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Case Report

Managing obstructive sleep apnea with prosthetic care: The role of Mandibular advancement device

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Abstract

Introduction: Obstructive Sleep Apnea (OSA) is a sleep-related breathing disorder characterized by intermittent upper airway obstruction during sleep, resulting in oxygen desaturation and disrupted sleep. While Continuous Positive Airway Pressure (CPAP), lifestyle modifications, and surgery are conventional treatments, mandibular advancement devices (MADs) offer an effective, non-invasive alternative for patients with mild to moderate OSA, or for that intolerant to CPAP therapy

Case Characteristics: A 64-year-old female presented with a primary complaint of shortness of breath during sleep. She had previously used CPAP therapy, which effectively reduced her AHI but caused significant discomfort, prompting her to seek an alternative solution.

Discussion: Earlier documentation suggest MAD treatment as custom devices have a higher effectiveness than ready-made. The patient has shown 18 mm of protrusion that allowed for forward positioning of the mandible during sleep.

Conclusion: Mandibular advancement devices represent a viable, non-invasive treatment option for patients with mild to moderate OSA, particularly in cases where CPAP therapy is not tolerated. The current case highlights significant clinical improvement and normalization of PSG parameters, supporting the integration of MAD therapy in routine prosthetic care for sleep apnea management.

Keywords: Obstructive sleep apnea, Mandibular advancement device, Polysomnography

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1. Introduction

Sleep is vital for health, constituting about one-third of life. Both sleep quantity and quality are crucial for well-being, yet poor sleep is common, with over 70 recognized disorders, including insomnia and obstructive sleep apnea (OSA).[1] OSA is caused by intermittent airway blockage, leading to oxygen desaturation during sleep.[2] It affects 9-38% of the population, particularly males and the elderly, with obesity and conditions like retrognathia and reduced muscle tone as major risk factors[2]. OSA is diagnosed via polysomnography (PSG), which monitors oxygen levels and airflow.[3]

OSA severity is classified by the apnea-hypopnea index (AHI): mild (5-15 events/hour), moderate (15–30 events/hour), and severe (over 30 events/hour).[4] Severe OSA disrupts sleep, especially in the supine position.[4] The primary treatment for OSA is CPAP, though poor adherence due to discomfort is common.[5] Alternatively, mandibular advancement devices (MADs) reposition the jaw to improve airflow, offering higher compliance rates. MADs are typically used for mild to moderate OSA or severe cases intolerant to CPAP.[6] This case report describes a severe OSA case treated with an MAD, resulting in complete symptom resolution and normalization of PSG parameters, including AHI.

2. Case Presentation

A 64-year-old female patient presented to the dental clinic with complaints of shortness of breath during sleep. **(Figure 1A)** She had been using CPAP but found it uncomfortable and sought an alternative treatment. Her medical history included

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diabetes, hypertension, and hyperlipidaemia. The patient's height was 170 cm, weight 75 kg, and BMI 26 kg/m², indicating she was overweight. Her symptoms included snoring, morning headaches, disturbed sleep, excessive daytime sleepiness, fatigue, and low mood.

A full overnight polysomnography (PSG) showed an AHI of 62.31 events per hour, with a supine AHI of 111 per hour and a non-supine AHI of 46 per hour. The patient had 13% of total sleep time with oxygen saturation below 88%, indicating obstructive sleep apnoea with significant oxygen desaturation. Using CPAP, her AHI dropped to 2 events per hour. **(Table 1)** However, due to intolerance, alternative treatments were offered, including EPEP, MAD, and a tongue-retaining device. The patient chose the non-surgical MAD option.

Preoperative intraoral photographs were taken **(Figure 1B)**, and impressions of the upper and lower arches were made using polyvinyl siloxane. **(Figure 2)** Casts were created with die stone, and an elastomeric MAD was fabricated. The device featured two lateral telescopic rods: a 5 mm short rod and an 8 mm long rod. **(Figure 3)** The mandible's initial protrusion was set at 60% of the range using a 17 mm blue elastic strap. The patient was also advised to pursue weight loss and positional therapy for improved sleep.

One week after using the oral appliance with 60% advancement, the patient reported significant improvement. The device, secured with a firm clear elastic strap **(Figure 4)**, effectively held the mandible forward. All OSA symptoms, including snoring, morning headaches, disturbed sleep, daytime sleepiness, fatigue, and low mood, disappeared.

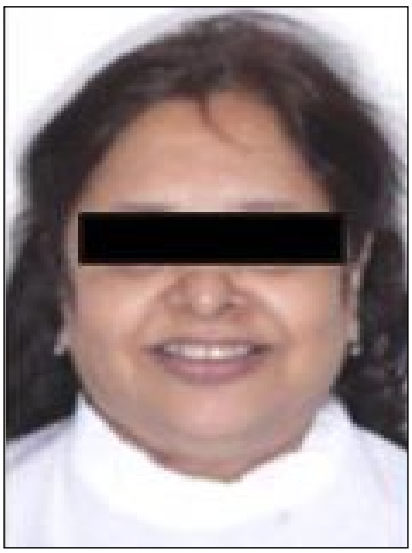

Figure 1A: Preoperative photograph

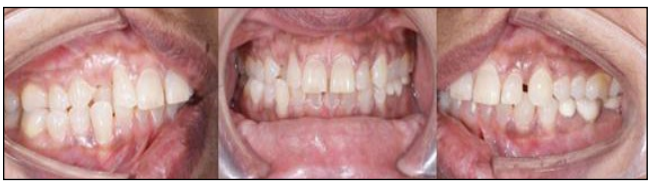

Figure 1B: Preoperative intraoral photograph

Figure 2: Impression of upper and lower arch were made with Poly vinyl siloxane material.

