



# Approaching Difficult Patients Convincing Your Patient To Use PAP Therapy

David W. Kohls, APNP

# Objectives

- ▶ Define adherence to PAP therapy and recognize the relatively high rate of non-adherence
- ▶ To identify equipment and technology factors which can influence adherence
- ▶ Recognize/understand how to use treatment monitoring data
- ▶ Identify patient factors which influence adherence to PAP therapy
- ▶ Recognize principles of behavioral therapies which can be used to improve adherence to PAP therapy



# Disclosure

I have no actual or potential conflicts of interest in relation to this program/presentation.

David W. Kohls, APNP

# Adherence to PAP Therapy

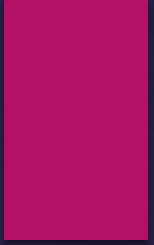
(25)

- ▶ Defined as use for at least 4 hours, 70% of nights
- ▶ Greater than 6 hours of use results in normal levels of objective and subjective measures of daytime sleepiness, memory, and daily functioning
- ▶ 50-60 % of patients are adherent to PAP therapy
- ▶ 29-83% of patients are non-adherent to PAP therapy
- ▶ The decision is usually made during the first week of therapy
- ▶ Use increases gradually once the decision to adhere is made
- ▶ The average use of PAP therapy is approximately five hours per night



# PAP or No PAP?

- ▶ 2006 AASM Practice Parameters
  - ▶ PAP therapy is an option in mild OSA
- ▶ Mixed results in studies of outcome
  - ▶ PAP reduces AHI, but does not necessarily reduce BP or improve EDS, mood, or quality of life
    - ▶ Of 32 patients with AHI < 10, ten had improved quality of life at 4 weeks
    - ▶ At 3 months, only 4 continued to adhere to PAP therapy

- 
- ▶ Important to correlate AHI with symptoms and co-morbidities
  - ▶ As many as 25% of sleep patient have more than one sleep disorder
  - ▶ Medicare Rules
  - ▶ Examples of “overtreatment”



# There Are Alternatives To PAP Therapy

## Oral Appliances

- ▶ AASM/AADSM 2015 Guidelines
  - ▶ OA should be prescribed, rather than no therapy, for patients requesting treatment for primary snoring (STANDARD)
  - ▶ A qualified dentist should use a custom, titratable device (GUIDELINE)
  - ▶ Consider OA for patients who are intolerant of PAP therapy or prefer alternative therapy (STANDARD)
  - ▶ Qualified dentist provides oversight of treatment and periodic follow up visits with sleep specialist (GUIDELINE)
  - ▶ Follow up testing (GUIDELINE) (24)



# Alternatives To PAP Therapy (cont.)

## Weight Reduction

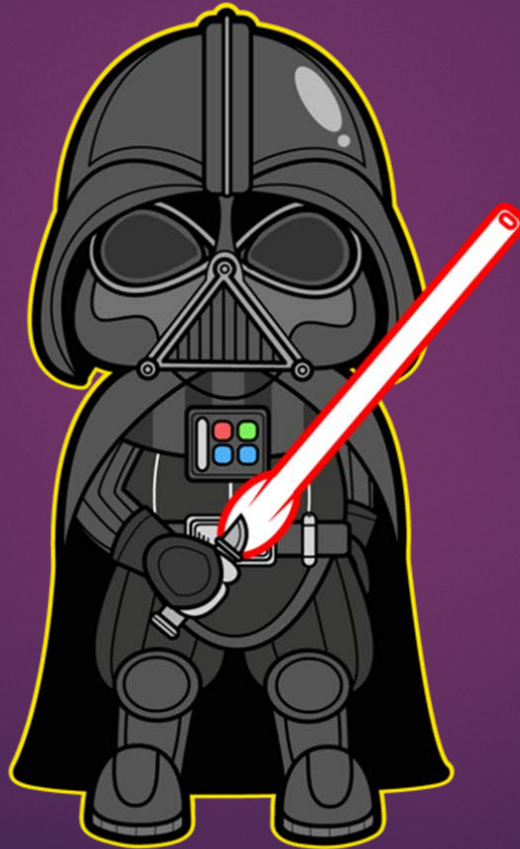
- ▶ A 10% reduction in weight leads to a 26% reduction in RDI (23)
- ▶ Other benefits
  - ▶ Lowered BP
  - ▶ Improved pulmonary function
  - ▶ Improved snoring and sleep architecture
  - ▶ Possible reduction in PAP pressure requirement



# Alternatives To PAP Therapy (cont.)

- ▶ Positional Therapy
- ▶ Winx Therapy (Negative pressure system)
- ▶ Tongue Retaining Devices
- ▶ Nasal Microvalves
- ▶ Surgical Treatments
- ▶ Hypoglossal Nerve Stimulation

# Introducing PAP Therapy to Patients



















# Introducing PAP Therapy to Patients

- ▶ Timing the introduction after diagnosis
- ▶ The decision to adhere to PAP therapy is usually made in the first week
- ▶ Patients' first impression after PAP titration predicts adherence (9)



# Determining Treatment Pressure Requirements



# Full night attended PSG titration

- ▶ Preferred approach over other titration strategies (10)

# Split-night studies

- ▶ Less costly, more convenient for the patient, and reduces delay in starting home therapy
- ▶ Might underestimate severity and titration might be incomplete (REM, body position)
- ▶ Fewer opportunities for patient education



# In-Home Titration

- ▶ Use of auto-titrating CPAP can be as effective as attended titration
- ▶ Reduces time from diagnosis to starting home therapy
  - ▶ Delays determination of optimal treatment pressure
- ▶ Reported AHI is not the same as AHI determined by PSG
  - ▶ Event detection algorithms vary considerably among manufacturers (11)
  - ▶ Treatment emergent central apneas and other factors affecting airflow
  - ▶ Risk of under or over treatment
- ▶ Follow up testing of oxygen saturation is often needed
- ▶ Major disadvantage: Absence of a technologist who can choose, adjust, and change the interface if needed

