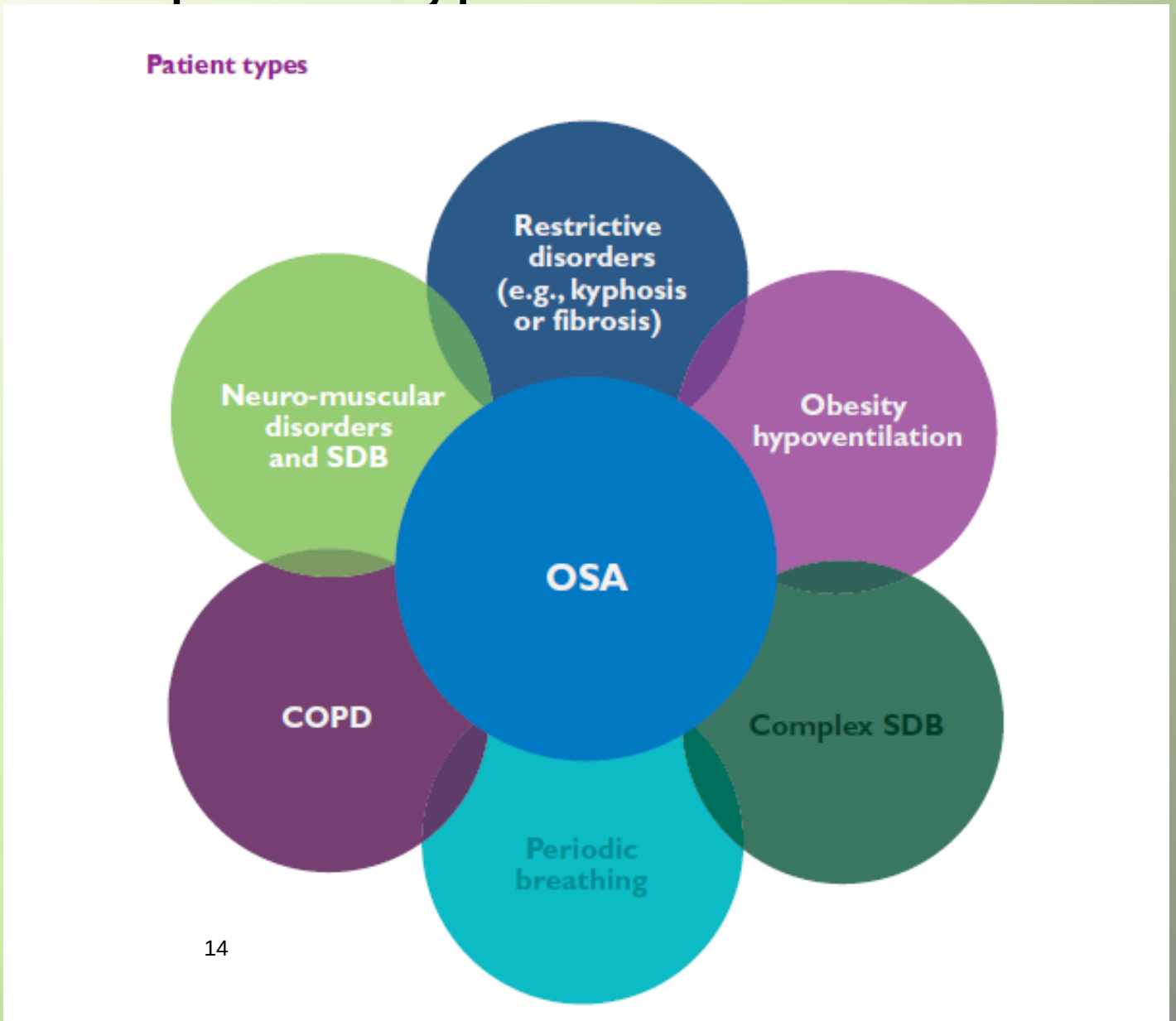


Prescription zone



BiPAP S
Titration protocol

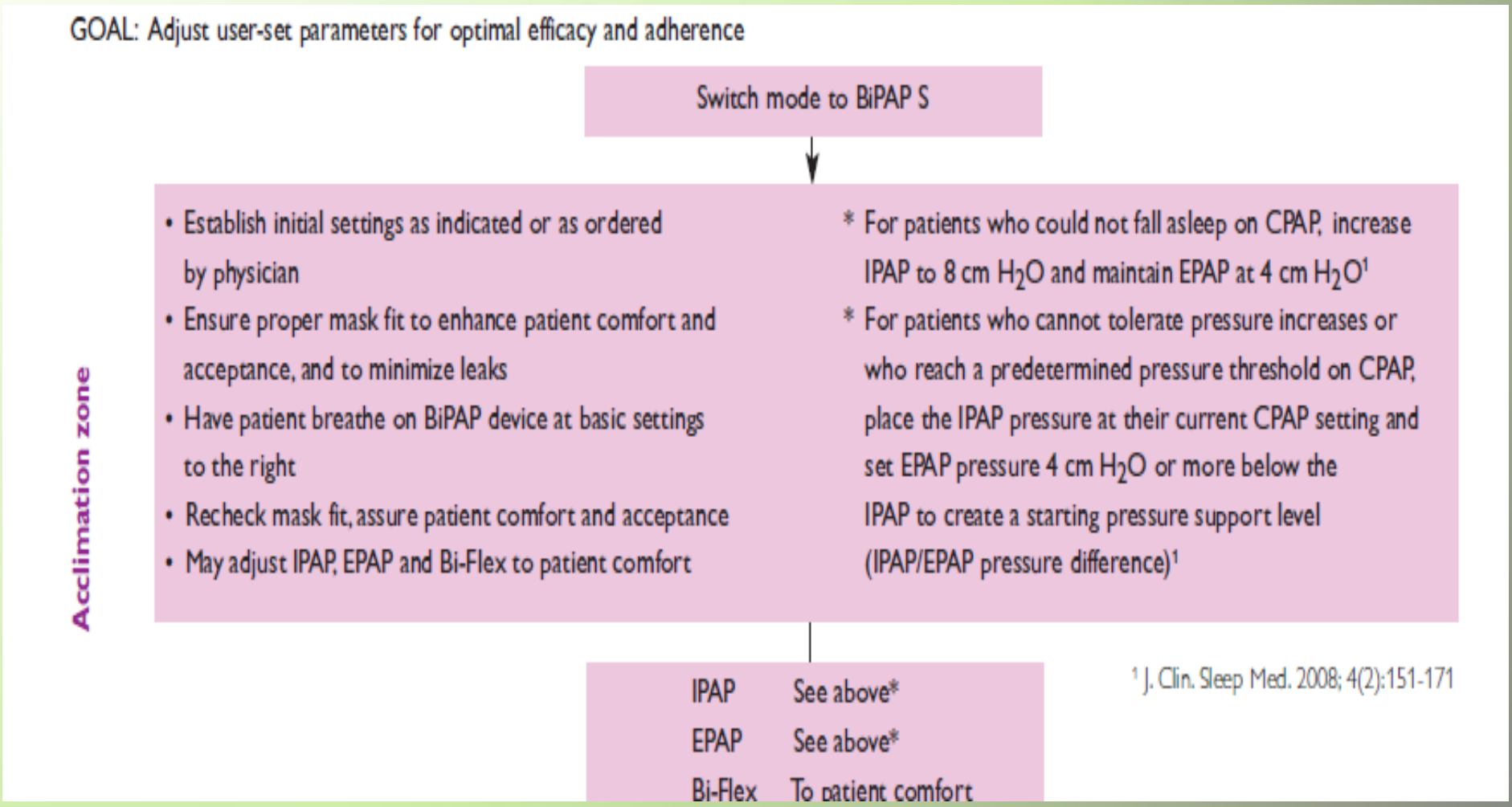
BiPAP S patient types



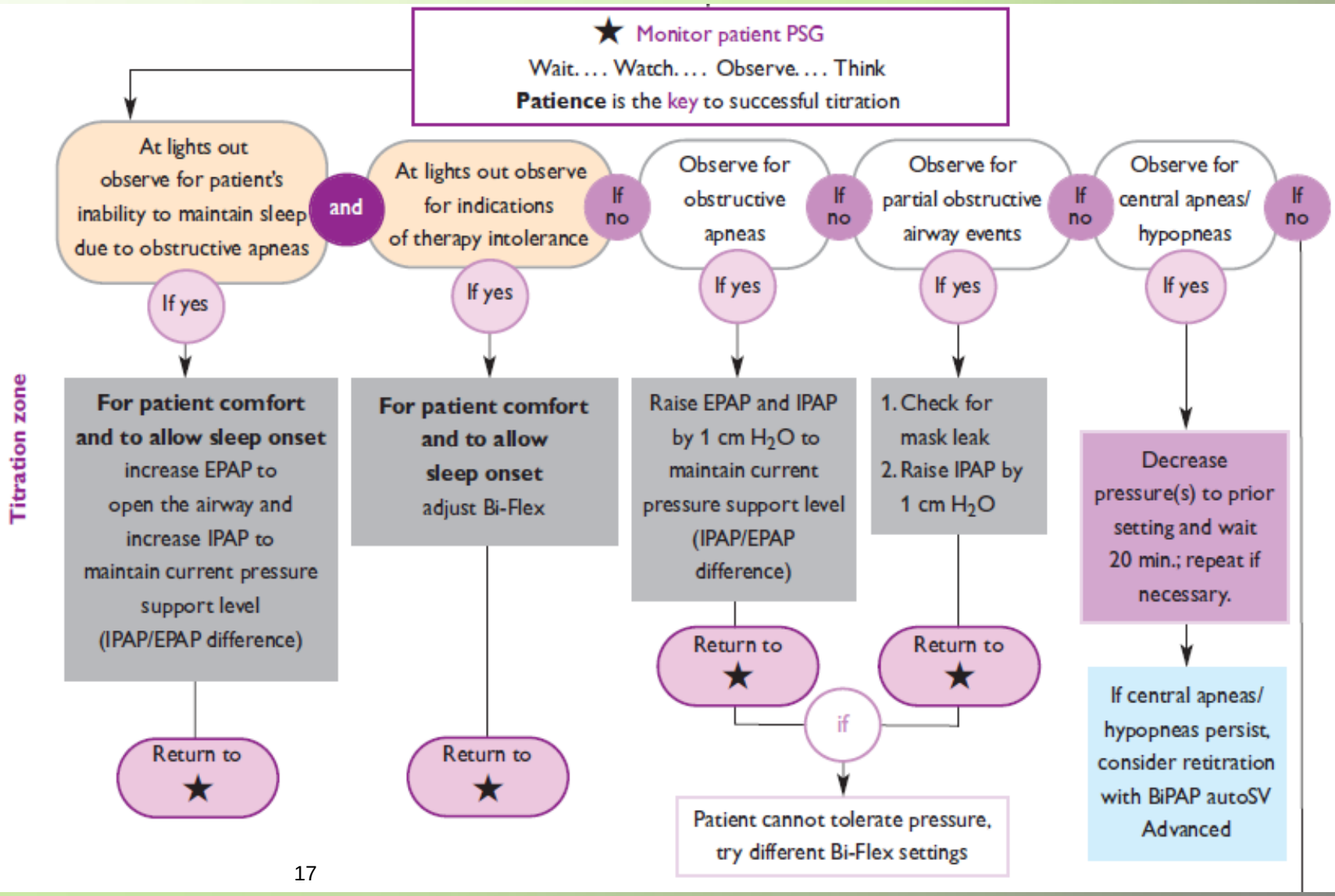
Bi-level S mode

- Bi-level support with spontaneous mode activated
- This mode is commonly used with patients who are able to maintain a constant respiratory rate, but require a pressure difference for comfort or to augment a tidal volume while they sleep.
- Can be used with the following patients:
  - Non compliant CPAP
  - Non tolerance to CPAP
  - Obesity hypoventilation
  - COPD or restrictive thoracic

BiPAP S acclimation zone



BiPAP S titration zone



BiPAP S prescription zone

Obstructive Sleep Apnea review/treatment:

- Several randomized controlled trials have demonstrated that over a short period of time CPAP relieves daytime sleepiness and improves the health-related quality of life (HRQL) of patients with OSA syndrome.

Obstructive Sleep Apnea treatment/ evidence:

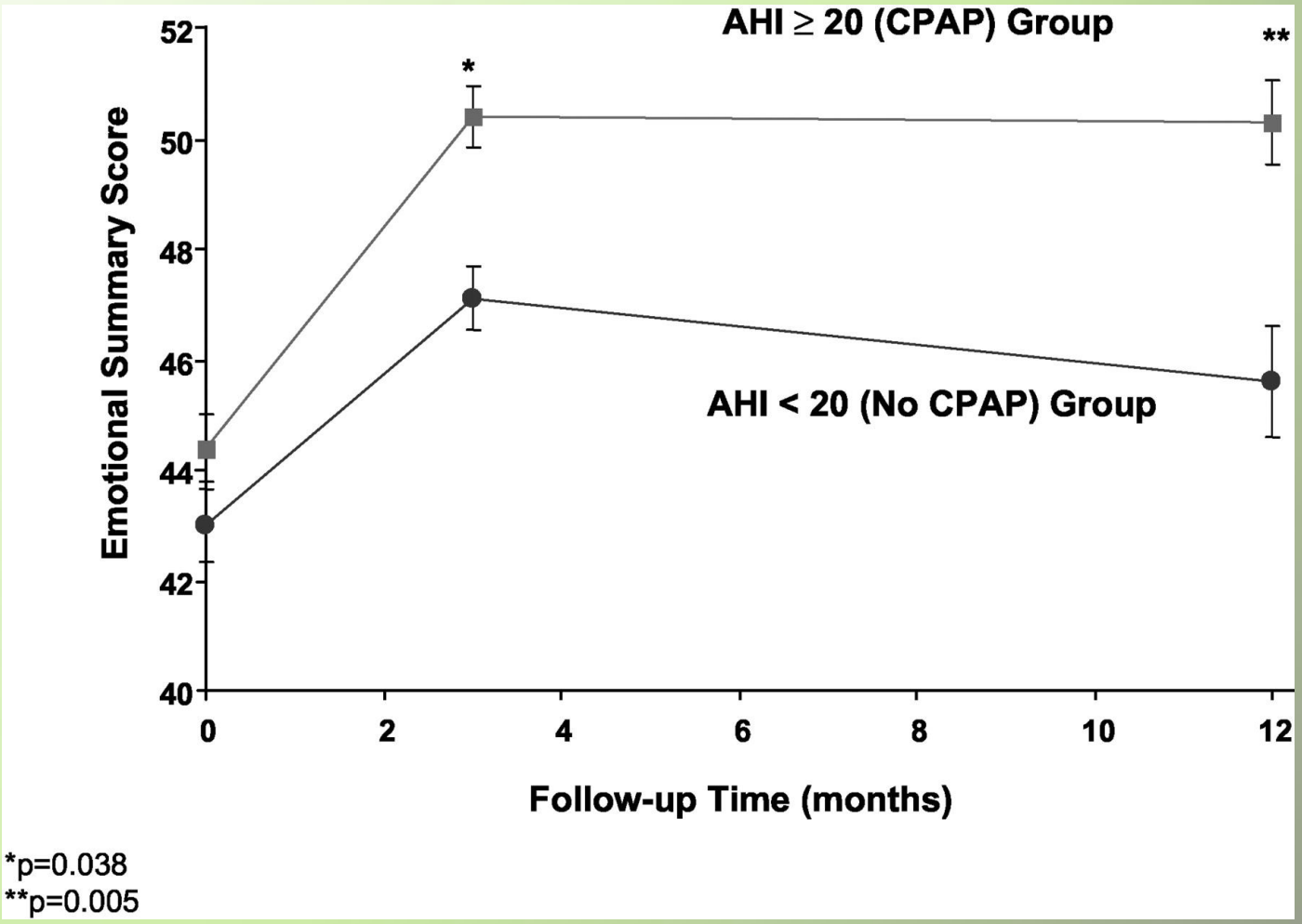
- (*Chest.* 2002;122:1679-1685.)
- **Title: "Can Continuous Positive Airway Pressure Therapy Improve the General Health Status of Patients With Obstructive Sleep Apnea? A Clinical Effectiveness Study"**
- Study to determine the short-term **and long-term** impacts of continuous positive airway pressure (CPAP) therapy on health-related quality of life (HRQL) in patients with obstructive sleep apnea (OSA).

