

양압치료 추적관리 및 관리



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양압치료 추적관찰 및 순응도 측정

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양압기 치료 순서

1. 양압치료 대상 환자 선택
2. PAP 기기의 선택 ; CPAP, APAP, BiPAP
3. CPAP pressure titration
4. 환자교육, 처방내용, mask fitting
5. 양압 치료 추적관찰 및 순응도 측정

양압치료 대상 환자 선택

- CPAP 적응증
 - Standard: Moderate to severe OSA; AHI>15
 - Optional
 - Symptomatic Mild OSA
 - Improving quality of life
 - decreasing BP in drug-resistant hypertensive OSA
- Autopap 적응증
 - CPAP intolerant moderate to severe OSA
 - 동반질환(CHF, COPD, central apnoea syndrome, hypoventilation syndrome)이 없는 moderate to severe OSA환자에서 titration study없이 사용할 때
- BiPAP 적응증
 - CPAP intolerant OSA
 - 고압이 필요하여 환자가 내쉬기 힘들 때

Pressure Titration

- Decision of control of the patient's obstructive respiration
 - low (preferably <5 per hour) RDI
 - a minimum sea level SpO2 above 90%
 - a leak within acceptable parameters
- Grading of titration
 - Optimal titration
 - RDI<5/hr for at least 15 minutes
 - Including supine REM sleep
 - not continually interrupted by spontaneous arousals or awakenings
 - Good titration
 - RDI ≤10 or 50% decrease if baseline RDI<15
 - Including supine REM sleep
 - not continually interrupted by spontaneous arousals or awakenings
 - Adequate titration
 - overnight RDI ≤10 per hour but does reduce the RDI by 75% from baseline especially in severe OSA patients
 - Optimal or good titration criteria without supine REM sleep

양압기 치료의 목표

- 수면무호흡증의 발생을 방지
 - 기준: RDI<5
- 수면무호흡증과 관련된 증상의 개선 또는 제거
 - 주간과다졸림증
 - 피로, 무기력
 - 주의 집중력, 의욕, 기억력 감퇴
- 수면무호흡증과 관련된 장기합병증의 예방
 - 고혈압, 당뇨병, 고지혈증, 대사증후군
 - 허혈성 심장질환의 예방
 - 뇌졸중의 예방
 - 알츠하이머 치매 위험도 감소

장기간 사용 여부의 확인 순응도; Compliance

- Criteria of minimum compliance
 - at least four hours a night
 - for five nights a week.
- Failure rate: 29-83%, reported
- The patient's age, sex, and socioeconomic status have been ruled out as having some bearing on compliance.
- The patient's feelings of stress, anger, anxiety, or depression did not affect CPAP compliance.

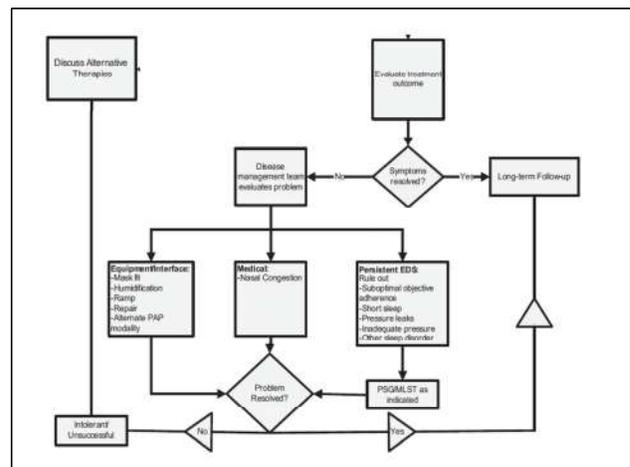
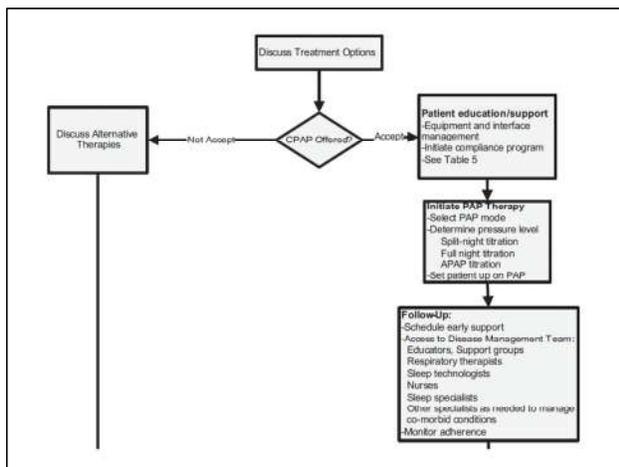
Factors affecting compliance

