

# Oral appliances for the treatment of snoring and obstructive sleep apnea: a review (Structured abstract)

Schmidt-NowaraW, LoweA, WiegandL, CartwrightR, Perez-GuerraF, MennS, . Oral appliances for the treatment of snoring and obstructive sleep apnea: a review. Sleep 1995;18(6) :501-510.

## Record status

This record is a structured abstract written by CRD reviewers. The original has met a set of quality criteria. Since September 1996 abstracts have been sent to authors for comment. Additional factual information is incorporated into the record. Noted as [A:.....].

## Author's objective

To evaluate the effectiveness of oral appliances for the treatment of snoring and obstructive sleep apnoea (OSA).

## Type of intervention

Sleep disorders

## Specific interventions included in the review

Oral appliances for snoring and OSA including mandibular advancement device (MAD), tongue-retaining device (TRD) and nocturnal airway patency device (NAPA).

## Participants included in the review

Adults with OSA; predominantly male, middle-aged and overweight, where diagnosis of OSA was validated with polysomnography in all but one study.

## Outcomes assessed in the review

Percentage improvement in snoring (Apnea-Hypopnea Index, AHI), sleep apnoea improvement, sleep, sleepiness and side-effects.

## Study designs of evaluations included in the review

Case series with comparisons of conditions before and after treatment, and case reports were included.

## What sources were searched to identify primary studies?

MEDLINE was searched from 1966 to July 1994 using the search terms 'orthodontic appliances', 'activator appliances', 'sleep apnea syndromes' and 'snoring'. Experts were contacted for additional material. Abstracts and review papers were not considered.

## Criteria on which the validity (or quality) of studies was assessed

The studies were evaluated according to a recommended validity criteria by Cook et al. (see Other Publications of Related Interest no 1). The authors do not state how the papers were assessed for validity, or how many of the authors performed the validity assessment.

## How were the inclusion criteria applied?

The authors do not state how the papers were selected for the review, or how many of the authors performed the selection. The studies were selected principally from peer-reviewed journals, which describe the patients, treatments and measurements in sufficient detail to allow reproduction.

## How were the data extracted from primary studies?

The authors do not state how the data were extracted for the review, or how many of the authors performed the data extraction.

### **Number of studies included**

Twenty-one studies (n=304) were included: 2 case reports and 19 case series.

### **How were the studies combined?**

The studies were combined by a narrative review.

### **How were the differences between studies investigated?**

The authors do not state how differences between the studies were investigated.

### **Results of the review**

Snoring.

Improvement in 73 to 100% of patients was reported in all 9 studies; these were based mainly on subjective self-reporting by patients and their bed partners.

Sleep Apnoea.

All reports showed an improvement in the average AHI when using an appliance. Of the 271 cases with data reported in a form suitable for calculation, the mean AHIs before and with treatment were 42.6 and 18.8, respectively, an average reduction of 56%. The degree of improvement varied. Although 70% of the patients in these studies showed at least a 51% reduction in AHI, many did not return to normal levels, whilst some patients showed no improvement or became worse. Fifty per cent of patients achieved normal breathing (defined as an AHI of less than 10 with treatment), and 39% of patients with an initial AHI of greater than 20 remained above that level with treatment. In the 14 studies presenting data for individual patients, 20 patients (13%) had a greater AHI with treatment than before.

Sleep and sleepiness.

Polygraphic assessments of sleep before and during oral appliance treatment have shown a reduction in stage I sleep, an increase in slow wave and stage REM (rapid eye movement) sleep, and a reduction in sleep fragmentation, mid-sleep wake time and arousal.

Side-effects.

Excessive salivation and transient discomfort, for a brief time after awakening, are commonly reported with initial use and may prevent early acceptance of oral appliances. Later complications may include temporomandibular joint (TMJ) discomfort and changes in occlusal alignment. Published reports suggest that TMJ pain and occlusal changes are relatively uncommon occurrences but the long-term risk of these complications is not well-defined. Compliance data are limited, but reports have ranged from 50 to 100%.

### **Was any cost information reported?**

The production cost of the device varies depending on whether a dental laboratory is required for custom fitting, or it is a pre-fabricated unit. Typical costs for custom-fitted appliances and service range from \$400 to \$900.

### **Author's conclusions**

Despite considerable variation in the design of these appliances, the clinical effects are consistent. More studies are needed to define the therapeutic role of oral appliances in the spectrum of sleep disorders related to upper airway obstruction.

## CRD commentary

The review provides adequate detail of individual studies. However, the search strategy was limited to MEDLINE. A more extensive search have included other databases, e.g. PsychLIT, plus handsearching and a search for unpublished articles. The inclusion criteria were not explicitly defined. Due to the heterogeneity of interventions, a narrative synthesis seems appropriate but an overall result is difficult to estimate from the analysis of individual study results.

## Other publications of related interest

1. Cook DJ, Guyatt GH, Laupaus A, Sackett DL. Rules of evidence and clinical recommendations on the use of antithrombotic agents. *Chest* 1992;102:3055-115. 2. Wright J, Johns R, Watt I, Melville A, Sheldon T. Health effects of obstructive sleep apnea and the effectiveness of continuous positive airways pressure: a systematic review of the research evidence. *BMJ* 1997;314:851-60.

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## Copyright comments

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# Subject index terms

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