

Combination Therapy of Oral Appliance and Auto-Titrating CPAP of Patient with Edentulous Maxillary Arch

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This is a case study demonstrating combination therapy between an auto-titrating CPAP (continuous positive airway pressure) and oral appliance in a patient with an edentulous maxillary arch. Results demonstrated a decrease in average and mean CPAP pressure as well as a decrease in AHI (apnea hypopnea index) when combination therapy (oral appliance in conjunction with auto CPAP) is used versus auto-titrating CPAP alone.

KEYWORDS: combination therapy, oral appliance, edentulous, auto CPAP

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Combination therapy has been shown to increase efficacy of treatment of obstructive sleep apnea with combination of PAP therapy and oral appliance. It has also been shown to decrease optimal pressure and apnea hypopnea index.¹ A previous case study has demonstrated combination therapy with use of an oral appliance and an auto-titrating CPAP unit.² This case study incorporates combination therapy for a patient with an edentulous maxillary arch. Combination therapy should be attempted to help improve efficacy of treatment and enhance disease alleviation when needed. Combination therapy should begin to be looked at as standard of care rather than taboo following a single treatment modality.³

REPORT OF CASE

A 57-year-old Caucasian male presented inquiring about oral appliance therapy. Patient was currently being treated with an auto-titrating CPAP. He complained of mask leaks and high pressures. The patient had referred himself to a sleep physician approximately 1 year previously because of excessive daytime sleepiness and complaints from his spouse of loud snoring and witnessed apneas. The patient underwent a split-night sleep study at that time. The split-night polysomnogram was interpreted by an American Academy of Sleep Medicine-accredited sleep physician, resulting to a diagnosis of severe obstructive sleep apnea. The patient exhibited an apnea-hypopnea index (AHI) of 63/h and oxyhemoglobin desaturations to a nadir of 74% during the baseline portion of study. There was a highly positional component to the OSA during polysomnography. During the CPAP titration portion of the study, the patient struggled to fall asleep with CPAP and was only able to do so on his side. He was titrated to a pressure of 13 cm H₂O, on his side, at which mild snoring was noted. The physician's opinion was that a pressure of 13 cm H₂O would likely be insufficient in supine position.

Upon presentation, patient's body mass index was 31 kg/m² and neck size was 18 inches. History of present illness included witnessed loud snoring and apneas by patient's spouse, multiple sclerosis, acute sleep attacks with cataplexy, optic neuritis,

and vertigo. Past medical history included nicotine addiction, coronary artery disease, and multiple sclerosis. Past surgical history included an angioplasty for coronary artery disease. Medications included Copaxone, simvastatin, vitamin D3, and baby aspirin; he had no known drug allergies.

The patient was edentulous on the maxillary arch and had a well-fitting complete denture. He was missing teeth #17, 18, 20, 32 on mandibular arch and exhibited generalized mild periodontitis with localized moderate periodontitis on LR.

Patient's denture was in a Class I relationship with mandibular teeth. The oropharynx was characterized by a very low-arched palate (Mallampati IV). Tonsils had a grade I presentation. He had a large tongue with scalloping of the lateral borders. The temporomandibular joints, muscles of mastication, and mandibular range of motion were within normal limits. Consultation report to the physician stated an attempt could be made to treat the patient with an oral appliance.

A prescription for an oral appliance was received from the sleep physician, stating need for combination therapy due to high pressures and unresolved apneas. A dual laminate Herbst style oral appliance with telescopic arms was fabricated for the patient. This appliance was chosen because the silicone based inner lining was thought to easily adapt to denture.

The oral appliance inserted easily upon delivery. At one-week follow-up, patient stated he was able to sleep through 1st and 2nd nights easily with both the appliance and auto CPAP. On the 3rd and 4th nights he only used the appliance between 1–4 hours and had not worn it since because of sores in the area of the maxillary anterior. Adjustment was made to the oral appliance to loosen the fit of anterior denture teeth. The patient stated that appliance felt more comfortable following adjustment. The patient was placed on titration protocol. At one month follow-up post-insertion, the patient said that he sleeps easily with both the appliance and auto CPAP. A small sore was noted in the area of the left maxillary canine eminence. A small adjustment was made to the denture in area corresponding to sore as indicated by Thompson marker. The patient reported he has decreased daytime sleepiness and says auto-CPAP seems much more tolerable.

Table 1—Auto CPAP Summary.

	Auto CPAP Alone	Combination Therapy (Auto PAP + Oral Appliance)
Auto CPAP mean pressure	13.5 cm H ₂ O	8.5 cm H ₂ O
Auto CPAP peak average pressure	15.3 cm H ₂ O	10.5 cm H ₂ O
Average device pressure ≤ 90% of the time	15.3 cm H ₂ O	9.6 cm H ₂ O
Average AHI	11.4	6

He felt the appliance was working well. The patient was asked to make no further turns. A decision was made to wait to see the auto-CPAP data to evaluate the efficacy of combination therapy before undertaking any further titration.

Table 1 shows summary data from Phillips Respronic auto CPAP. The patient used a Mirage Quattro full face mask for both data ranges. Data were collected from patient's auto CPAP card. Data downloads were over approximately 2–3 month segments. The data showed a 5 cm H₂O decrease in mean pressure of combination therapy vs. auto CPAP alone. A decrease in AHI from 11.4 to 6.0 was also seen in combination therapy vs. auto CPAP alone.

DISCUSSION

Upon presentation, the patient was frustrated with auto CPAP due to high pressures. Combination therapy of auto PAP and oral appliance enabled further disease alleviation and increased patient satisfaction versus auto PAP alone. The patient was treated with an oral appliance fit to maxillary denture. Another technique would be to fabricate an oral appliance directly on edentulous arch.⁴ This technique would help avoid adjustments to the patient's existing denture.

It is interesting to note in reading sleep physician's findings following his initial consult with patient, prior to polysomnogram, it states, "I have arranged a polysomnogram followed by CPAP titration. CPAP would be the only possible treatment. Indeed, he is wearing an upper denture." This is an example of need for enhanced education and awareness needed about dental sleep medicine.

Self-reported by patient was enhanced PAP compliance following combination therapy. Further research should be

performed to examine relationship between PAP compliance due to decreased pressures seen with combination therapy between oral appliance and PAP.

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