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TREATMENT OF SLEEP APNEA WITH MANDIBULAR ADVANCEMENT DEVICE: CASE REPORT

Prosthodontics

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ABSTRACT

Background - Mandibular advancement device (MAD) has been described as an alternative treatment to the severe obstructive sleep apnea (OSA), once it is not as effective as the continuous positive airway pressure therapy (CPAP) in reducing the apnea and hypopnea index (AHI).
Case report- We report a case of a 55 years old male who presented with moderate sleep apnea. Polysomnography report shows the AHI score of 50 that is diagnosed a severe sleep apnea. Mandibular Advancement Device (MAD) was planned for the treatment of sleep apnea.
Conclusion - Mandibular advancement device resulted in increase in the upper airway space. This ultimately helped in the therapeutic treatment of snoring and improved quality of life.

KEYWORDS

Sleep Apnea, Obstructive; Polysomnography; Mandibular Advancement.

INTRODUCTION :

Sleep apnea affects 2 per cent to 4 per cent of western population. Within Asia, the occurrence of sleep apnea is over 4.1 percent. A latest report by Liu et al in Chinese adolescents has revealed that self reported sleep problems are objectively common. In India, the precise prevalence of sleep-disordered breathing is not known. This is relatively due to a lack of responsiveness amongst physicians and absence of formal epidemiological data from the Indian subcontinent. Most of the sleep related breathing disorders currently in India is both under diagnosed and also remain under treated.

Sleep apnea is a serious sleep condition in which recurrent interruption in breathing and is characterized by repetitive, complete or partial obstruction of the upper airway while sleeping, resulting in sleep division as well as oxygen desaturation.[1]

The continuous positive airway pressure (CPAP) therapy is the most efficient treatment for severe sleep apnea with AHI score more than 30 and improves patient's subjective symptoms and cardio-metabolic alterations.[2] But at the same time it causes several discomfort and intolerance so raising the need of an alternative treatment.

Mandibular advancement device (MAD) is advised for treatment of mild to moderate obstructive sleep apnea. This device alters location of mandible and other structures impeding the airway and thus refining the sleep-related complaints.[3] But in cases with severe sleep apnea, along with CPAP, MAD can be advised in patients with intolerance to CPAP.

The purpose of this case report is to present a successful case using a mandibular advancement device in a CPAP-in- tolerant individual with severe OSA.

CASE REPORT

A 55 years old male patient came to the department of prosthodontics of Mahatma Gandhi Dental College and Hospital, Jaipur with the complaint of loud snoring and interrupted sleep. He had a history of stroke twice 2 years back. Patient is undertaking the continuous positive airway pressure (CPAP) therapy since one year and has reported an intolerance to the therapy as well as discomfort. Patient had a normal gait, with endomorphic built and large circumference of neck. Intraoral examination showed the class 3 mallampati classification of soft palate. The symptoms that reported were loud snoring , interrupted sleep , chest pain, headache, sleepiness during work and tiredness.

A polysomnography test was done overnight in the hospital general ward. This test included electroencephalography, electromyography, electrocardiogram, oxygen saturation measured by a finger pulse oximeter and electroculogram. The respiratory variables recorded by pressure nasal cannula and thermistor. Respiratory effort was measured using a respiratory inductance plethysmography. Snoring was recorded by a microphone and body position was monitored using a piezo- electric sensor. The sleep was recorded for 7 hrs and 25 minutes with 3105 episodes of snoring and the apnea-hypopnea (AHI) score of 50 that is diagnosed as severe sleep apnea.

Table 1.

AHI	Rating
<5	Normal (no sleep Apnea)
5-15	Mild Sleep Apnea
15-30	Moderate Sleep apnea
>30	Severe Sleep apnea

A preoperative lateral cephalograph was taken before fabrication of the device. On tracing the cephalograph, the superior pharyngeal airway space was 6.4mm. Maxillary and mandibular aliginate impressions were made using stock trays. Casts were poured with dental stone. Casts were duplicated. Bite was obtained from the patient with the protruted mandible to 50% by asking the patient to bring the mandible forward and bite on the material.

The casts were mounted with the same obtained bite. The adams clasps were fabricated for both the first molars of both the maxilla and mandible. The wax patterns were made on both maxillary and mandibular casts following the twinblock design with a 70 degrees ramp. The wax patterns were then invested and cured as per normal procedure using heat cure clear acrylic resin. The patient was adviced to wear the device overnight.

Fig. 1 Mandibular Advancement Device

A post insertion lateral cephalograph was taken immidiatly after the delivery of device to evaluate the change in the upper airway area

radiographically. The measured value was 7.6mm The increase in the reytropharyngeal space was found in the post insertion cephalograph that shows the positive effect of Mandibular advancement device.

The follow up was planned as three months followed by annual reporting. After three month follow up, there was no sign of any temporomandibular joint or any musculature pain. There were no sign of any disocclusion due to oral appliance. The compliance of device was 6 hours every night. There were less episodes of sleep interruption and symptoms like snoring and day time tiredness reduced as measured subjectively by patient.

Patient was advised to continue the use of MAD along with CPAP.

DISCUSSION:

Due to intolerance caused by continuous positive airway pressure (CPAP) therapy, there has been an increasing interest in discovering therapeutic options with higher compliance for patients with obstructive sleep apnea. [2] The positive effects on sleep apnea using an oral device in patients with obstructive sleep apnea have been verified in many short-term studies.[4]

MAD are fabricated so that it can be attached to both dental arches leading to increase in the upper airway space due to modified positions of mandible, tongue and soft palate.[5,6]though it is advised to use the oral appliances in cases with mild to moderate sleep apnea[8] but it is also proved to have satisfied results in decreasing the AHI score in patients with severe sleep apnea[2], Downward and outward rotation of the mandible leading to increase in retropharyngeal space results in relief of the obstruction in the airway.[1]

It has also been proved that there is a strong association between OSA and medical conditions like cardiovascular diseases such as hypertension and diabetes mellitus, which are the chief health issues in both developed and developing countries.[8] Redline et al in 2010 found a correlation between obstructive sleep apnea and incidence of stroke as well as other serious health issues .[9]

In this case report, we reported a case of the patient who was intolerant to CPAP therapy and had a positive medical history of stroke. The areas of concern were patient compliance, effects on snoring, sleep apnea and patient satisfaction with respect to quality of life and overall health status.

The lateral cephalograph taken immediately post-insertion showed increase in the retropharyngeal space that justifies the use of the mandibular advancement device. The 3 months follow up reported the positive effects of the device with a feedback of decrease in the episodes of sleep interruption, snoring and more effectiveness in the work. The patient was advised for annual follow ups with repeated Polysomnography tests every year.

CONCLUSION :

Due to the cost and compliance issues with CPAP, mandibular advancement devices are advised to the patients with obstructive sleep apnea. But CPAP still remains the first line treatment for severe sleep apnea cases. In this report, patient gave a positive feedback after three months follow up and this ultimately helped in the therapeutic treatment of sleep apnea, snoring and improved quality of life.

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