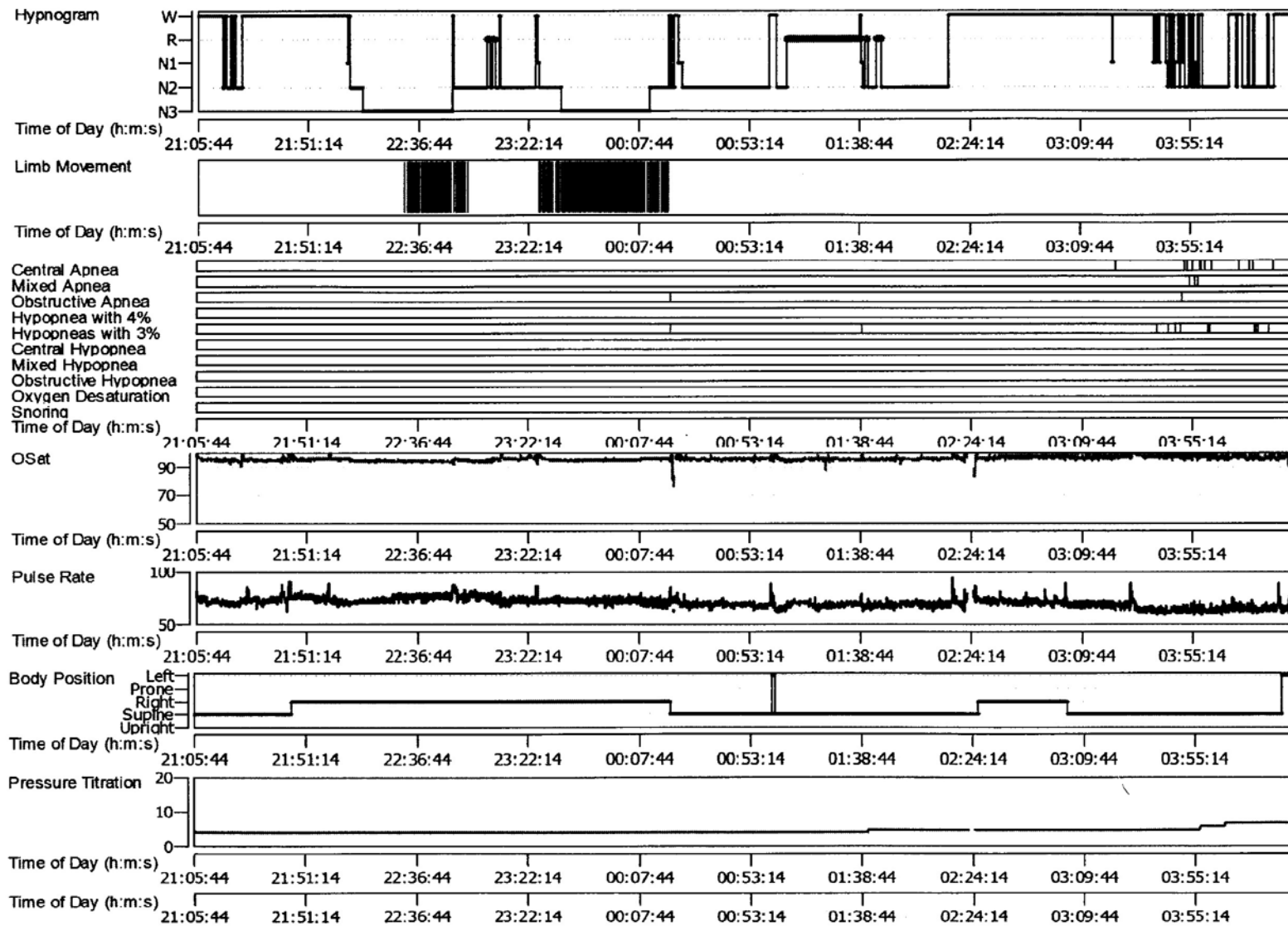


Which Method is Best?

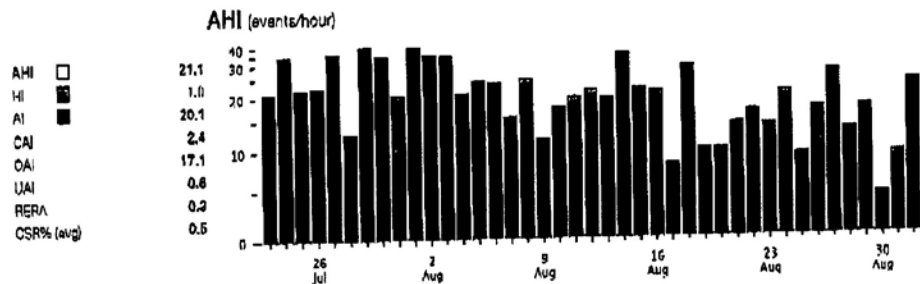
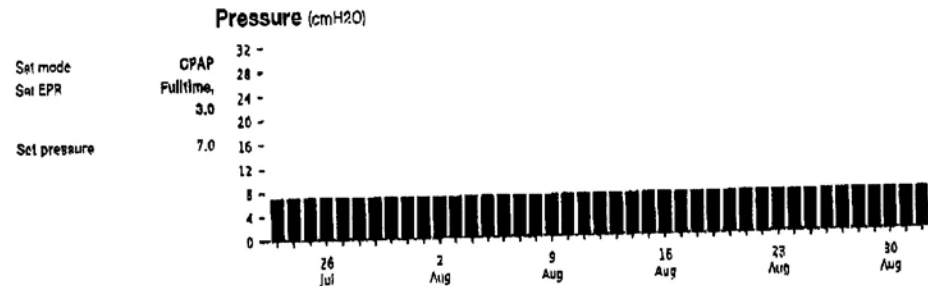
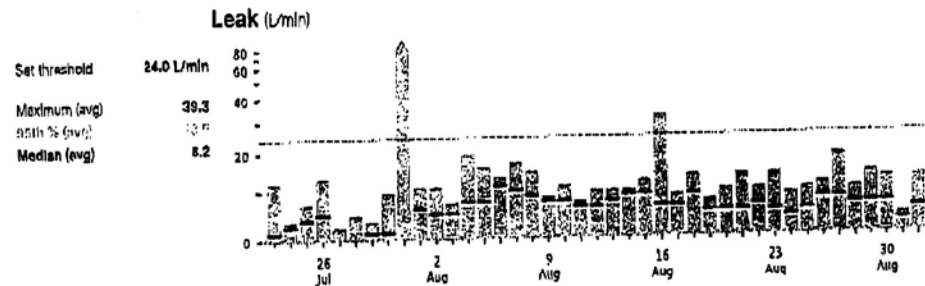
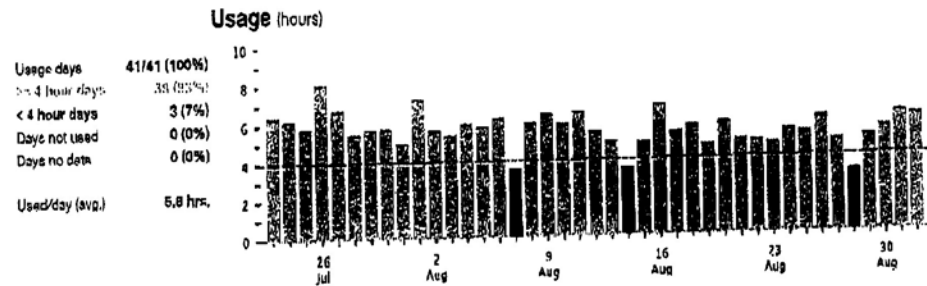




# Interpreting Therapy Monitoring Data



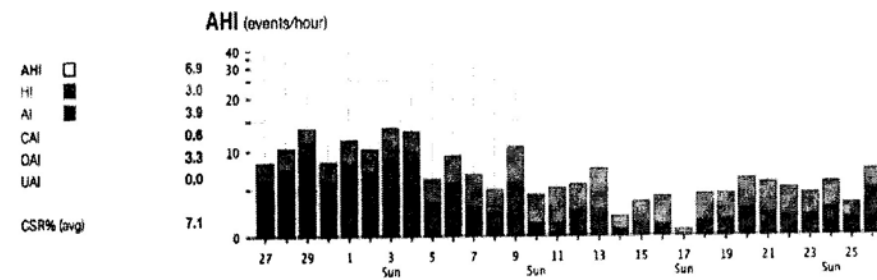
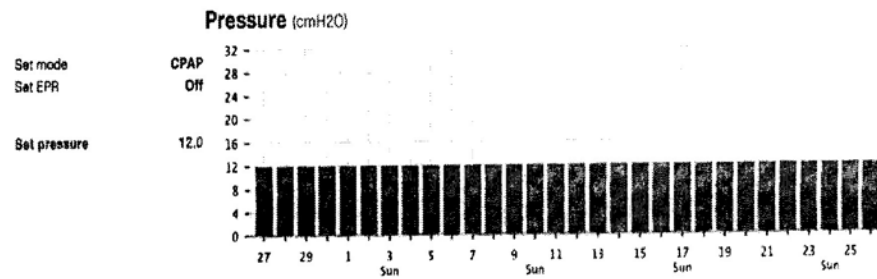
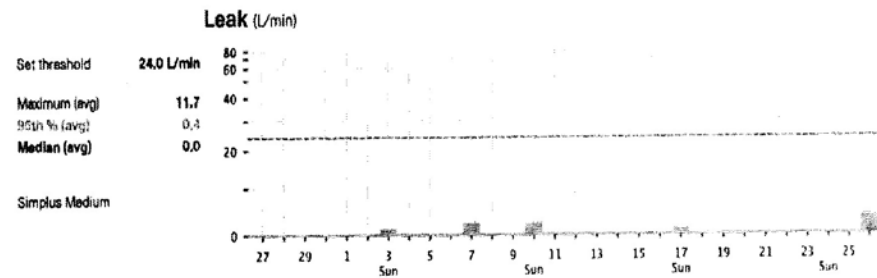
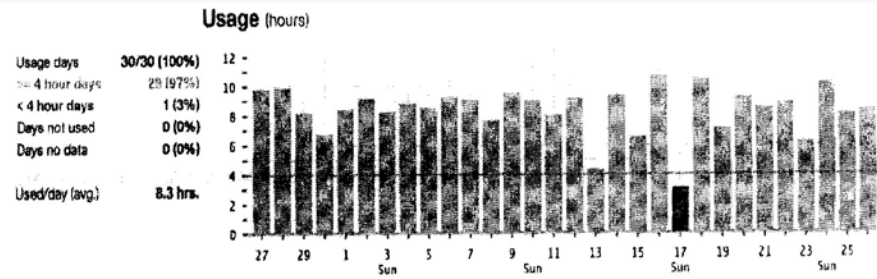




Excessive  
Pressure?