- A higher AHI tend to be more compliant
- Compliance tends to be less
 - Those who do not understand the health-related problems of apnea
 - Those who refuse CPAP during titration
 - Those who complain of claustrophobia
 - Those patients who are self-conscious and reluctant to wear the CPAP interface in the presence of their sleeping partner
- Side effects and problems with the patient-CPAP system
 - nasal drying, increased congestion, sneezing, rhinorrhea, sinusitis, conjunctivitis, claustrophobia, pressure sores on the bridge of the nose, difficulty exhaling, allergic reaction to the materials in the mask, air swallowing with gastric distension, machine noise, and skin creases the next morning.

<http://www.sleepreviewmag.com>

Improving CPAP Compliance

1. Early and ongoing education
2. Rapid initiation of CPAP therapy; titration in split study or rapid titration schedule.
3. Immediate individual follow-up
4. Monitoring compliance and efficacy
5. Long-term support and trouble-shooting
6. Mask fit and choice of interface
7. Nasal congestion, steroids/antihistamines
8. Humidification
9. Choosing the right device
10. Group support



Followup Schedules

1. Early Followup (24-48 hours, 1 week, 2 weeks)
2. Ongoing Followup (6 weeks, 6 months)
3. One-Year Followup

<https://www.sleepresolutions.com/blog/what-happens-during-a-cpap-followup>

Checking-up Issues

1. **Compliance:** how well you are following your CPAP therapy program
2. **Adherence:** how well you are "sticking to it," and any issues that may be preventing you from doing so
3. **Mask Fit:** how well your CPAP mask works for your unique needs
4. **Communication:** giving honest feedback on all aspects of your CPAP therapy program, including your perceptions about the equipment, your body's responses, etc.

Early Follow-up

- Within 24-48 hours, using phone calls
- Mask comfort issues.
 - Is your mask comfortable?
 - Are you feeling any chafing?
 - Are you having trouble keeping it on while sleeping?
- Equipment issues.
 - Is the air pressure too weak or too strong?
 - Do you wake up with dry nostrils, mouth, or throat?
 - Is the length of tubing interfering with your sleep?
 - Is the noise of the CPAP distracting?
- Medical issues.
 - Are you feeling more rested?
 - Has your daytime sleepiness improved?
 - Are you still snoring or suffering sleep apnea, where you stop breathing?
- Miscellaneous issues
 - Does your bed partner have any concerns or questions?

At the 1-week follow-up

- 1) Attempt switching the size, style, or type of mask you are using
- 2) Adding or removing padding;
- 3) Changing to a different model of CPAP/Bipap machine
- 4) Other non-equipment recommendations on subjects
 - Good sleep hygiene habits
 - Attendance at support groups
 - Desensitization techniques to wearing a mask
 - Tips for falling asleep, and extending sleep
 - Suggestions on how family/bed partners may assist

Ongoing Follow-ups

- At 2-week, 6-week, and 6-month
- Check up of machine records, removable memory chip
 - evaluation of machine effectiveness and compliance
- Checkup issues
 - Proper cleaning of PAP unit and accessories
 - Checking for fit of mask
 - Equipment and supply replacement recommendations
 - Weight gain, weight loss, alcohol usage while using your CPAP

Yearly Follow-up

- Any physical changes that may require a new mask
- Maintenance check on your CPAP equipment, ensuring it is functioning properly
- Information about new equipment, including masks and CPAP machines
 - Machine warranty: 20,000 hours, over 5years

