

**PERFORMANCE OF AUTO-TITRATING CPAP DEVICES
IN A SIMULATION OF
VARIED PATIENT BREATHING**

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BACKGROUND

Automatic titrating CPAP devices for treatment of sleep apnea have been introduced in recent years. These devices monitor patient breathing, and respond to a variety of perceived patterns by adjusting the pressure up or down as deemed appropriate. Several clinical studies have demonstrated the effectiveness of these devices, yet little is known about the mechanisms they use to determine treatment, or differences between devices.

METHODS

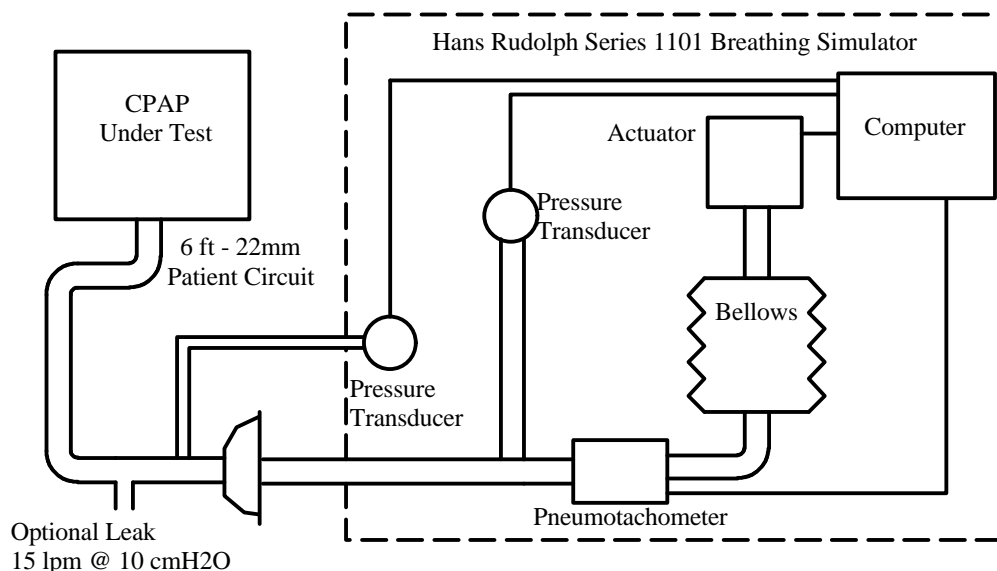
Four commercially available “auto-CPAP” products were challenged with a mechanical breathing simulator (Hans Rudolph Inc. Series 1101). Breathing patterns were recorded on patients undergoing polysomnographic study. The resulting flow waveform was ‘played back’ by the breathing simulator. Four patient recorded waveforms were selected for a unique quality, normal breathing, flow limited or flattened waveform, hypopnea and apnea.

The devices were subjected to the patterns for 30 minutes each, with a period of normal breathing (30 minutes) interspersed between the other patterns. Pressure at the mask was filtered to remove intra-breath variations, and recorded every 20 seconds.

The test was repeated with the addition of an ‘inadvertent’ leak, before the mask. The leak was calibrated to 15 lpm at 10 cmH₂O.

UNITS TESTED

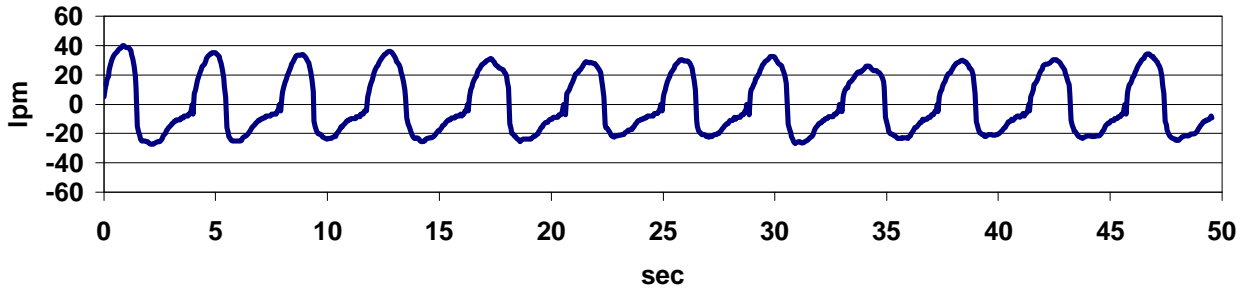
- AutoSet T - ResMed
- GoodKnight 418P - Puritan Bennett
- Tranquility Auto – Respirationics
- AutoAdjust LT - DeVilbiss



