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Using PAP Downloads to Manage Sleep Apnea Patients

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I AM STILL SLEEPY BUT I AM USING MY PAP THERAPY
Starting PAP Therapy

Tolerance

- Every patient’s experience with tolerating PAP therapy depends on a combination of symptoms and consequences of the disorder.
- Each patient’s adjustment process for starting CPAP therapy is unique.
Adjusting to PAP Therapy

- When starting PAP therapy, patients require a period of adjustment:
  - the presence of the PAP mask on the face
  - the feel of the air pressure delivered by the PAP unit

- The adjustment time varies and can take from a few days to a few weeks.
- Some patients may take months to adjust to PAP.
Never Give Up!
Persistence Pays Off

- The most important recommendation for any patient starting CPAP therapy is to not give up.
- The sleep physician and the sleep center staff can help patients who have persistent difficulty adjusting to therapy.
Side Effects of PAP Therapy

- The most common PAP side-effects are mask or pressure related:
  - Claustrophobia to the PAP mask
  - Nasal congestion rhinitis or a runny nose
- While CPAP side-effects are a nuisance, serious side-effects are very uncommon.
- Research has shown that the side-effects from using PAP are rarely the reason patients stop using it.
Side Effects of PAP Therapy

- Frequent nocturnal awakenings
- Nasal irritation
- Dryness
- Puffing
- Leaking
- Claustrophobia
- Snoring
- Flatulence
- Other sleep disorders
Fatigue and Sleepiness

- Symptoms are usually eliminated as soon as PAP therapy is started.
- Studies have shown that the maximum effect of PAP therapy occurs in about 2 weeks.
- For unclear reasons, some patients have *persistent sleepiness* despite good adherence to PAP.
- Stimulant medication may be appropriate for some of these patients since PAP will not make up for insufficient sleep.
Manage Patient’s Symptoms

- If mask claustrophobia is interfering with PAP tolerance, send the patient for desensitization training.

  - Goal is getting patient accustomed to the PAP mask and pressure so that they forget it’s on their face.
  - Start with short periods of time while awake and engaged in a distraction like watching TV or reading (10 minutes and build from there).
  - Gradually increase the time using PAP while sleeping from 1-2 hours up to 6-7 hours.
Manage Patient’s Symptoms

- Make sure the mask is comfortable and the humidifier is working.
- Treat nasal congestion with heated humidification or nasal medications.
- Emphasize the positives to patients about improvements in sleep and sleep apnea since those patients who struggle with therapy often lose track of some of the good things they have noticed about therapy.
Simple Things Can Help Minimize Side-Effects of PAP

- The PAP mask must be fitted appropriately:
  - A mask that is too large or too small will be uncomfortable.

- Nasal symptoms frequently respond to heated humidification of the PAP air:
  - PAP machines now come with heated humidifiers but many patients do not use them.

- Teach the patient not to overtighten the mask:
  - Common mistake can lead to mask discomfort and skin irritation.
  - If air leaks occur, the PAP interface should be changed.
Exhalation Relief

- Exhalation relief allows the CPAP machine or BPAP machine to reduce the inspiratory pressure during exhalation, which makes it easier to breathe out against the pressure. PAP manufacturers have different names for exhalation relief, but they mostly work the same way. Pressure can be adjusted up to $3cm$ for comfort.

- **Respironics** calls their pressure relief **C-Flex, A-Flex, or C-Flex+**. C-Flex lowers the pressure on exhale and quickly ramps back up to the prescribed pressure. **A-Flex** on Auto CPAP machines only, lowers the pressure on exhalation and gradually increases the pressure during inhalation. This allows for a more fluid breath.

- **ResMed** uses **EPR** for pressure relief. Pressures are decreased up to $3cm$ during exhalation and quickly increased back to prescribed pressure when inhalation is detected.

- **DeVilbiss - SmartFlex** is similar to Respiration C-Flex and ResMed EPR.
Managing Patients with PAP Downloads
What They Tell Us?
Summary Report

CPAP
Summary Report

Auto CPAP
Encore Report Structure: Full Report

Demographics
Hours of Use
Pressure Trend

Patterns of Use
(One or more pages)

Long-Term Trends
Black indicates no breathing detected. Is the device off or is there a large leak?

Patient is struggling with compliance. Note all red bars which signify that 4 hours of usage a night is not being met. The black bars signify that breathing is not being detected.
Patterns of Use

The first number represents time duration of total compliance. The second number represents total blower hours.