수면다원검사 재검이 필요한 경우

- 증상이 사라지지 않을 때
 - 주간졸림증이 양압기로 해결되지 않으면 수면 무호흡증이 Narcolepsy나 idiopathic hypersomnia와 동반되었을 가능성이 있음.
- 생활패턴이나 건강상의 변화가 있을 때
 - 최근의 급격한 체중의 감소나 증가
 - 다른 내과적 질환이 나타날 때: 뇌졸중, 심근경색증, 심부전증
- 증상이 다시 나타날 때
 - 코를 다시 골기 시작할 때
 - 수면 중 헐떡거림, 숨막히는 증상, 숨이 멈추는 증상이 생길 때
 - 다른 무호흡증 주간 증상이 나타날 때: 아침 두통, 피로감, 집중력저하, 기억감퇴, 우울감, 감정이 날카로워질 때

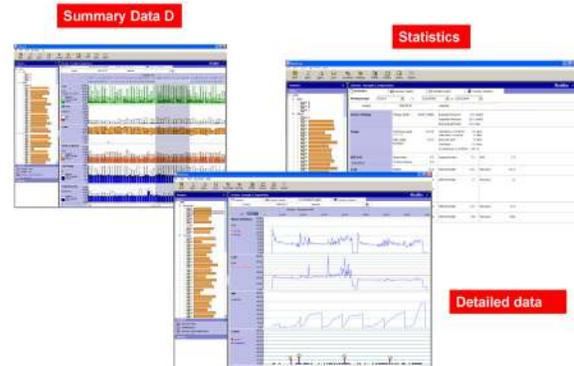
<http://www.alaskasleep.com/>

CPAP기기의 사용 데이터 확인

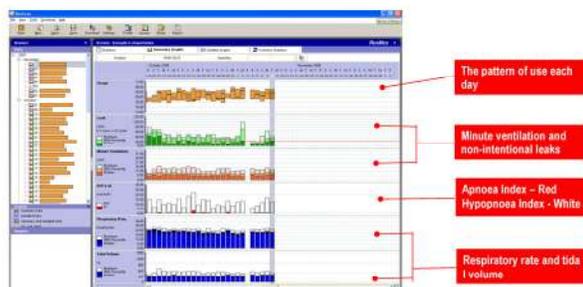
- Resmed
 - ResScan
- Phillips
 - EncorePro 2
- Fisher & Paykel
 - InfoSmart™



Three main screens give an overview of the data

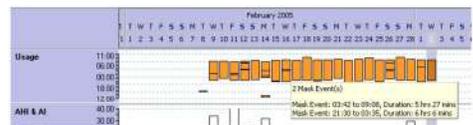


Summary Data



Usage data: Gives an indication of patient's sleep hygiene and whether they are observing a regular bedtime
Minute ventilation: Allows clinician to see whether the patient is having variations in minute ventilation, either inter or intra-night.
Leak: An acceptable leak is one where the 95th centile remains <24l/min and the median leak <12 L/min.
AHIAI: The residual apnoea hypopnoea index

What is the usage?



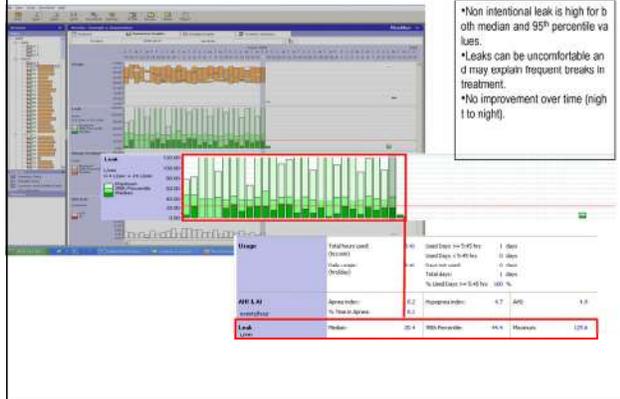
Usage data: Gives an indication of patient's sleep hygiene and whether they are observing a regular bedtime

What is the pattern of usage :

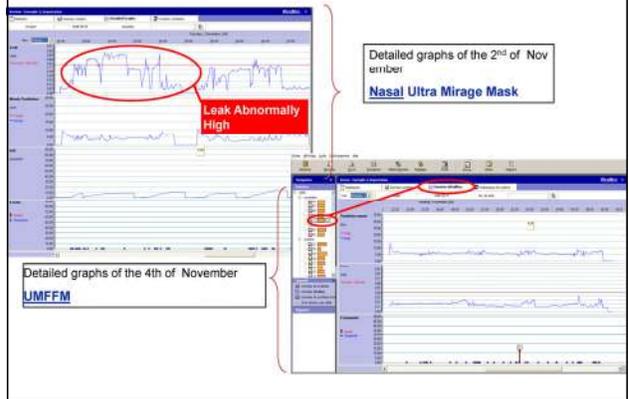
- Every day
- The length of each session - is it regular, is it increasing?
- Breaks in treatment and their length
- Daytime usage - is this a nap or are they requiring extra support?