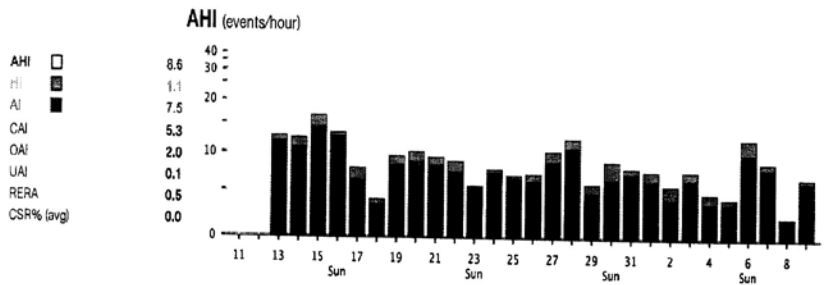
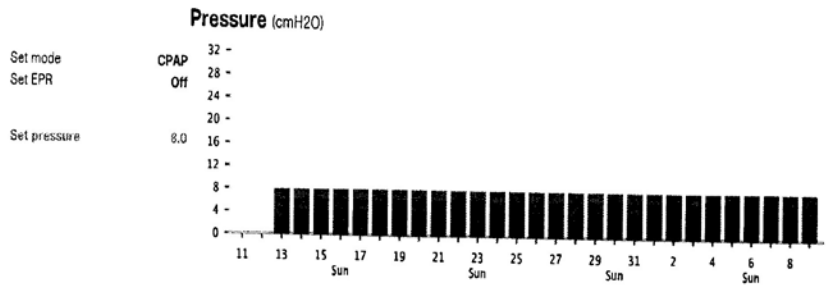
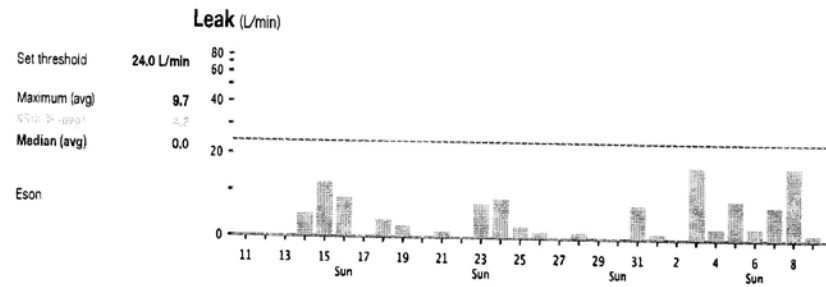
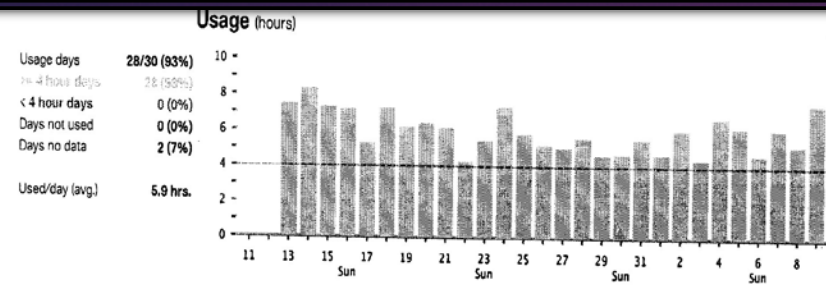
Inadequate  
Humidity?

Other Sleep  
Disturbances?

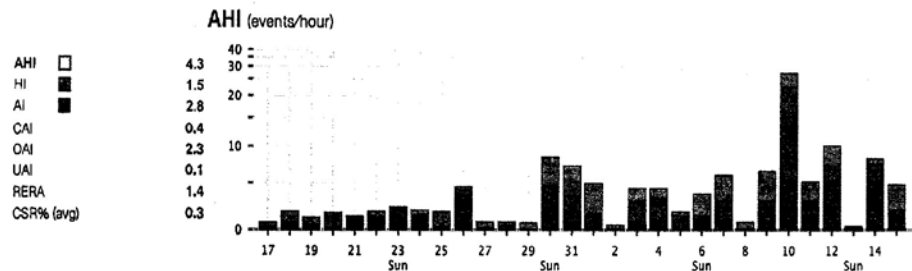
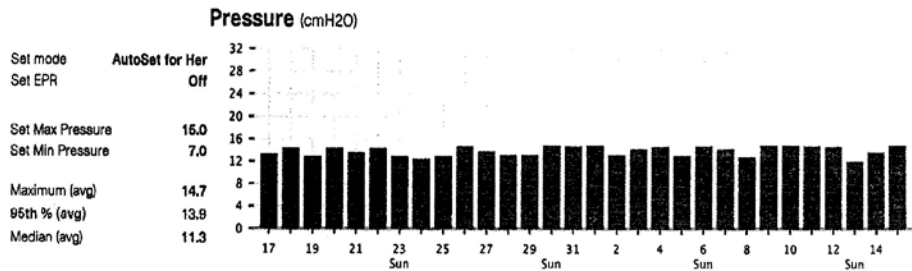
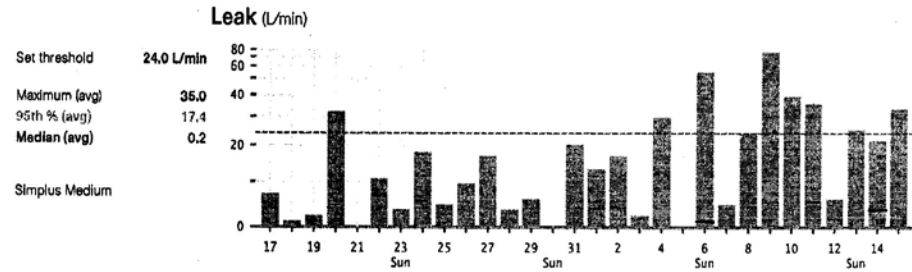
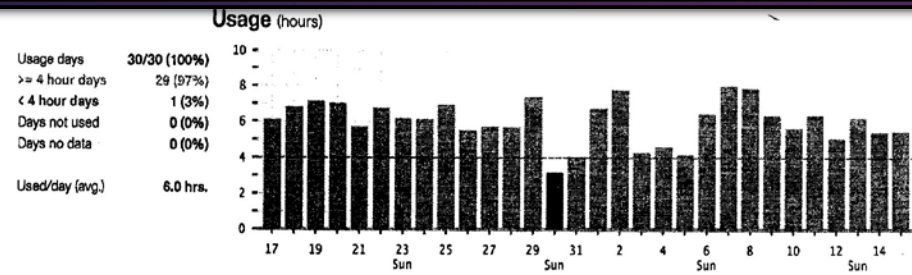