- 723 patients into this study. Of these, 481 (66.2%) were men. The mean age of the study participants was 49.4 ± 12.1 years.
- *Interventions:* All patients with AHIs > 20 received CPAP therapy; those with AHIs < 20 did not. The HRQL of all study participants was measured using the 36-item medical outcomes study short form (SF-36) questionnaire at baseline and then at 3 and 12 months of follow-up.

Medical outcomes study short form (SF-36) questionnaire

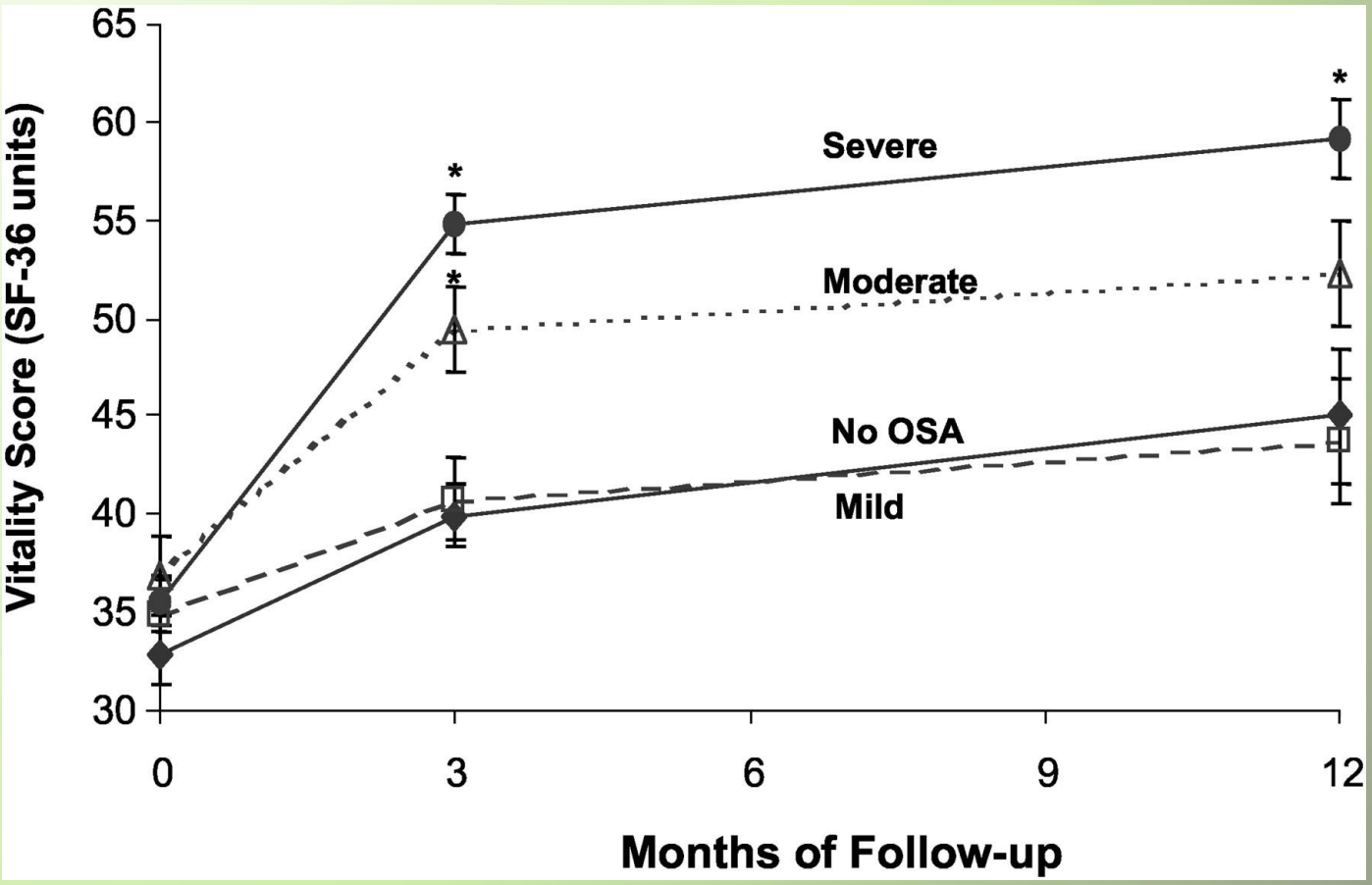
- The SF-36 is a 36-item survey instrument that quantitatively measures physical functioning and emotional health. Each variable has a potential score range of 0 (worst possible health) to 100 (best possible health). There are eight domains in the SF-36 (physical functioning; role-physical; bodily pain; general health perception; vitality; social functioning; role-emotional; and emotional health). These domains can be grouped into two categories, producing physical and emotional (component) summary scores.

