

## Treatment of Sleep Apnea

### Unmet Needs

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Judging by the number of publications and amount of media exposure allocated to sleep apnea syndrome, it is obvious that the awareness of sleep apnea as a major public health problem is no longer restricted to a small group of sleep specialists. Cognizance of the syndrome and its consequences has diffused to larger and larger circles of the medical community. The wide prevalence of the syndrome, its strong association with cardiovascular morbidity and mortality, and the relative ease by which diagnosis can be made have greatly influenced this process. In view of the fact that only 7 to 18% of the estimated 12 to 15 million persons having sleep apnea in the United States have had their conditions diagnosed so far,<sup>1</sup> it can be safely predicted that the number of cases of sleep apnea diagnosed annually will be greatly accelerated in the coming years. Suitable diagnosis and treatment of such a large number of patients is not an easy task. In recent years, continuous positive airway pressure (CPAP) has become the main treatment modality in sleep apnea. There is convincing evidence that effective CPAP treatment can alleviate daytime and nighttime symptoms of the syndrome, such as sleepiness and fatigue, intellectual deterioration, and restless sleep.<sup>2 3 4 5</sup> Furthermore, studies have been carried out demonstrating that CPAP treatment can reduce diurnal and nocturnal BP values, as well as waking levels of sympathetic nerve activity,<sup>6 7</sup> and can acutely reduce plasma noradrenalin levels.<sup>8</sup> Recently, this treatment was shown to be more effective in lowering BP than a sham CPAP treatment.<sup>9</sup>

There is, however, a major drawback in CPAP treatment and that is its relatively low compliance. In spite of its proven efficacy, different studies showed that compliance with CPAP treatment is no more than 60 to 70%; in most cases, nightly use is only approximately 5 h.<sup>10 11</sup> In general, the lesser the severity of the syndrome, the lower the compliance. This emphasizes the need for alternative methods of treating sleep apnea patients. In this issue of *CHEST* (see page 1511), Pancer et al evaluate the efficacy of an adjustable mandibular positioning appliance for the treatment of snoring and sleep apnea. Although there have been several previous publications on the role of oral appliances in treating sleep apnea patients,<sup>12 13 14 15 16</sup> this is the largest study conducted so far. Seventy-five of the 134 patients who were fitted with the dental appliance were restudied by polysomnographic (PSG) recordings after an average of 85 days. Clinical assessment was made in 121 of these patients after an average of 350 days. Overall, there was a significant reduction in the apnea/hypopnea index (AHI) from  $44 \pm 28$  to  $12 \pm 15$  and a reduction in the arousal index from  $37 \pm 27$  to  $16 \pm 13$ . Epworth scores and bedpartners' assessment of

snoring also revealed a significant improvement. In 38 of the 75 patients, sleep apnea was abolished. In these patients, the AHI decreased from a pretreatment level of  $39 \pm 21$  to  $5 \pm 3$ . In an additional 32 patients, there was a significant reduction in the AHI from  $55 \pm 31$  to  $22 \pm 18$ . Although the definition of a responder may be somewhat arbitrary (eg, a 50% reduction in AHI, a decrease in AHI to  $< 5$ , to  $< 10$ , etc.), and the efficacy of the appliance is still inferior to that of CPAP, it is evident that the large majority of patients in this study showed impressive improvement in nocturnal breathing with treatment. While previous studies<sup>15 16</sup> have suggested that the chances of success of oral appliances may be higher in patients with mild to moderate sleep apnea, the results of Pancer et al demonstrated that patients with severe sleep apnea, as well as those with mild to moderate cases, benefited from the device.

While the study provides convincing evidence to support the efficacy of the adjustable appliance in treating sleep apnea, more information is needed on the importance of side effects with this kind of treatment. As in other studies using oral appliances, side effects occurred in 30% of the patients and mostly consisted of nonspecific teeth and jaw discomfort, and excessive salivation. Since the patients in this study could adjust the degree of protrusion themselves, it is not known how many of these side effects were caused by "aggressive" adjustment of the device, and how many were independent of the degree of protrusion. Unfortunately, information about the degree of protrusion was not available for these patients. If, indeed, side effects are caused by an aggressive adjustment, then control of the device should not be left in the hands of the patients. Furthermore, some patients could have set the appliance to be more comfortable and thus remained untreated. Obviously, more information is needed to resolve this question, particularly in long-term treatment.

Another lesson that can be learned from the present study is that the chances of successful treatment of sleep apnea, both with respect to efficacy and with respect to compliance, may be augmented if there is collaboration between sleep specialists and dentists. Too often the diagnosis of sleep apnea syndrome is made independently of treatment; the sleep specialist who diagnosed the syndrome is not involved in its treatment, and he or she has no information about treatment success or failure. Thus, sending a sleep apnea patient to have a dental appliance fitted without monitoring his or her response to treatment and adjusting the treatment accordingly is a recipe for low compliance. Likewise, a CPAP treatment regimen may require adjustments and further titrations in order to ensure the patient's compliance. Regardless of the treatment modality, due to the associated expenses, follow-up PSG recordings or any other form of follow-up studies, are rarely done in sleep apnea patients unless treatment is evaluated as part of a research protocol. In many cases, there are not even follow-up clinical interviews to ensure that patients comply with treatment and continue to be satisfied with it. Given the size of the patient population in need of suitable treatment, sleep specialists should play a more active role in the treatment and follow-up of sleep apnea patients. Reports of increased compliance with CPAP treatment after using simple interventions such as weekly phone calls and educational programs,<sup>17 18 19</sup> and decreased compliance in patients with sleep apnea that is diagnosed at home by ambulatory monitoring as compared to patients whose conditions are diagnosed at the sleep laboratory,<sup>20</sup> further stressed the centrality of the sleep specialists in the treatment procedure of sleep apnea patients. Using a low-cost monitoring methodology for follow-up evaluation by sleep specialists may serve both to encourage patient compliance and to help make decisions regarding the need for treatment readjustment. Thus, it is essential that a close cooperation takes place

between sleep specialists and dentists in the case of oral appliances; between sleep specialists and respiratory therapists in case of treatment with nCPAP; and between sleep specialists and ear, nose, and throat surgeons in the case of upper airway surgery for the improvement of treatment in sleep apnea syndrome.

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