Naïve to CPAP



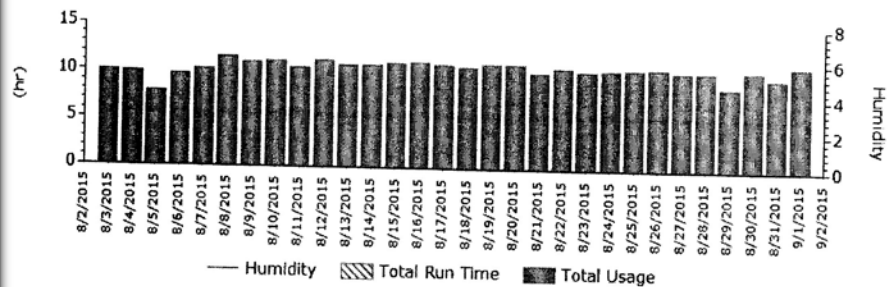
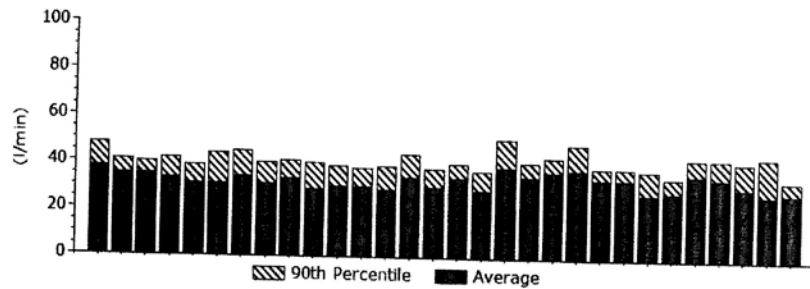
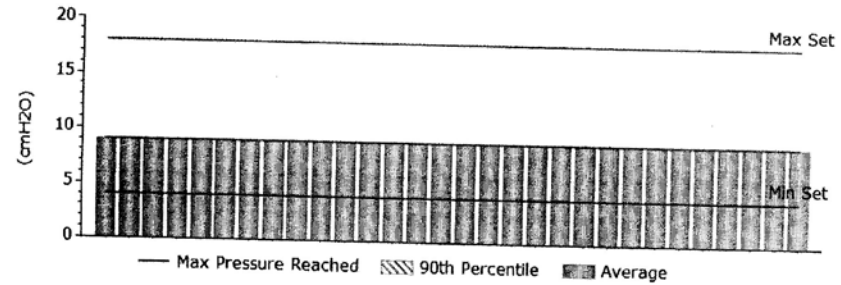
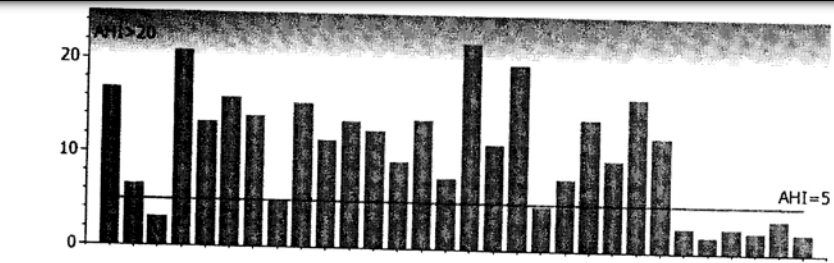


# Treatment Emergent Central Apneas

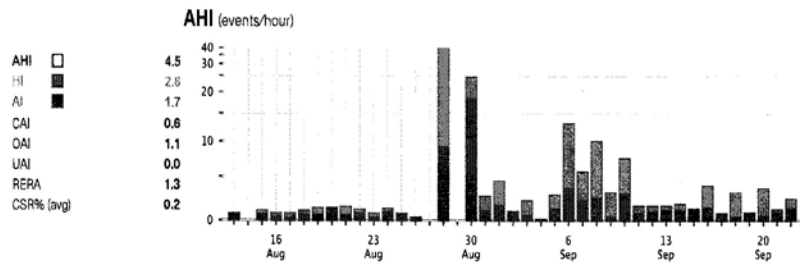
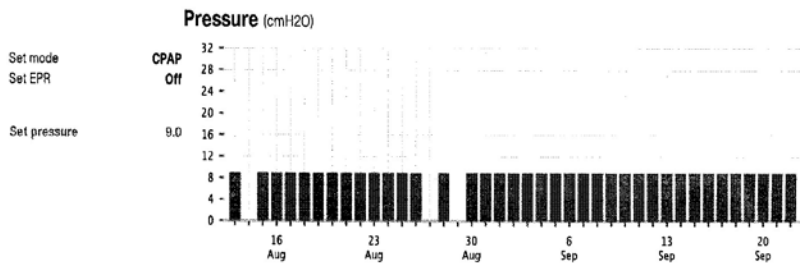
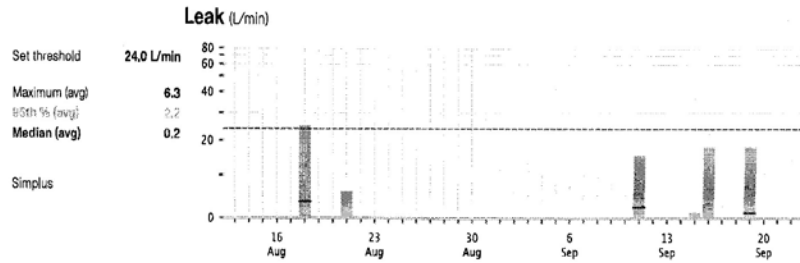
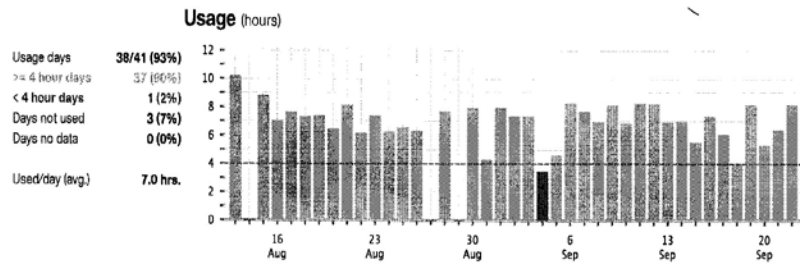