Emotional summary score



*p=0.038
**p=0.005

Vitality score



Obstructive Sleep Apnea review/treatment:

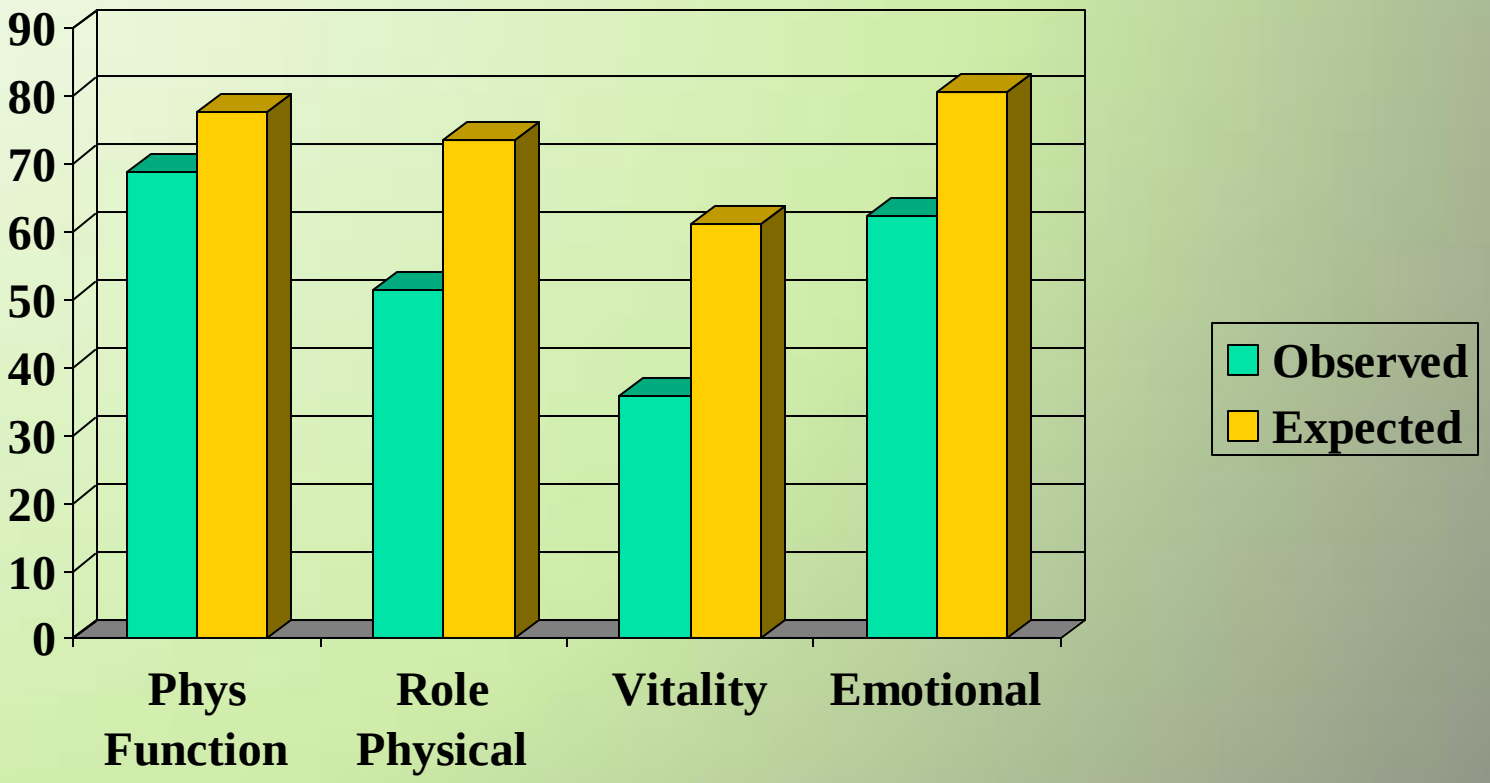
- Study Summary:
  - Evidence shows CPAP is an effective long-term therapy for improving the emotional health status of patients with OSA in the community, which is consistent with findings from previous long-term studies
  - Many untreated OSA patients experience poor health related quality of life. Rapid and sustained improvements in their health status can be achieved through CPAP therapy.

