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[Intervention Review]

# Pressure modification for improving usage of continuous positive airway pressure machines in adults with obstructive sleep apnoea

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## ABSTRACT

### Background

Continuous Positive Airways Pressure (CPAP) is considered to be the cornerstone of therapy for obstructive sleep apnoea (OSA). However, compliance with this treatment is frequently poor, which may lead to ongoing symptoms of sleep disruption, daytime sleepiness and poor waking cognitive function. Mechanical interventions which involve changing the way that positive pressure is delivered, and the addition of humidification, might improve compliance.

### Objectives

To determine the efficacy of pressure level modifications and additional humidification in increasing CPAP machine usage.

### Search methods

We searched the Cochrane Airways Group Specialised Register (September 2008).

### Selection criteria

Randomised controlled trials (RCTs) assessing interventions to improve compliance with CPAP usage. Control groups received fixed pressure CPAP.

### Data collection and analysis

Two authors assessed articles for inclusion in the review and extracted data. We made attempts to obtain additional unpublished data from the trialists.

### Main results

Forty-five studies met the inclusion criteria (1874 participants). **Auto-CPAP (30 studies, 1136 participants):** a statistically significant difference in machine usage of 0.21 hours/night (0.08 to 0.35) was observed in favour of auto-CPAP from cross-over studies. This difference is of questionable clinical significance. Pooled effect estimates from parallel group trials detected a similar sized difference for average nightly machine usage, but this was not statistically significant. Evidence from parallel group studies did not identify a statistically significant difference between pressure modes in Epworth Sleepiness Scores, but there was an overall reduction of 0.64 units with cross-over studies (-0.12 to -1.16) in favour of auto-CPAP. Parallel group studies did not identify a significant difference. More participants preferred auto-CPAP to fixed CPAP where this was measured. **Bi-level PAP (six studies, 285 participants):** no significant differences were observed in machine usage. One small study found no difference in preference. **C-Flex (six studies, 318 participants):** no significant

difference was observed in machine usage. **Humidification (three studies, 135 participants):** there were conflicting findings between the studies. Two parallel group trials found no significant difference in machine usage, whereas a cross-over study found a significant difference.

### Authors' conclusions

Improvement in average machine use of auto-CPAP was superior in studies with a cross-over design; the point estimate in parallel group trials was similar, but did not reach statistical significance. It is uncertain how use of machines in study settings relates to 'real world' use. Where preference was measured participants preferred auto-CPAP to fixed pressure CPAP. Further studies are required to assess the evidence for Bi-PAP, C-Flex™ and humidification. The studies assembled were characterised by high machine usage in the control groups, and low withdrawal rates. Future studies need to consider the effects of treatment in participants with more mild disease, and those who struggle to accept therapy despite persistent symptoms.

### PLAIN LANGUAGE SUMMARY

#### The effects of different pressure delivery interventions for improving use of continuous positive airway pressure in the treatment of obstructive sleep apnoea

Obstructive sleep apnoea (OSA) is caused by intermittent airway closure during sleep such that airflow stops despite continued efforts to breathe. Continuous positive airways pressure (CPAP) can be an effective treatment for this condition but requires regular use, and many people cannot tolerate it, or do not use it every night. Attempts to improve compliance with treatment have included changes to the mechanical devices used to deliver airway pressure, such as auto-CPAP, bi-level PAP, expiratory pressure relief and additional humidification. We examined the evidence for these different approaches. None led to large increases in hours of use, though when asked, most participants expressed a preference for the auto-CPAP machine rather than fixed pressure. When bi-level PAP and fixed CPAP were compared, initial patient acceptance was greater for bi-level PAP in one study, but long-term usage in those accepting treatment was similar for both devices. Expiratory pressure relief (C-flex™) did not show improvement in hours of use and symptom scores. According to the evidence currently available, compliance with positive airway pressure therapy for OSA is similar, irrespective of the mode of delivery (e.g. fixed, auto-titrating or bi-level device).