# Discontinuation of Nasal Steroid Spray



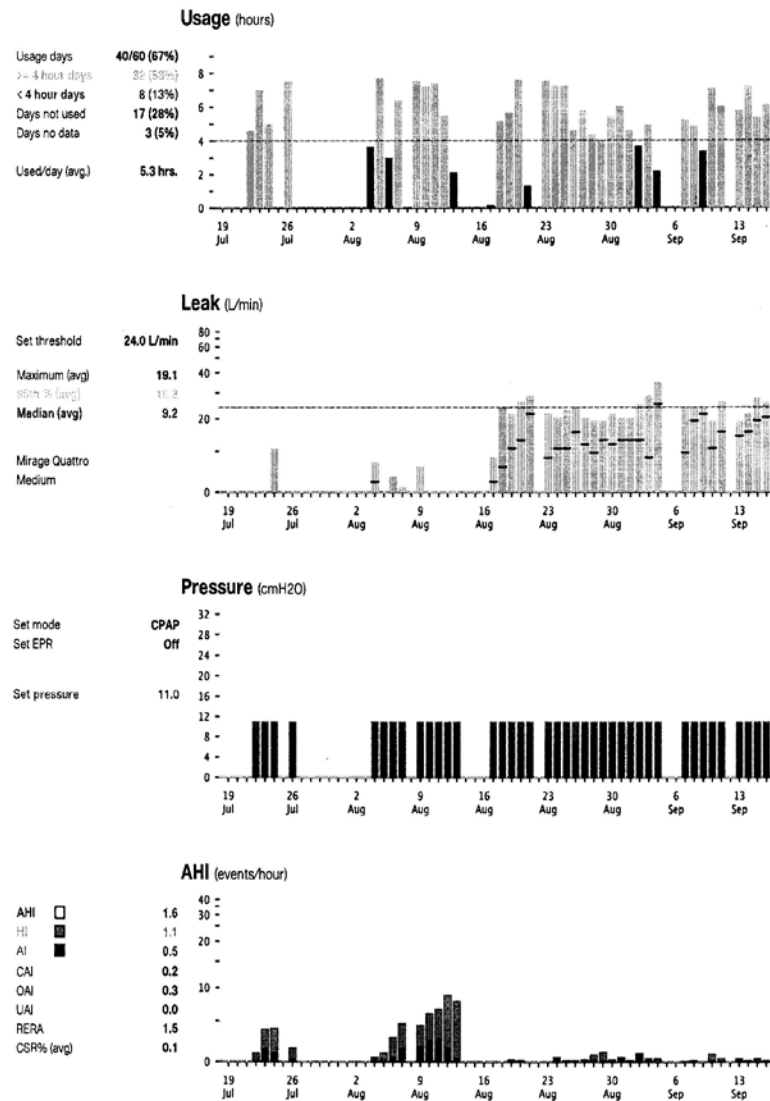


# Mystery Solved



# Shoulder Surgery



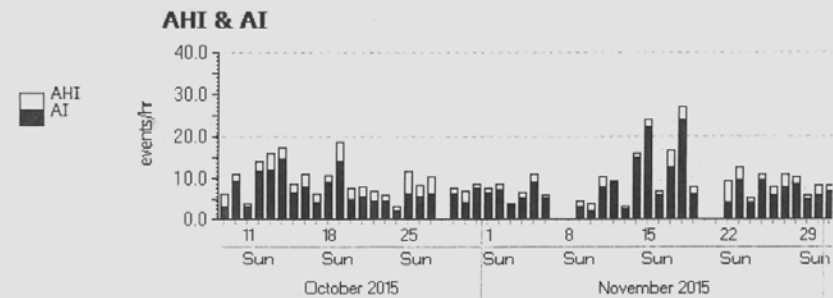
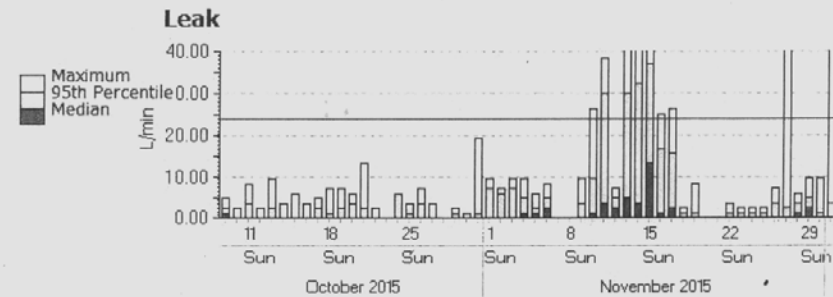
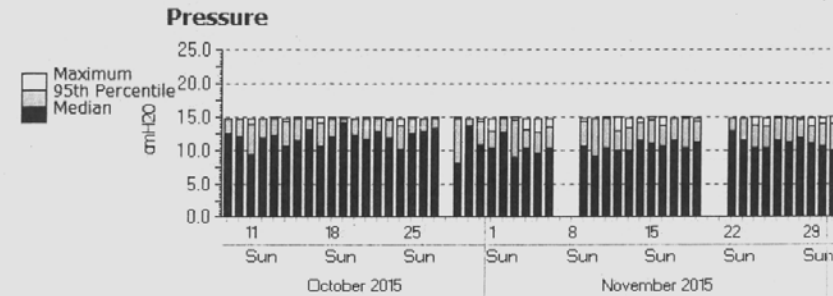


# Mask Fit Problem

## Summary Graphs

12/15/2014 - 12/17/2015

Device: S9 AutoSet (S



REM Behavior Disorder  
With PLMDS

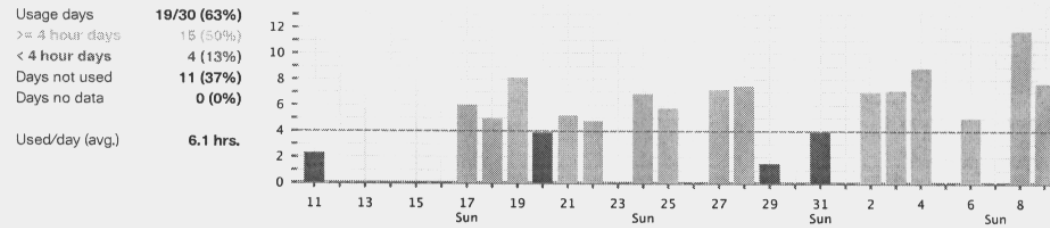


# Therapy Report

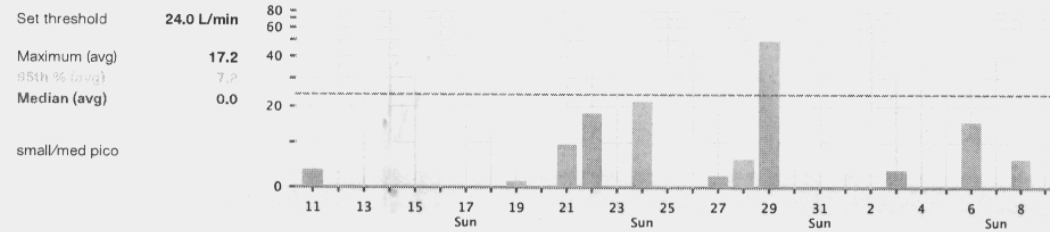
AirSense 10 AutoSet for Her

SN: 23151953058

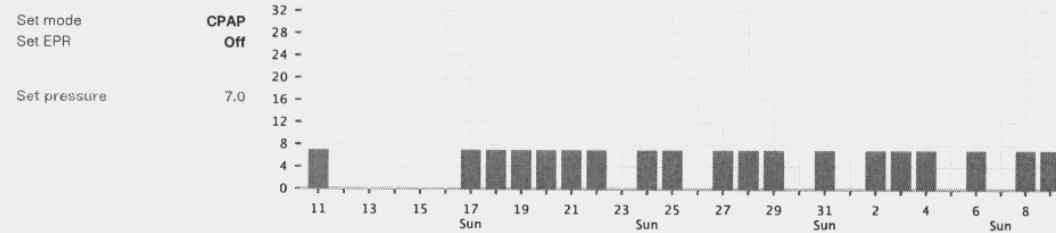
## Usage (hours)



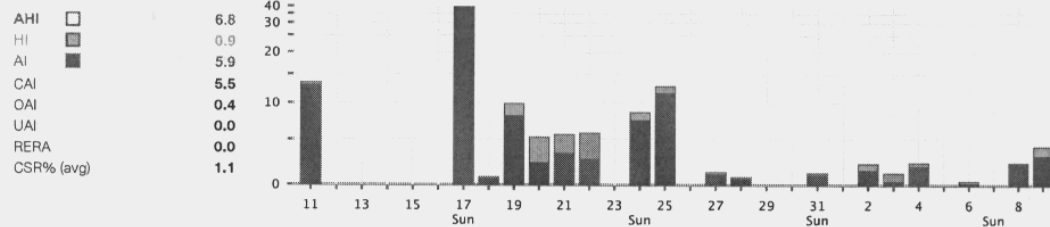
## Leak (L/min)



## Pressure (cmH2O)



## AHI (events/hour)



Control of  
RLS/PLMS

# Which Mode of PAP Therapy is Best?

- ▶ CPAP, Auto CPAP, BiPAP-S, ST, Auto BiPAP, AVAPS, ASV
- ▶ Pressure ramping, EPR
  - ▶ Has not been proven to increase adherence (8)
- ▶ Fixed CPAP is suggested as first-line treatment for most patients with OSA (1)
- ▶ There is little difference between fixed or APAP with regard to efficiency or adherence in uncomplicated moderate to severe OSA(2)



## ► APAP vs CPAP effect on BP (3)

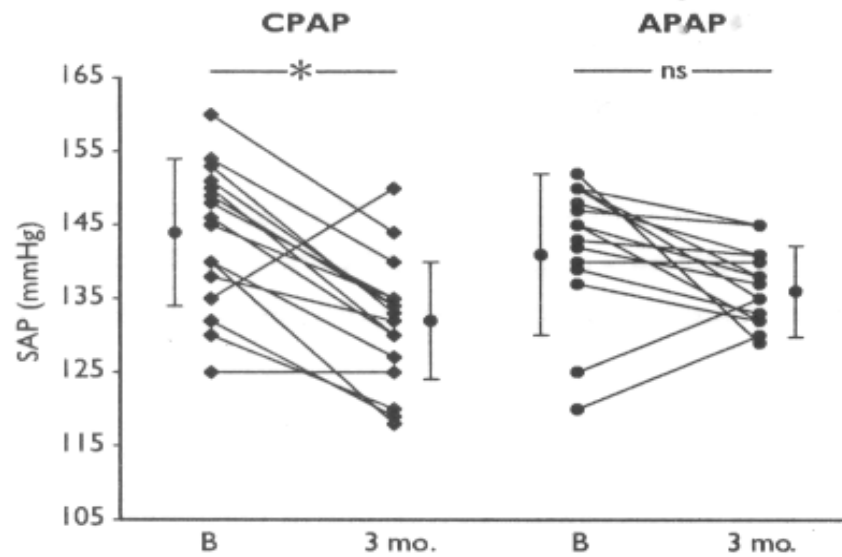


Figure 1. Individual and average changes in SBP (SAP) in patients treated with CPAP or APAP. B = baseline. \* $p < 0.05$ . Average data are expressed as mean  $\pm$  SD.