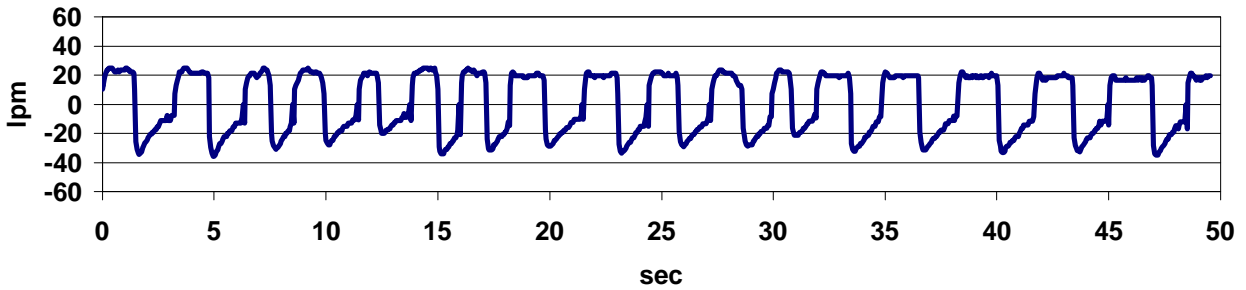
Test Setup

BREATHING PATTERNS

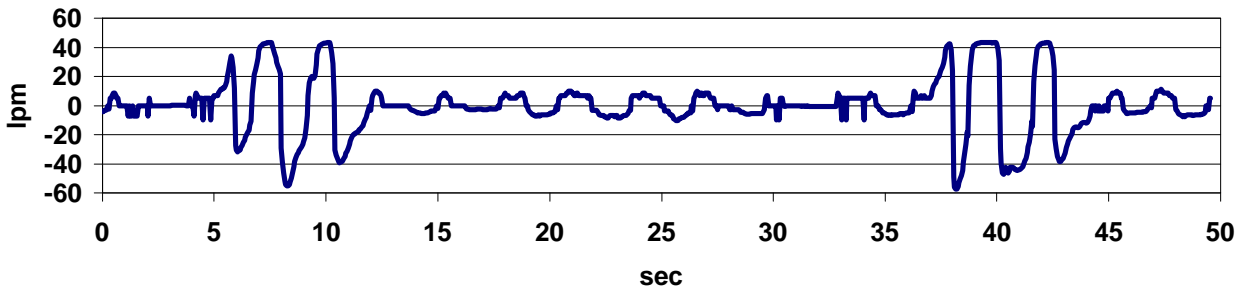
'NORMAL'



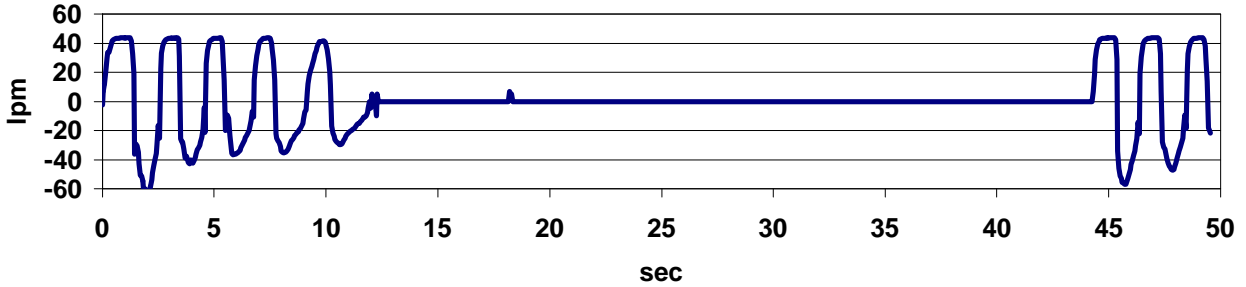
'FLOW LIMITATION'