Blower On and no breathing detected

Blower Off

The first number represents time duration of total compliance. The second number represents total blower hours.
Note the differences in times. Right is blower time, left is therapy time. The black bars indicate that the device is running but breathing is not detected. It is a different view of compliance issues.
<table>
<thead>
<tr>
<th><strong>Long Term Trend</strong></th>
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<tbody>
<tr>
<td>Sleep Therapy Long Term Trend</td>
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<tr>
<td>Pressure (cmH20)</td>
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<tr>
<td>CPAP Pressure 10.0</td>
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<tr>
<td>Percent of Night in Periodic Breathing (PB)</td>
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<tr>
<td>Average % of Night in Periodic Breathing 5.3%</td>
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<td>Clear Airway Apnea Index (CA)</td>
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<td>Average CA Index 0.1</td>
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<tr>
<td>Obstructed Airway Apnea Index (OA)</td>
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<td>Average OA Index 0.5</td>
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<td>Hypopnea and RERA Indices</td>
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<td>Average Hypopnea Index 0.8</td>
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<td>RERA Index 1.8</td>
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<tr>
<td>Flow Limitation and Vibratory Snore Indices</td>
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<tr>
<td>Average AHI 1.4</td>
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<tr>
<td>Percent of Night in Large Leak (LL)</td>
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<td>Average % Night in Large Leak 31.1%</td>
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<tr>
<td>Average Large Leak 2 hrs. 19 mins. 37 secs.</td>
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**Annotations:**
- Average % night in Periodic Breathing
- Average Central Apnea index
- Average Obstructive index
- Average Hypopnea
- Average RERA
- Average Flow Limitation index
- Average Snore index
- Average % night in large leak
- Average time in Large Leak
Is this the appropriate therapy device?

What is causing high hypopneas?

What is causing high AHI?

Large leak may be a problem and limit the auto algorithm’s ability to reach therapeutic range.

The long term trend page can provide a lot of info. Both % of night in PB and Average CA index can help lead decide if the patient is on the appropriate device.

A high AHI and mask leak can help with determining the problem.
This page provides up to eight hours of device scored titration. The blue line shows patient flow and the red line shows device pressure. If the device is in auto mode, the report will show changing pressures, specifically when it changes, how it changes and why it changes.
Fixed CPAP Reports: Patient Demographics

- Dates for Reports
- Humidifier setting
- C-Flex setting
- Mode
- Usage Pattern
- Pressure
Auto CPAP Reports: Patient Demographics

Clinician: MWeisClin, John


- Device Used
- Humidifier setting
- A-Flex setting
- Mode
- Usage Pattern

- Max pressure setting
- 90% pressure setting
- Min. pressure setting

- Avg Humidifier: 3.3, Last Setting: 4.0
- Avg Flex: 2.8, Last Setting: 2.0
- Auto CPAP with A-Flex

- Pressure (cmH2O):
  - Min CPAP Setting
  - Max CPAP Setting
  - 90% CPAP

- Hours of Usage: 25, 20, 15, 10, 5, 0
Daily Details

Up to 7 days of Daily Pressure, AHI and Leak Reporting

Pressure Profile

- 90% Pressure: 9.0
- Average CPAP Pressure: 7.4

Event Flags:
- Central apnea
- Obstructed
- Hypopnea
- Flow limitation
- Snore
- RERA
- AHI

Max pressure setting

90% Pressure

Average Pressure

Pressure Profile

Min. pressure setting

% Periodic Breathing

Sleep Therapy Flags

Indices

1.1 % of Night in PB

CA: 0.3
OA: 0.0
H: 1.3
FL: 0.3
VS: 12.6
RE: 0.5
AHI: 1.6
Daily Details

- **Total Leak (LPM)**
  - Green: Normal Mask Fit
  - Black: Breathing not detected
  - Light Green: Large Leak
  - Blue: Total Leak

- **Blower on but no breathing detected**

- **Breathing detected but too large for event detection**

- **Total leak profile in LPM**
  - Min in Large Leak: 95.0 mins
  - % of Night in Large Leak: 30%
  - Average Leak: 87.9

**Daily Events Per Hour**

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**Total AHI**: 3.7

- **90% Pressure**
- **Minutes at Pressure**
- **Time in large leak**
- **% time in large leak**
- **Ave Leak in night**
Periods of PB indicate the wrong therapeutic device.

Large leak early and too low pressure to start. Device will correct leak by decreasing pressures.
Graph descriptions

**Usage**
Breakdown of patient's usage in days and hours, indicating their usage patterns.

**Leak**
Refers to unintentional leak. Tip: 95th percentile value should be ≤ 24 L/min. If > 24 L/min, check mouth leak or mask fit.

**Mask information**
Per prescription entered into AirView.

**Events**
Type and occurrence per hour. Tip: AHI should be below patient's recommended threshold. If it is above the threshold, check the AI, HI, CAI, OAi, and UAI.

**SpO2**
This graph and associated statistics will only be available if there is an oximetry module connected to the device.