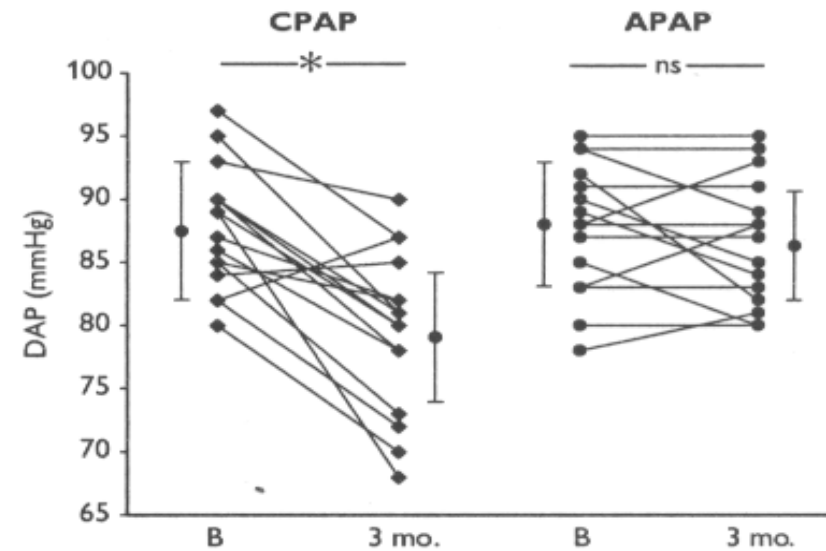
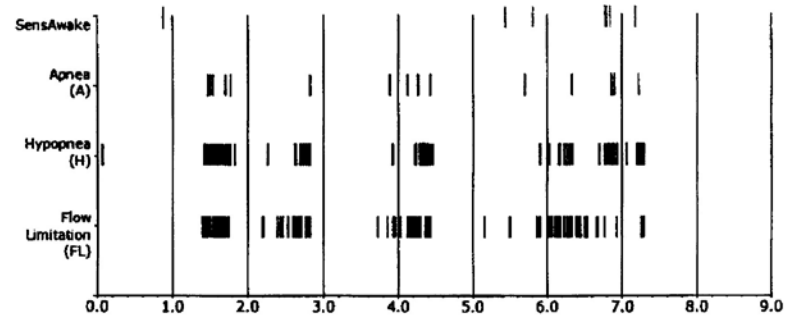
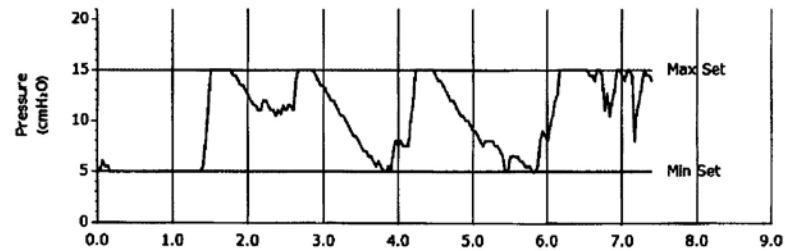


Figure 2. Individual changes in DBP (DAP) in patients treated with CPAP or APAP. See Figure 1 for expansion of abbreviations.



Total SensAwake: 7  
SensAwake/Hr:1  
Total Apnea:15  
AI: 2.0  
At Max Pressure:8  
Total Hypopnea:65  
HI: 8.7  
At Max Pressure:42  
AHI:10.7  
Total Flow Limitation:125  
Flow Limitation/Hr:17



Pressure  
Average:10.5  
Median:10.5  
90th Percentile:15



System Leak  
Average:38  
Median:38  
90th Percentile:47  
% Time with Excessive Leak:0%

10:00 PM 11:00 PM 12:00 AM 1:00 AM 2:00 AM 3:00 AM 4:00 AM 5:00 AM 6:00 AM

Total Usage:07h 24m  
Total Run Time:07h 24m  
Percentage Usage: 100%

P (cmH <sub>2</sub> O)	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
T (mins)	0	90	30	22	40	18	14	40	38	18	28	108	0	0	0	0	0
A	0	1	1	0	1	0	0	1	2	1	0	8	0	0	0	0	0
H	0	0	1	1	3	0	1	5	5	2	4	43	0	0	0	0	0
FL	0	0	4	3	9	0	4	9	10	3	3	80	0	0	0	0	0

Time and events at pressure

APAP can be sub-optimal for some patients



# Which Mode Of PAP Therapy?

- ▶ BiPAP-S, BiPAP-ST, AVAPS, ASV used in certain subgroups
  - ▶ Chronic respiratory insufficiency
    - ▶ COPD
    - ▶ Neuromuscular diseases
    - ▶ Chronic opioid use
    - ▶ Central sleep apnea
      - ▶ SERVE-HF Study
  - ▶ Insurance coverage issues



# Which Mode Of PAP Therapy?

- ▶ BiPAP for uncomplicated OSA
  - ▶ Sometimes used during sleep studies if because of mask leaks or if the patient has difficulty tolerating higher pressures
  - ▶ Some patients do not do well because their breathing pattern is not “in sync” with the machine’s timing
  - ▶ Improving the mask fit and starting home therapy at lower pressures might result in CPAP being effective
  - ▶ However, some patients prefer BiPAP
    - ▶ Krakow, et al. found that men “greatly preferred” (85% vs 15%) BiPAP over CPAP, whereas only a small percentage of women preferred BIPAP over CPAP (4)



# We All Don't Breathe The Same

## Gender Differences

- ▶ Women tend to have less severe OSA than men
  - ▶ However, the consequences are at least the same, or worse
    - ▶ Greater endothelial dysfunction
    - ▶ More likely to develop anxiety and depression
- ▶ Men have a greater response to hypercapnia
  - ▶ However, they hypo-ventilate when they return to sleep which leads to airway instability (6)
  - ▶ Women might preserve ventilation more efficiently than men during hypocapnia (5)
- ▶ Episodes of upper airway resistance and flow limitation that do not meet the criteria for apneas/hypopneas are more common in women. Women have less pharyngeal fat and lower soft tissue volume in the neck



# We All Don't Breathe The Same

- ▶ Can insomnia cause sleep disordered breathing?
  - ▶ Krakow, B, et al. found that 80-90% of patients with insomnia had SDB (7)
    - ▶ PTSD patients had normal sleep prior to their traumatic experience
  - ▶ Noise induced sleep fragmentation can increase upper airway collapsibility (8)
  - ▶ Periodic Limb Movements and nonspecific arousals