'HYPOPNEA'

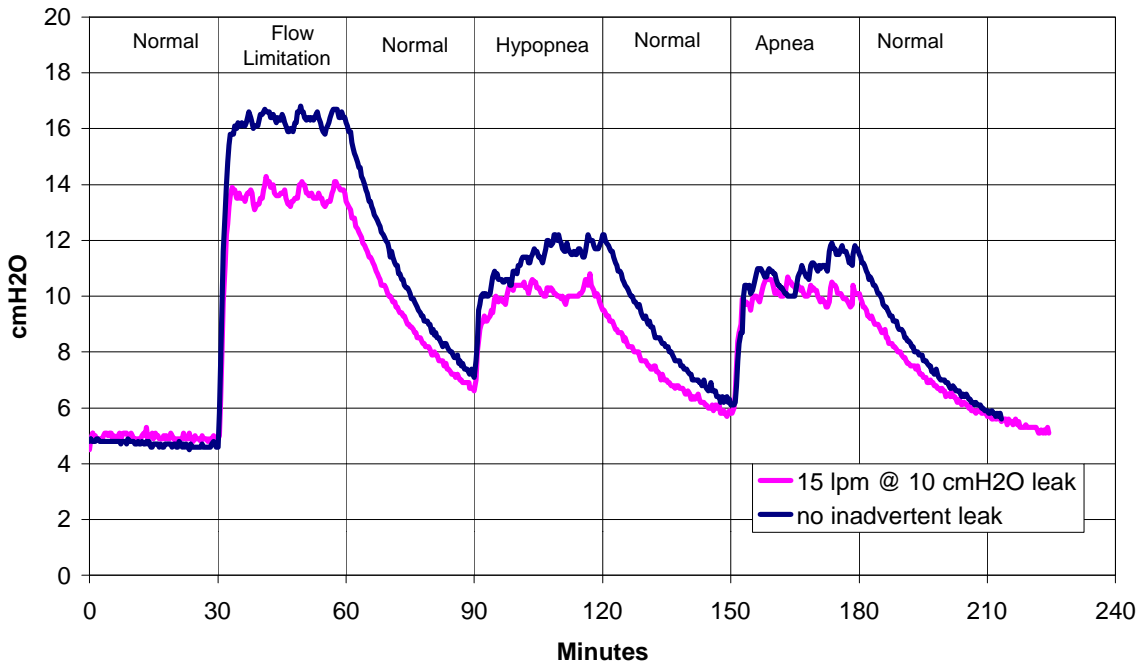


'APNEA'