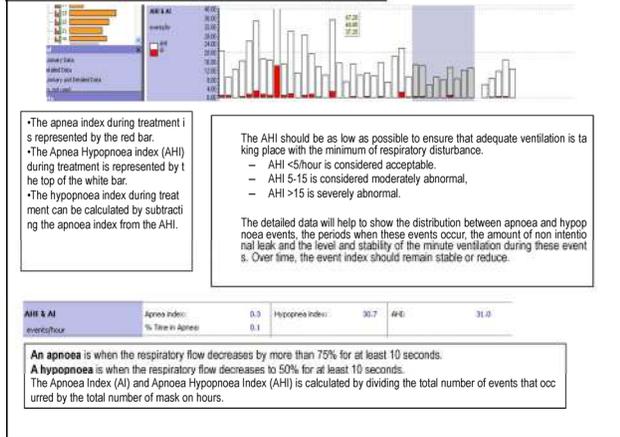
Mouth Leak: Summary and statistics Data



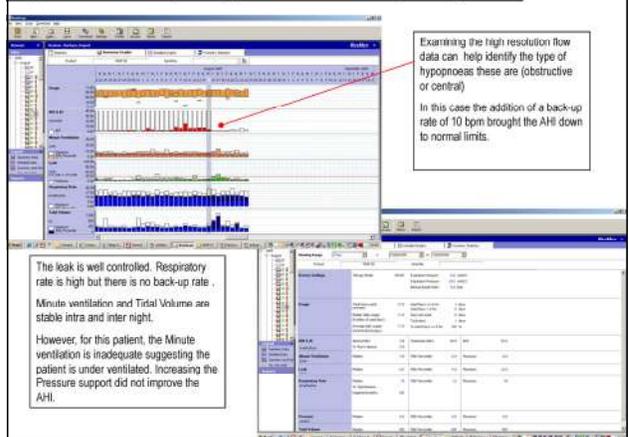
Mouth Leak correction. Fitting a full face mask



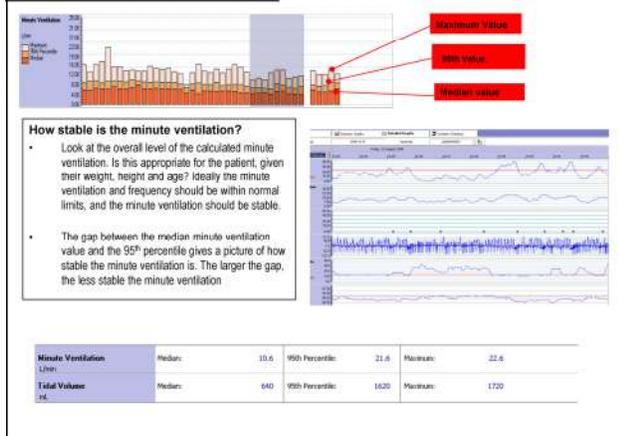
What is the Apnoea Hypopnoea index (AHI)?



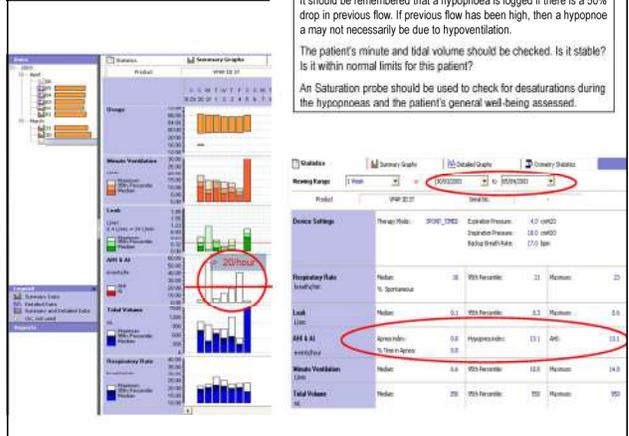
High AHI – Poor inspiratory effort or lack of respiratory drive