The top of the bar shows the 95th percentile SpO2 value. The horizontal line indicates the median SpO2 value.
Compliance Report

Usage 04/22/2015 - 05/19/2015

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<td>26/28 days (93%)</td>
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<tr>
<td>&gt;=4 hours</td>
<td>26 days (93%)</td>
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<tr>
<td>&lt;4 hours</td>
<td>0 days (0%)</td>
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Usage hours 240 hours 38 minutes

Average usage (total days) 6 hours 30 minutes
Average usage (days used) 9 hours 15 minutes
Median usage (days used) 9 hours 25 minutes

AirSense™ 10 AutoSet™ for Her

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<td>EPR level</td>
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Therapy

| Pressure - cmH2O | Median: 6.1 | 95th percentile: 7.1 | Maximum: 7.5 |
| Leaks - L/min    | Median: 21.1 | 95th percentile: 23.5 | Maximum: 24.3 |
| Events per hour  | AI: 0.1 | R: 0.4 | AHI: 6.1 |
| Apnea Index      | Central: 4.4 | Obstructive: 1.3 | Unanswer: 1.0 |
| RERA Index       | 5.0         |

Cheyne-Stokes respiration (average duration per night) 20 minutes (9%)

SPO2-% Time spent SpO2 < 88%: 18 min

Usage - hours

Charts showing usage hours over time.
### Statistics available in the ResMed AirView Compliance Report

<table>
<thead>
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<th>CPAP</th>
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### Setting Parameters

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Acceptable Mask Leak

Leak Identification

Intentional Leak

Unintentional Leak

TOTAL FLOW = Intentional + Unintentional

Leak (or Flow) is proportional to Pressure
What is a Large Mask Leak?

- **Large Leak Levels occur @ > 2 times the average mask exhalation port leak**
- Considered to be in “Large leak” if threshold exceeded **for greater than 1.5 minutes**.
- A light green hash mark on Mask Leak graph indicates a large leak has occurred.
What Is Acceptable Mask Leak?

Total Leak (LPM)

Min in Large Leak
145.0 mins

% of Night in Large Leak
57.8 % of Night

Average Leak
93.0

Min in Large Leak
1.0 mins

% of Night in Large Leak
0.2 % of Night

Average Leak
36.0
What happens with Auto and a Large Leak?

**Large Leak Levels occur @ > 2 times the average mask exhalation port leak**

- “Large Leak” cleared when the leak level falls below threshold for more than 1.5 minutes.
- **Drops pressure 1 cm every two minutes** until large leak condition is cleared.
Should the Leak Be Treated?

- Is the patient symptomatic?
- Does the patient or the spouse complain that the leak wakes them up at night?
- Does the patient limit the time of use secondary to the leak?

- PAP devices decrease pressure when large leaks are detected for over 1.5 minutes.
- Do not increase pressures to address the leak.
- Large leak is an indication of mask fit issues requiring correction.
I Feel Better Since I Started PAP Therapy, But My Husband Tells Me I Am Still Snoring

Fixing Mask Leak May Help With Snoring

Adding a Chin Strap May Help to Reduce Snoring

Change to a Full Face Mask

Check Mask Fit
Advanced Event Detection

Identification of complicated and changing conditions that may indicate alternative therapy

No Algorithm Response
(CA) Clear Airway Apnea

Periodic Breathing

Hypopnea

Vibratory Snore

(OA) Obstructed Airway Apnea

RERA

Flow Limitation

Mask Fit Indicator
Advanced Event Detection

Identification of complicated and changing conditions that may indicate alternative therapy

Periodic Breathing such as Cheyne-Stokes Respiration

- Waxing and waning breathing pattern repeating itself between 30 and 100 sec
- The nadir is characterized by at least a 40% reduction in airflow from baseline
- The pattern must be present for several minutes
Advanced Event Detection

Identification of complicated and changing conditions that may indicate alternative therapy

This Airway is Obstructed

This Airway is Clear
Advanced Event Detection

Identification of complicated and changing conditions that may indicate alternative therapy

OA: Obstructed Airway Apnea

CA: Clear Airway Apnea

OA: Obstructed Airway Apnea
Troubleshooting

- Detailed download not available
  - Review the patient’s history
  - Review Clinical Outcomes (Epworth Sleepiness Scale, FOSQ, Snore Outcomes Survey, etc.)

- Improve Usage
  - Work on improving comfort
  - Change type of Interface

- PAP Adjustment Period
  - Urge patient to replace the mask following awakenings
  - Wear device during naps
  - Place patient on a trial sleep medication
Attention To:
- Hours of use
- AHI
- Snoring
- Leak
Doctor, I’m Still Sleepy

I SLEPT FOR THE LAST 13 HOURS

& I'M STILL SLEEPY

memegenerator.net
Still Sleepy on PAP?????

- Increase the PAP Pressure
- Consider change to AutoPAP at set range to determine best pressure
  - Choose maximum IPAP
  - Choose minimum EPAP
  - Choose maximum range between IPAP and EPAP
- Consider changing to BPAP
  - Set inspiratory pressure—resolves snoring and hypopnea
  - Set expiratory pressure—resolves apnea
Engage Patient in Their Therapy

Philips SleepMapper
Resolve Problems with PAP Usage

On Top of The World