# PAP Equipment/Technology Factors

## Mask/Interface Fit





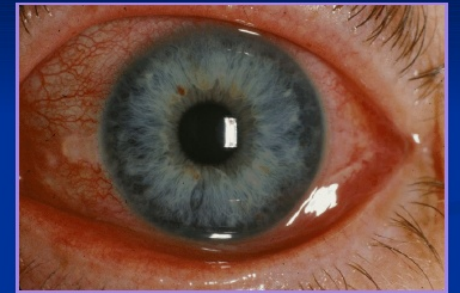
# PAP Equipment/Technology Factors

- ▶ Mask leak and discomfort is significantly higher in non-adherent patients



## CPAP-associated Red Eye

- Clinical Problems
  - Dry eye syndrome
  - EXW CL intolerance
  - Recurrent Corneal Erosion
  - Infectious conjunctivitis
- Causes
  - Air leaks
  - Retrograde air flow thru nasolacrimal apparatus
- Treatment
  - Lubricating ointments HS, punctal plugs
  - CPAP refitting: adjust headgear and pressure





# PAP Equipment/Technology Factors

## Humidification

- ▶ PAP therapy does not work well if there is nasal/upper airway congestion
- ▶ Irritation from cold/dry air causes congestion and/or rhinorrhea
- ▶ Patients > 60 are 5x more likely to require heated humidification
- ▶ Patients taking 2 or more medications are 6x more likely to require HH
- ▶ Patients with chronic mucosal disease are 4x more likely to need HH. Treat underlying condition
- ▶ Cool rooms – Rainout
- ▶ Patients misunderstand symptoms of inadequate humidification
- ▶ Examples

# PAP Equipment/Technology Factors

- ▶ Impact on bed partner
  - ▶ Noise
    - ▶ Newer machines are very quiet
    - ▶ Mask Leak
  - ▶ Air impacting partner
    - ▶ Exhaust port diffusers



# PAP NAP

- ▶ Brief daytime procedure (100 minutes)
- ▶ Provides opportunities for mask desensitization, trial of interfaces, and PAP exposure
- ▶ Provides an opportunity to identify behavioral obstacles

Krakow B, et al. *A Daytime, Abbreviated Cardio-Respiratory Sleep Study to Acclimate Insomnia Patients with Sleep Disordered Breathing to Positive Airway Pressure.* J Clin Sleep Med 2008; 4(3): 212-222

# Patient Factors Affecting Adherence

- ▶ No single factor has been consistently identified as predictive of adherence
- ▶ Weaker relationship
  - ▶ Age, sex, marital status, and socioeconomic status
  - ▶ Mood disorders, stress, anger
  - ▶ Severity (AHI)



# Patient Factors (cont.)

- ▶ Stronger relationship
  - ▶ Degree of reported daytime sleepiness
  - ▶ Severity of oxyhemoglobin desaturation during sleep

# Self-referral versus partner referral (14)

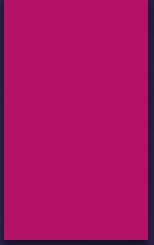


“It’s a taser. It’s for your snoring.”



# Patient Factors (cont.)

- ▶ Patient education with a sleep specialist (15) (17)
- ▶ Lack of claustrophobia, nasal airflow problems, presence of problem solving skills, and optimism regarding the benefit of PAP therapy

- 
- ▶ Behavioral factors such as self-efficacy and social support have the greatest influence on compliance (16)
  - ▶ Self-efficacy
    - ▶ Defined as a positive motivation and confidence to engage in healthy behavior



# Standard Versus Intensive Patient Support

- ▶ Intensive support may result in greater adherence and symptom improvement over standard support (12)

# Standard Support

- ▶ Pre-testing education
- ▶ 24 hour follow up phone call
- ▶ Follow up visits at 1, 3, and 6 months



# Intensive Support

- ▶ Home pre-test education
- ▶ Additional two nights of CPAP titration in the sleep center
- ▶ Nurse home visits at 7, 14, 28 days and at 4 months

# Cognitive Therapies

## Transtheoretical Model

People fall along a dynamic continuum of motivational readiness to change current behavior

- ▶ Pre-contemplation (Not thinking about changing)
- ▶ Contemplation (Thinking about change, but not trying)
- ▶ Preparation (Beginning to make changes slowly)
- ▶ Action (Actively engaging in regular behavior change)
- ▶ Maintenance (18)



## Social Cognitive Theory

- ▶ Focuses on problem solving skills, coping skills, goal setting, self-efficacy, and outcome expectations
- ▶ More aptly applied to persons who are ready to change  
(19)

# Predicting Adherence

- ▶ Study predicting adherence with models
  - ▶ Psychological Variables
    - ▶ Readiness
    - ▶ Decisional Balance (Comparing the pros and cons of new behavior)
    - ▶ Self-efficacy
- ▶ Measures of behavior change, when assessed at one week and 3 months predicted adherence at 6 months
- ▶ However, baseline measurements were not predictive of adherence
- ▶ Avoid tailoring treatment to baseline predictions
- ▶ Assessment early and at every follow up visit could be more beneficial (20)



# Employing Behavioral Strategies

- ▶ Patients should be encouraged to think about the benefits and barriers to using PAP therapy
- ▶ Patient-centered, not provider-centered
  - ▶ The provider acts as a guide, not an expert
  - ▶ Avoid argumentation

# Employing Behavioral Strategies

- ▶ Identify discrepancies
- ▶ Perceived benefits and barriers
- ▶ Common barriers
  - ▶ Discomfort
  - ▶ Disturbance of bed partner
  - ▶ Travel
  - ▶ Less symptom improvement than expected



# Employing Behavioral Strategies (cont.)

- ▶ Express empathy
- ▶ Expect resistance
  - ▶ Remind the patient that he/she is in control
  - ▶ Use visual feedback
  - ▶ Support self-confidence: Point out past successes
- ▶ Use behavioral therapy principles at every visit, starting with the first



# Patient Education and Support

- ▶ Always be looking for teachable moments
- ▶ Tailor the information provided to the patient and repeat at every visit
  - ▶ Only 12% of adults in the U.S. have proficient health literacy
  - ▶ 1/3 have difficulty with common health tasks (eg. Following prescription directions)
  - ▶ 80% forget what a provider tells them as soon as they leave the office
  - ▶ 50% of recalled information is incorrect (21)
- ▶ Think about how the patient perceives what you say



# Summary

- ▶ Be aware of equipment/technology factors
  - ▶ Look at “the big picture” when interpreting monitoring data
- ▶ It is not known how much education and support is required
  - ▶ Study heterogeneity of interventions (22)
- ▶ Pre-testing assessment with education and early follow up are extremely important
- ▶ The approach to the patient should be individualized and reassessed at every follow up visit
- ▶ Keep alternative treatment options in mind



A Coordinated Team Approach  
Optimizes The Probability Of  
Success





Questions?



# References

(5) White DP, et al. *Sexual influence on the control of breathing.* J Appl Physiol, 1983. 54(4): p. 874-9

(6) Jordan, AS, et al. *Ventilatory response to brief arousal from non-rapid eye movement sleep is greater in men than in women.* Am J Respir Crit Care Med, 2003. 168(12): p. 1512-9

(7) Krakow B, Ulibarri V, Romero E. *Persistent insomnia in chronic hypnotic users presenting to a sleep medical center.* J Nerv Ment Dis. 2010; 198(10):1-8

Krakow B, Ulibarri V, Romero E. *Patients with treatment-resistant insomnia taking nightly prescription medications for sleep: a retrospective assessment of diagnostic and treatment variables.* Prim Care Companion J Clin Psychiatry 2010; 12(4):PCC.09m00873.  
ed. 1994; 150(2): 481-5.4

Roy S. A Missing Link (Dr. Barry Krakow's findings on the relationship between insomnia and sleep-disordered breathing) [www.sleepreviewmag.com](http://www.sleepreviewmag.com), Jan/Feb, 2014



# References (cont.)

Littner MR. *Mild Obstructive Sleep Apnea Should Not Be Treated.* Journal of Clin Sleep Med, Vol. 3, No. 3, 2007

Chiner E, Andreu A, Sancho-Chust J, Sanchez-de-la-Torre A, Barbe F. *The Use of Ambulatory Strategies for the Diagnosis and Treatment of Obstructive Sleep Apnea in Adults.* Expert Rev Resp Med. 2013; 7(3): 259-73