Benefits of CPAP for the recipient

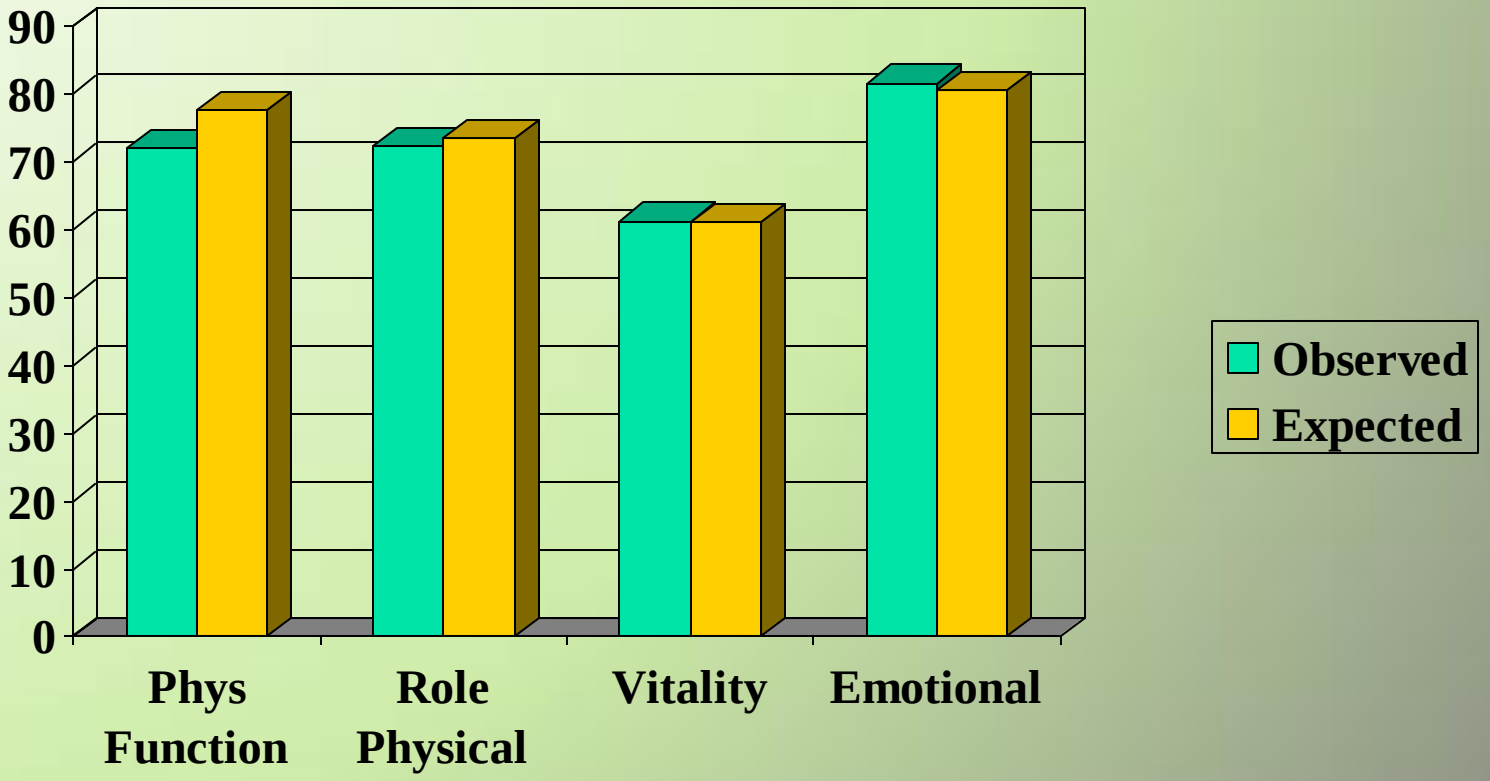
Obstructive Sleep Apnea (OSA) has been shown to affect the quality of life (QOL) in patients, and QOL improves after treatment with nasal continuous positive airway pressure (CPAP)

CHEST. 2003;124:942-947

Comparison of the Baseline SF-36 Scores of Patients to National Norms* **BEFORE CPAP TX**



Change in the Scores of **Patients** on the SF-36 After Treatment With CPAP Versus Expected



