

A Summary of:

Heated Humidification or Face Mask to Prevent Upper Airway Dryness During Continuous Positive Airway Pressure (CPAP) Therapy

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TAKE HOME POINTS

- Nasal CPAP decreases the relative humidity of the air that is received by the patient during treatment.
- Mouth leaks cause a decrease in the air's relative humidity during CPAP.
- Heated humidification prevents the decrease in relative humidity of inhaled air caused by CPAP and significantly reduces the decrease in relative humidity caused by a mouth leak.
- A full face mask will prevent any reduction in the relative humidity of inspired air caused by CPAP and will also prevent any decrease caused by mouth leak.
- However, any benefit gained in increased compliance due to reduction of nasal symptoms during CPAP, using a full face mask, is countered by lack of compliance due to mask discomfort (patients preferred the nasal mask).

AIM

To evaluate the way nCPAP influences the relative humidity of inspired air.

To assess the impact on relative humidity by the addition of a heated humidifier or a full face mask to the CPAP circuitry.

METHOD

The first study was performed on eight patients. Relative humidity and temperature were recorded during a full night polysomnography. nCPAP was administered with room air for the first half of the night and heated humidification was added to the circuit during the second half of the night. Mouth leak was also measured and was reported as a percentage of the total sleep time.

The second study was conducted during the day on 17 patients. Here the effects of nasal CPAP, with or without heated humidity, were compared with the effects of a full face mask on relative humidity and temperature of inspired air. The protocol had 7 continuous steps:

- 1) patients had to breath normally (30 mins)
- 2) use nasal CPAP with mouth closed (30 mins)
- 3) simulate a mouth leak (5 mins)
- 4) use CPAP with humidification with mouth closed (30 mins)
- 5) simulate a mouth leak (5 mins)
- 6) use CPAP with full face mask mouth closed (30 mins)
- 7) simulate a mouth leak (5 mins).

RESULTS

Study 1:

Mean relative humidity with nCPAP alone was significantly lower than that received on CPAP with a heated humidifier.

Mouth leaks were observed for approximately 31% of the total sleep time. During mouth leak there was a dramatic reduction in relative humidity of the inspired air when compared with nCPAP without a mouth leak. Heated humidification decreased the consequences of mouth leak by increasing relative humidity to the levels observed with dry CPAP with the mouth closed.

There was no statistical difference in temperature between nCPAP with or without heated humidification.

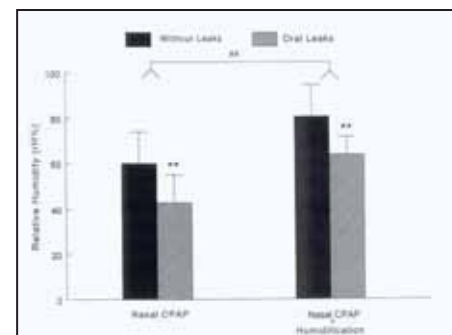


Figure 1: Nocturnal RH% (mean \pm SD) in 8 OSA patients during nCPAP with and without HH, with and without mouth leaks. ** $p < 0.01$ vs without leaks, ## $p < 0.01$ vs CPAP without humidification

Study 2:

Compared with control period of normal breathing the relative humidity was decreased when nCPAP was applied. When a mouth leak was introduced the relative humidity again markedly decreased. (Figure 2)

The addition of a heated humidifier prevented any change in relative humidity when the mouth was closed. There was a small decrease in relative humidity when a mouth leak was introduced but this did not reach the level recorded without humidification (Figure 2).

Using a full face mask maintained the relative humidity of the air so that neither the introduction of CPAP nor mouth leak caused a decrease (Figure 2).

There were no statistical differences in temperature between nCPAP with or without heated humidification on nasal or full face mask.

Although most patients confirmed that the full face mask reduced nasal symptoms, only 2 out of the 17 patients opted to continue its use. Most found the mask too uncomfortable and a poor fit.

CONCLUSIONS

Inhaled air dryness during CPAP therapy can be significantly reduced by heated humidification, even during mouth leaks.

The full face mask can prevent any changes to relative humidity during CPAP but due to lack of comfort the majority of patients would not comply to their treatment with this type of mask.

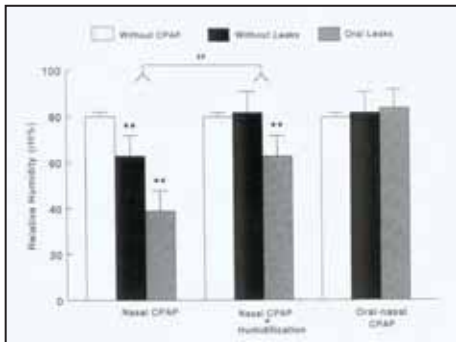


Figure 2: Daytime RH% (means \pm SD) in 17 OSA patients during nCPAP with and without mouth leaks, with and without HH or an oro-nasal mask