Engleman HM, Wild MR. *Improving CPAP Use By Patients With The Obstructive Sleep Apnea/Hypopnea Syndrome.* Sleep Med Rev 2003; 7:81

Kushida, et al. *Practice Parameters for the Use of Continuous and Bilevel Positive Airway Pressure Devices to Treat Adult Patients With Sleep-Related Breathing Disorders.* Sleep, Vol. 29, No. 3, 2006

Morgenthaler, et al. *Practice Parameters for the Medical Therapy of Obstructive Sleep Apnea.* Sleep, Vol. 29, No. 8, 2006



# References (cont.)

(8) Series F, Roy N, Marc I. *Effects of sleep deprivation and sleep fragmentation on upper airway collapsibility in normal subjects.* Am J Respir Crit Care Med. 1994; 150(2): 481-5.4

(4) Krakow, B, et al. *A Daytime, Abbreviated Cardio-Respiratory Sleep Study To Acclimate Insomnia Patients with Sleep Disordered Breathing to Positive Airway Pressure.* J Clin Sleep Med. 2008; 4(3): 212-222



# References (cont.)

Roy S. A Missing Link (Dr. Barry Krakow's findings on the relationship between insomnia and sleep-disordered breathing) [www.sleepreviewmag.com](http://www.sleepreviewmag.com), Jan/Feb, 2014

Schweller J. AutoPAP Versus CPAP: Which Is Better? <http://respiratory-care-sleep-medicine.advanceweb.com>, 2014

Nasca T. The Importance of CPAP Humidification. American Sleep Apnea Association. <http://sleepapnea.org>, 2015

Sopkova Z, et al. Predictors of Compliance Continuous Positive Airway Pressure Treatment in Patients with Obstructive Sleep Apnea and Metabolic Syndrome. Wien Klin Wochenschr 2009; 121(11-12): 398-404. <http://www.ncbi.nlm.gov/pubmed/19626298>



# References (cont.)

Sutherland K, Vanderveken O, Cistulli P. *Oral Appliance Treatment for Obstructive Sleep Apnea: An Update. J Clin Sleep Med, 2014; 10(2): 215-227*

(10) Epstein LJ, Kristo D, Strollo PJ Jr, et al. *Clinical guideline for the evaluation, management, and long-term care of obstructive sleep apnea in adults. J Clin Sleep Med; 5:263*

(11) Brown, LK, Lee, W. *Initiation of positive airway pressure therapy for obstructive sleep apnea in adults. Up To Date 2015*

(3) Patruno V, et al. Chest 2007; 131:1393-1399

(2) Vennelle M, White S, Riha RL, et al. *Randomized controlled trial of variable-pressure versus fixed pressure (CPAP) treatment for patients with OSAHS. Sleep 2010; 33:267*



# References (cont.)

(1) Epstein LJ, Kristo D, Strollo PJ Jr, et al. *Clinical guideline for the evaluation, management, and long-term care of obstructive sleep apnea in adults.* J Clin Sleep Med; 5:263

Brown, LK, Lee, W. *Initiation of positive airway pressure therapy for obstructive sleep apnea in adults.* Up To Date 2015

Vennelle M, White S, Riha RL, et al. *Randomized controlled trial of variable-pressure versus fixed pressure (CPAP) treatment for patients with OSAHS.* Sleep 2010; 33:267

Berry, RB, Sriram P. *Auto-adjusting positive airway pressure treatment for sleep apnea diagnosed by home sleep testing.* J Clin Sleep Med 2014; 10:1269



# References (cont.)

Weaver TE, Kribbs NB, Pack AI, et al. *Night-to-night variability in CPAP use over the first three months of treatment.* Sleep 1997; 20:278

Gay P, Weaver T, Loube D, et al. *Evaluation of positive airway pressure treatment for sleep related breathing disorders in adults.* Sleep 2006; 29:381

Strollo PJ, et al. *Upper Airway Stimulation for Obstructive Sleep Apnea.* N Engl J Med. 2014; 370:139-49

Bakker JP, et al. *Flexible pressure delivery modification of continuous positive airway pressure for obstructive sleep apnea does not improve compliance with therapy: Systematic review and meta-analysis.* Chest 2011; 139: 1322



# References (cont.)

(25) Weaver TE, et al. *Adherence to continuous positive airway pressure therapy.* Proceedings of the American Thoracic Society, Vol. 5, No. 2 (2008), pp. 173-178.

(12,14) Hoy CJ, et al. *Can support improve continuous positive airway pressure use in patients with the sleep apnea/hypopnea syndrome?* Am J Respir Crit Care Med 1999; 159:1096-1100.

Berry, RB, et al. *Auto-adjusting positive airway pressure treatment for sleep apnea diagnosed by home testing.* J Clin Sleep Med 2014; 10:1269



# References (cont.)

(9) Balachandran JS, et al. *A brief survey of patients' first impression after CPAP titration predicts future CPAP adherence: A pilot study.* J Clin Sleep Med 2013; 9: (3): 199-205

(15) Parthasarathy S, et al. *A national survey of the effect of sleep medicine specialists and American Academy of Sleep Medicine Accreditation on management of obstructive sleep apnea.* J Clin Sleep Med 2006; 2:133-42

(17) Fuchs FS, et al. *Adherence to continuous positive airway pressure therapy for obstructive sleep apnea: Impact of patient education after a longer treatment period.* Respiration. 2010; 80 (1): 32-7



# References (cont.)

(16) Sawyer AM, et al. *A systematic review of CPAP adherence across age groups: Clinical and empiric insights for developing CPAP adherence interventions.* Sleep Med Rev. 2011; 15(6): 343-356.

Krakow B, et al. *A Daytime, Abbreviated Cardio-Respiratory Sleep Study to Acclimate Insomnia Patients with Sleep Disordered Breathing to Positive Airway Pressure.* J Clin Sleep Med 2008; 4(3): 212-222.

(14) Hoy CJ, et al. *Can support improve continuous positive airway pressure use in patients with the sleep apnea/hypopnea syndrome?* Am J Respir Crit Care Med 1999; 159:1096-1100.

(18) Prochaska JO, et al. *The TransTheoretical Model and Stages of Change.* In: Glanz K, Lewis FM, et al. Health Behavior and Education. San Fransisco: Jossey-Bass Publishers; 1997; 60-84



# References (cont.)

(19) Bandura A. Social Foundations of Thought and Action. A Social Cognitive Theory. Englewood Cliffs: Prentice Hall; 1986

(20) Aloia MS, Arendt T, et al. *Predicting Treatment Adherence in Obstructive Sleep Apnea Using Principles of Behavior Change.* J Clin Sleep Med 2005; 1(4): 346-353

Bartlett D, Wong K, et al. *Increasing adherence to obstructive sleep apnea treatment with a group cognitive therapy treatment intervention: A randomized trial.* Sleep 2013; Nov 1;36(11): 1647-54

(21) US Department of Health and Human Services. Office of Disease Prevention and Health Promotion. *America's Health Literacy: Why We Need Accessible Health Information.* <http://health.gov/communication/literacy/issuebrief/> Last accessed Nov 10, 2015



# References (cont.)

Haniffa, M, et al. *Interventions to Improve Compliance with Continuous Positive Airway Pressure for Obstructive Sleep Apnoea*. Cochrane Database Syst Rev 2004;4:CD003531  
Medline

Richards D, et al. *Increased Adherence to CPAP With a Group Cognitive Behavioral Treatment Intervention: A Randomized Trial*. Sleep 2007;30:635-640

(23) Downey R. *Obstructive Sleep Apnea Treatment and Management*.  
<http://emedicine.Medscape.com/article/295807-treatment> Medscape

(24) Ramar K, Dort L, et al. *Clinical Practice Guideline for the Treatment of Obstructive Sleep Apnea and Snoring with Oral Appliance Therapy: An Update for 2015*. Journal of Clinical Sleep Medicine, Vol 11, No. 7, 2015