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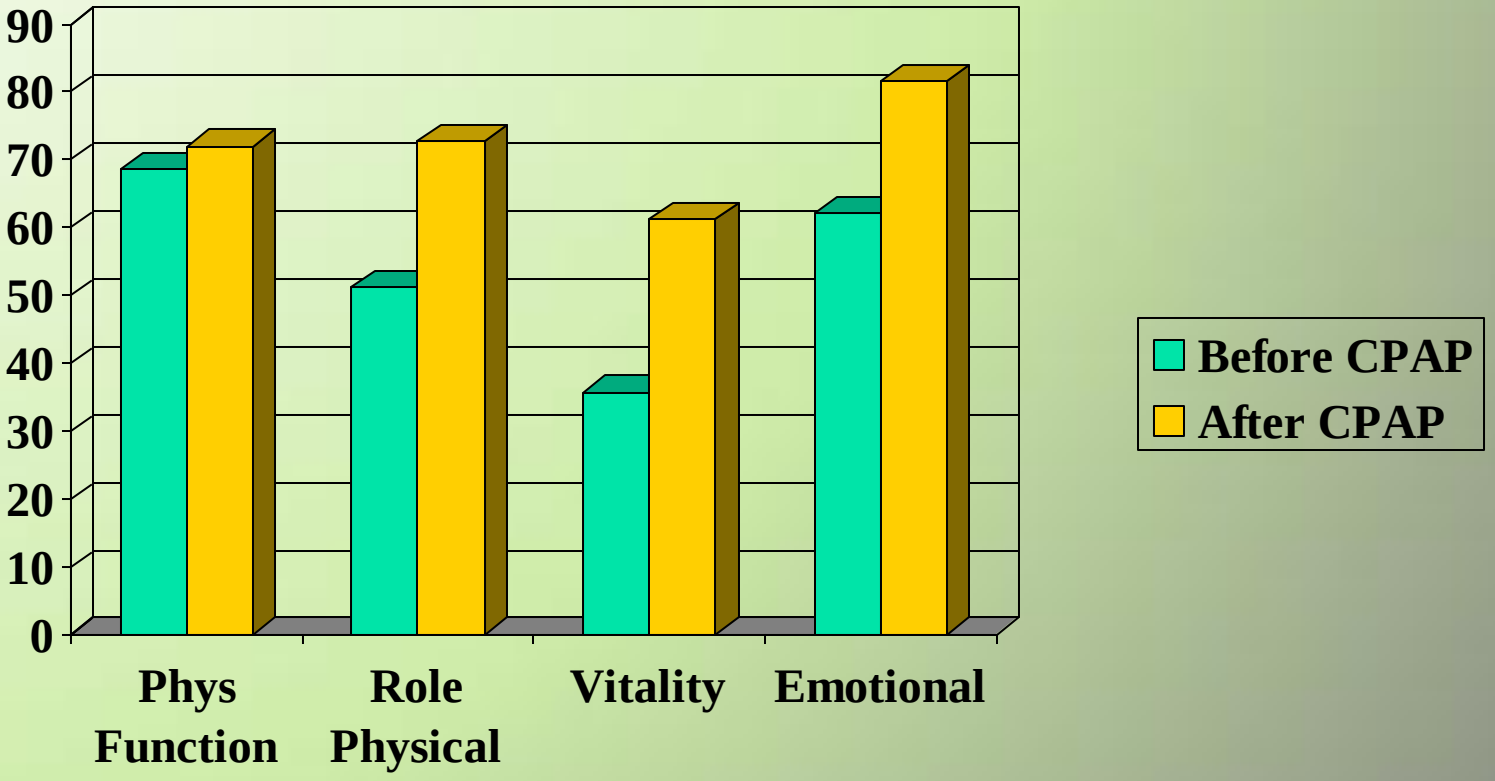
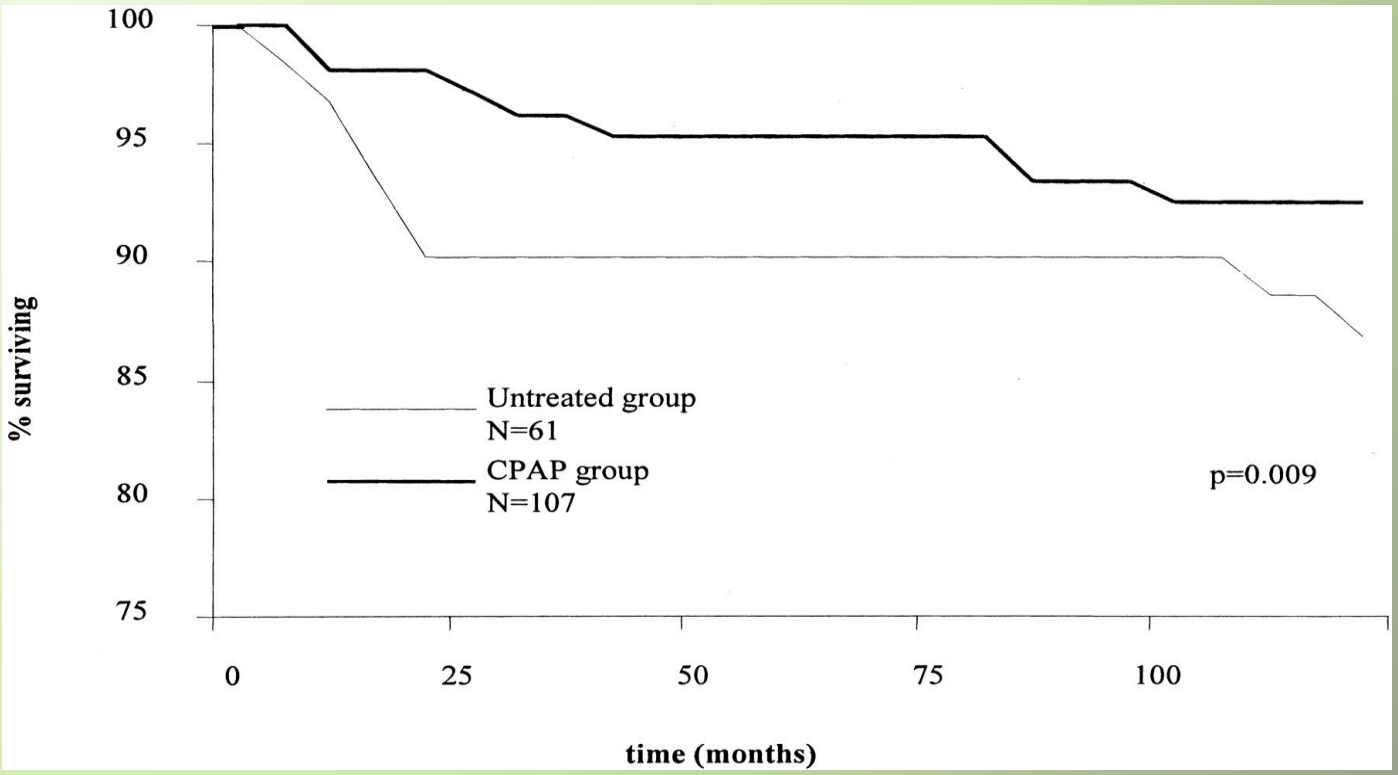