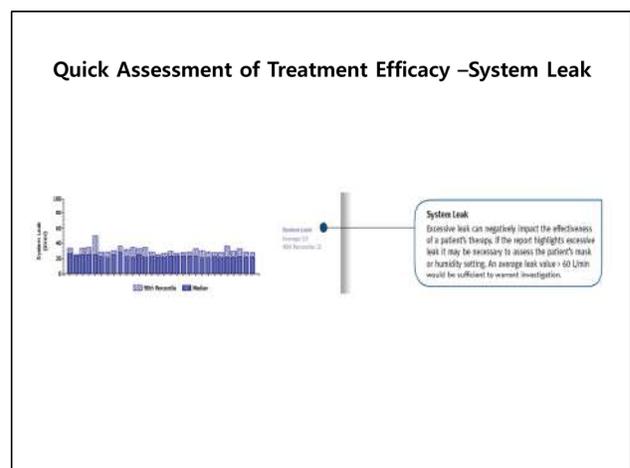
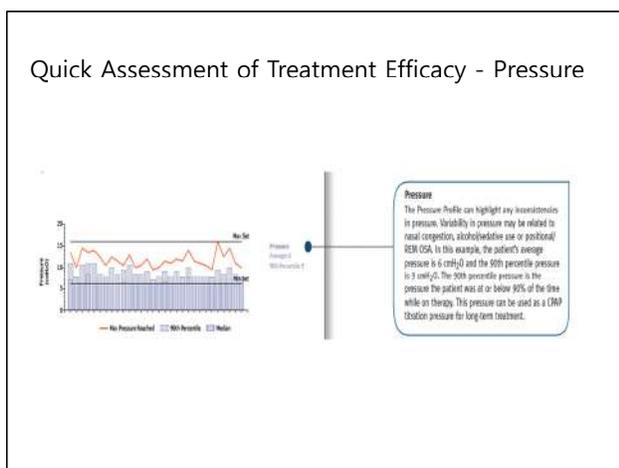
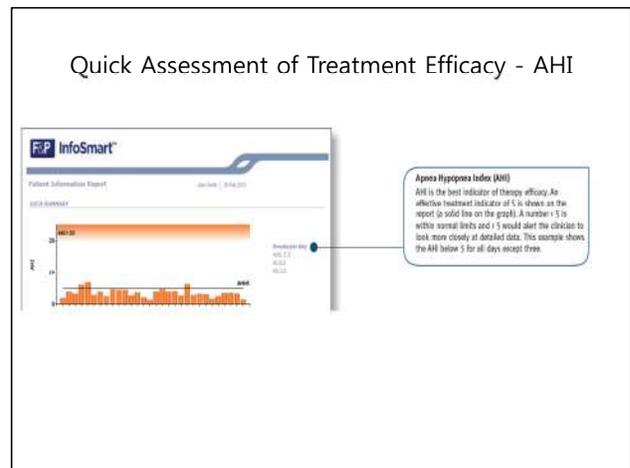
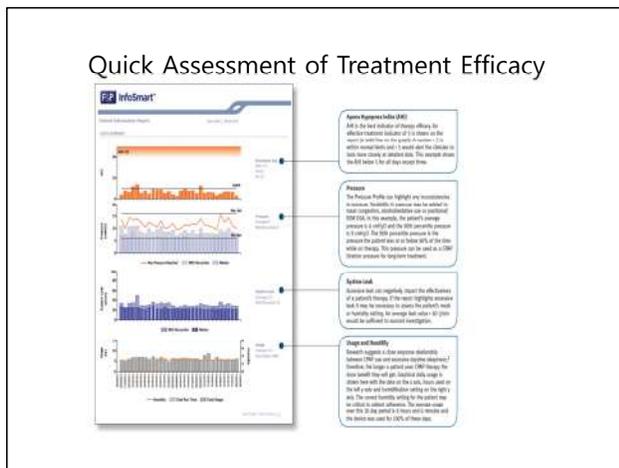
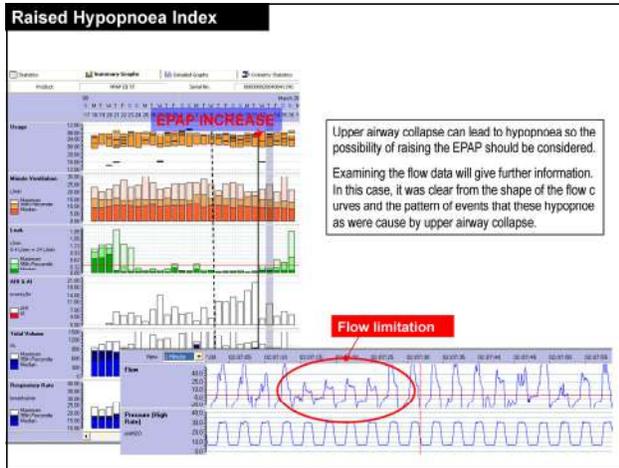