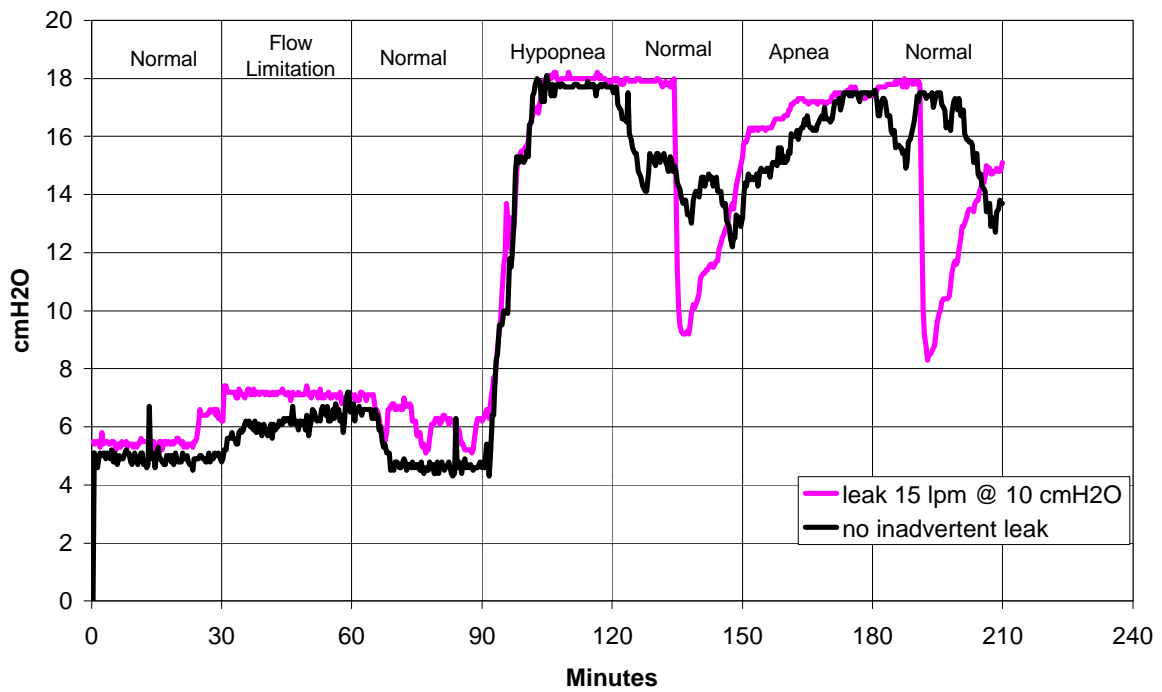


RESULTS

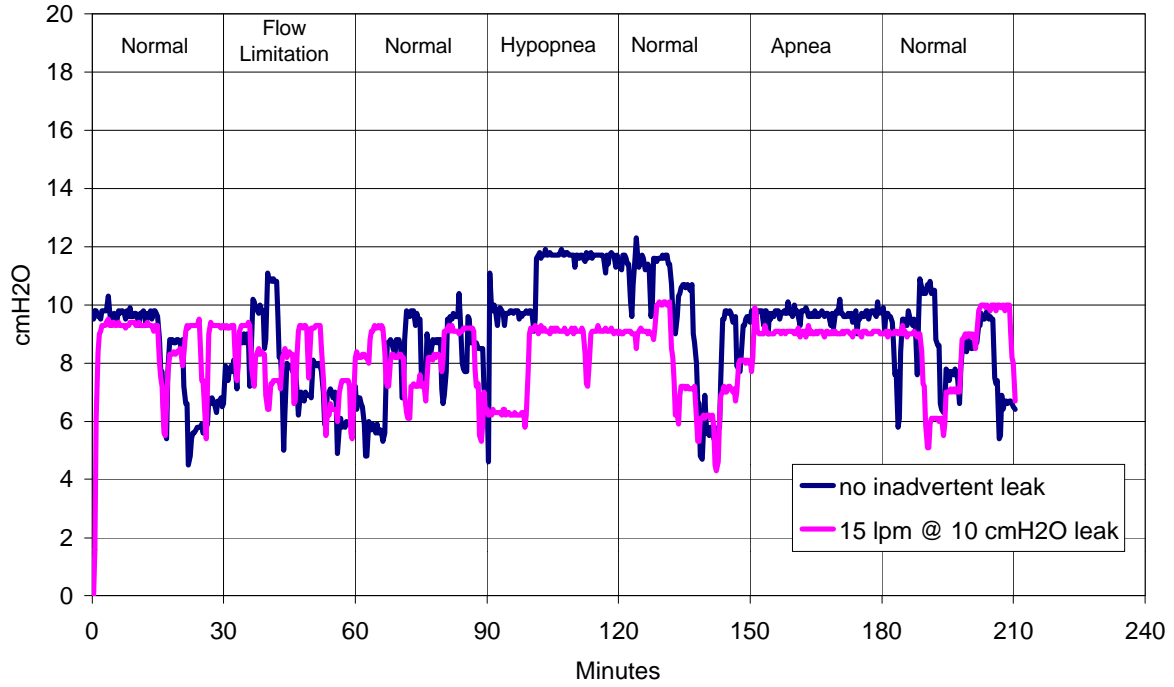
AutoSet T



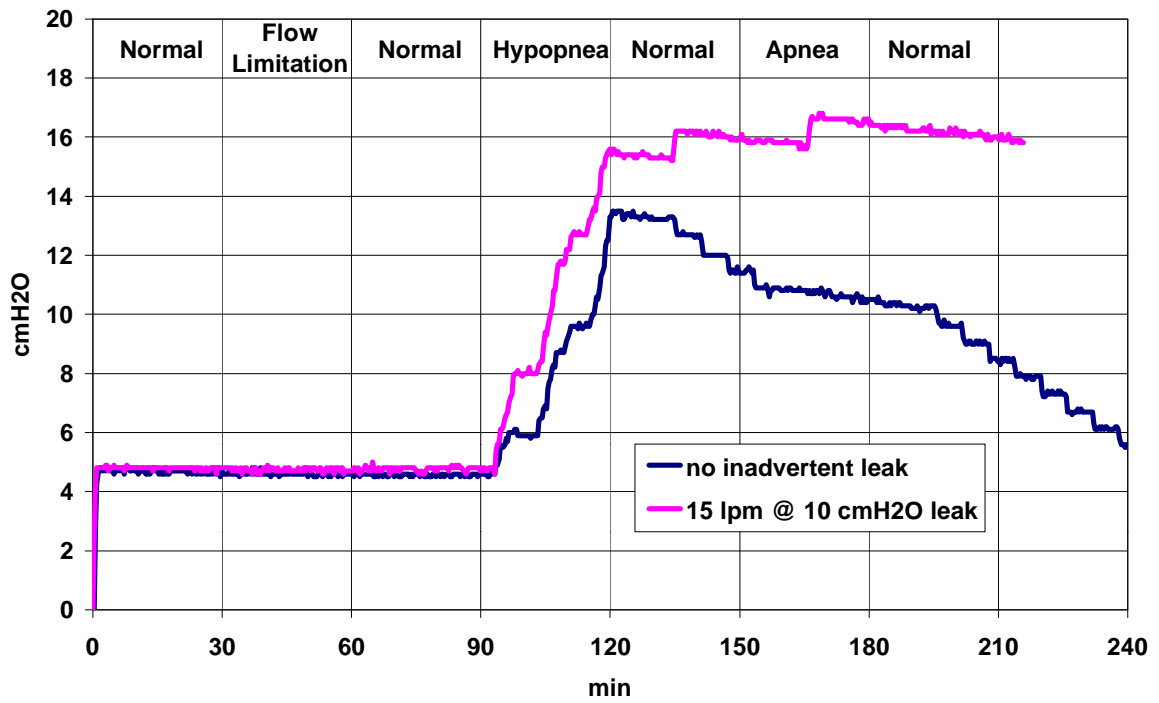
GoodKnight 418P



Tranquility



DeVilbiss AutoAdjust LT



DISCUSSION

Of the myriad of factors evaluated by 'auto-CPAP' devices, only four patterns were tested. In addition, patient adaptation was not allowed for.

CONCLUSION

Devices varied markedly in their response to patient breathing patterns.

All units responded differently when an 'inadvertent' leak was applied.

This data does not suggest that any one unit is 'better' than another.

There is lack of standardization in the methods employed by auto-CPAP devices.

It is expected that different patients will have varied experience depending on which device they are treated with.