Benefits of CPAP therapy

- CHEST/2005/127/2076-2084
- Long Term Effects of Nasal CPAP Therapy on Cardiovascular Outcomes in Sleep Apnea Syndrome
- Of OSA patients with previous cardiovascular risks, deaths from cardiovascular disease were more common in the group not treated (no CPAP) than the treated group (received CPAP); 14.8% vs. 1.9%
- Conclusion: data support a protective effect of CPAP therapy against death from cardiovascular disease in patients with previous cardiovascular disease & obstructive sleep apnea

Kaplan-Meier survival curve for cardiovascular death in CPAP-treated patients and untreated patients



Preoperative Assessment

Untreated or inadequately treated OSA is associated with a higher incidence of perioperative complications.

- **Consider weight loss prior to elective surgery**
- **Assess need for preoperative initiation of CPAP:**
  - **Have patient bring CPAP machine to hospital so it can be used *postoperatively***

Erectile dysfunction, obstructive sleep apnea syndrome and nasal CPAP treatment. Gonclaves, et.al

- **BACKGROUND AND PURPOSE: To evaluate the effect of one month of continuous positive airway pressure (CPAP) in a subgroup of obstructive sleep apnea (OSA) patients with erectile dysfunction (ED) and compare this subgroup with age- and body mass index (BMI)-matched OSA patients without ED.**

PATIENTS AND METHODS: Prospective general, sleep, psychiatric and sexologic evaluations were conducted. Epworth Sleepiness Scale (ESS), Beck Depression Inventory (BDI), Sleep Disorders Questionnaire (SDQ), Quality of Life SF-36, and polysomnography were used. Seventeen OSA patients with ED were compared prior to CPAP treatment and during CPAP treatment with age- and BMI-matched OSA patients without ED. Parametric and non-parametric statistics, chi-square, Fisher exact test and multiple regression analyses were performed.

Erectile dysfunction, obstructive sleep apnea syndrome and nasal CPAP treatment. Gonclaves, et.al

- CONCLUSIONS: ED in OSAS is related to nocturnal hypoxemia, and about 75% of OSAS patients with ED treated with nasal CPAP showed remission at one-month follow-up, resulting in significant improvement in quality of life.

Summary: Benefits of CPAP for OSA patients & their Bed Partners

PRO

- Patient Sleeps better
- Patient's Bed partner sleeps better
- Patient & partner More alert during the day
- Safer drivers
- Improved Physical & Mental functions
- Patient's Bed Partner there all night & when they wake*
- Don't sleep at work*
- Don't sleep during conversations, meetings, family reunions & visits*
- Dream more*

Summary: Benefits of CPAP for patients with OSA:

Con:

- Wear mask/ or other nasal interface every night
- Take CPAP machine on road trips/vacations

- Always looking for power outlets at hotels

When not to use CPAP

- 1) Hypercapnnia
- 2) Pneumothorax
- 3) Hypovolemia
- 4) Facial trauma
- 5) Patient at risk for vomiting

- 1) Pressure sores
- 2) Gastric distention
- 3) Pulmonary barotrauma
- 4) reduced cardiac output
- 5) Hypoventilation

Patient follow-up

- Continuing clinical assessment is essential for:
  - Compliance
  - Efficacy
- Complex sleep apnea patient may be the most challenging to follow up because they have multiple, changing pathologies requiring therapy
  - Achieving optimal therapy and meeting patient comfort needs can be a challenge that requires ongoing assessment of therapy device downloads and interviews with the patient

What amount of CPAP use constitutes sufficient adherence?

- Patients should use CPAP whenever they sleep
  - CMS: adequate CPAP use ≥4 h/night on 70% of nights
- Linear relationship between hours of CPAP use and improvements in:
  - Sleepiness
  - Quality of life
  - Blood pressure

What factors can optimize patient adherence to CPAP therapy?

- Early follow-up (within 1–2 weeks of therapy initiation)
- Support groups and bed partner support
- Cognitive behavioral therapy focused on CPAP
- Aid in therapy goal-setting
- Support in troubleshooting difficulties
- Heated humidification + nasal steroid for congestion
- Other PAP modes if patient has intolerance to pressure
- Short-term sedative hypnotic (for select patients only)

How should CPAP masks be chosen?

- No one mask type is superior to another
- Select mask to maximize patient comfort
- Oronasal (“full face”) masks
  - Patients who sleep with their mouth open
- Nasal masks
  - Better tolerated with claustrophobia
- Nasal pillows (sit under the nose and fit in the nares)
  - Also better tolerated with claustrophobia
  - Patients with unusual nasal bridge anatomy, facial hair, or absent dentition

CLINICAL BOTTOM LINE:

- Conservative measures: weight loss, avoid alcohol
- Patients who require CPAP
  - Symptomatic or severe OSA
  - OSA-related drowsy driving
- Benefits of adequate adherence to PAP therapy
  - Symptom resolution
  - Reduced cardiovascular risk