What is the minute ventilation?



Raised Hypopnoea Index





Quick Assessment of Treatment Efficacy – Usage & Humidity

Usage and Humidity
 Research suggests a close inverse relationship between CPAP use and excessive daytime sleepiness.² However, the longer a patient uses CPAP therapy the more benefit they will get. Graphical daily usage is shown here with the data on the x axis, hours used on the left y axis and humidification setting on the right y axis. The correct humidity setting for the patient may be critical to patient adherence. The average usage over this 30 day period is 5 hours and 6 minutes and the device was used for 100% of these days.

Interpreting Reports – Compliance Summary

Current Prescription
 The latest prescription setting is shown for reference.

CPAP Patterns of the Patients of CPAP use are displayed, helping to track patient sleep patterns.

Prescription Change
 Signaling a color bar, the associated new prescription is detailed under the Prescription column.

Interpreting Reports – Assessing Pressure

Increasing the maximum pressure may optimize therapy.

Time and Events at Pressure
 This table demonstrates the time spent at each pressure and the associated events. This table will only appear on this report if the device is set to Auto for that night's treatment.

Interpreting Reports – Leak Management

Pressure Profile
 The pressure profile demonstrates the pressure variations throughout each night (including minimum and maximum pressures). Prescription pressures are indicated by the horizontal black lines.

System Leak Profile
 The System Leak Profile demonstrates the leak levels throughout each night.

High Leak
 During periods of high leak the event data reported may not be accurate. Note: the pressure will remain constant during periods of excessive leak to prevent unnecessary pressure increases.

The Encore Report

Read and adapt treatment

Philips Korea Sleep & Respiratory Care

Report Details

Observations/Compliance Report

- Patient information
- Device settings (mode / Flex / humidifier)
- The daily hours of usage are shown by the vertical bars:
 - **Green** (duration of therapy \geq than that prescribed)
 - **Black** (blower on, but no patient breath detected)
 - **Red** (duration of therapy < than that prescribed)
- Profiles of P90 and PAverage for the therapy sessions over time period

Report Details Patterns of Usage

Total hours of usage is shown in hours:mins (ex. 4:07)

- The time in the left hand column indicates the total amount of time the patient was connected to the device
- The time in the right hand column indicates the total amount of time the blower was on

Poor night: 4:48 / 7:53
= Approximately for 3h05, the blower was on, but the device was not detecting patient breath

Report Details Long Term Trend

Trends over long term, for a specific period as indicated :

- Pressure profile, settings and pressure change , P90
- Average indices for residual events: CSR, CA, OA, H, RE, FL, Sn, AHI
- % of time in large leak is important!

Evaluates a change in the patient's clinical status

Report Details Daily details & statistics

Details of data recorded throughout one night/usage:

- Pressure profile & prescription window
- Average pressure, P90
- Residual events/hr: CSR, CA, OA, H, RE, FL, Snore, AHI
- Mask leak, % time in large leak
- Leak profile
- Daily events per hour table
- Events/pressure: visible or not, depending of the settings (Settings tab calculation)

Report Details Summary report

The last page summarises the data for the usage period. Statistics include:

- ✓ Compliance
- ✓ Therapy
- ✓ Significant leakage values per day
- ✓ Residual average AHI