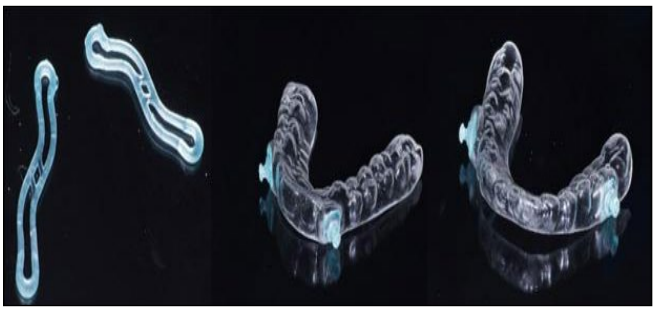

Figure 3: The elastomeric MAD was fabricated using this cast

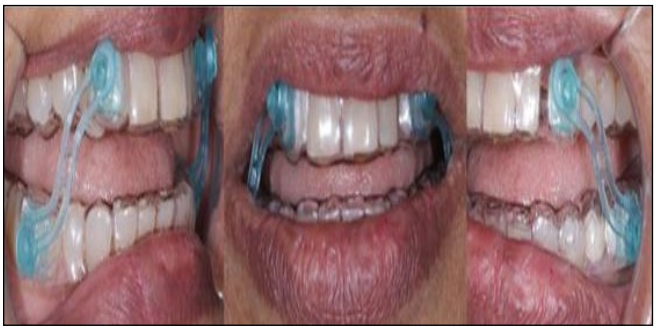

Figure 4: Post operative photographs of the patient

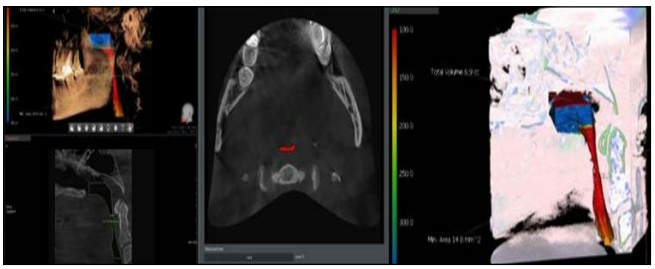

Figure 5: Airway scan without appliance (red area depicts narrowest area)

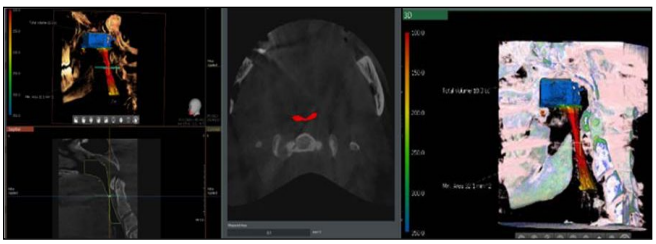

Figure 6: Airway scan with long appliance (red area depicts narrowest area)

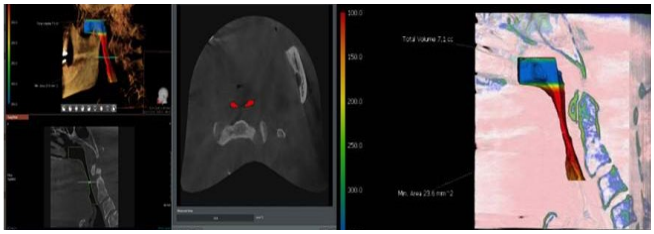

Figure 7: Airway scan with short appliance (red area depicts narrowest area)

Table 1: CBCT results

No.	Type of scan	Total volume of airway	Min area (Narrowest area in mm^2)
1	Airway scan without appliance (mandibular advancement device)	6.9	14.8
2	Airway scan with long appliance (mandibular advancement device)	10.3	32.1
3	Airway scan with short appliance (mandibular advancement device)	7.1	23.6

Table 2: Stop and bang questionnaire

Stop	Pre-operative	Operative
Do you snore loudly (louder than talking or loud enough to be heard through closed doors)?	Yes	No
Do you often feel tired, fatigued or sleepy during daytime?	Yes	Yes
Has anyone observed you stop breathing during your sleep?	Yes	No
Do you have or are being treated for high blood pressure?	No	Yes
Bang		
BMI more than 35kg/m^2?	Yes	No
Age over 50 years old?	Yes	Yes
Neck circumference > 16 inches (40 cm)?	Yes	Yes
Gender: Male?	No	No
Total Score	6	4

High risk of OSA: Yes 5-8
Intermediate risk of OSA: Yes 3-4
Low risk of OSA: Yes 0-2

2.1. Post-operative analysis

A CBCT scan of the airway region was conducted, with images reconstructed and evaluated in all planes. The scan was performed without the appliance **(Figure 5)**, with a long appliance **(Figure 6)**, and with a short appliance. **(Figure 7) (Table 1)** The CBCT revealed significant airway expansion.

After six months, the patient followed up with a sleep physician for a PSG to assess sleep quality. Despite weight loss from 75 kg to 67 kg, the PSG showed complete resolution of apnea, with only a few hypopnea events within normal AHI levels (0-5 events/hour). The patient's AHI decreased from 71/hour to 2/hour, showing similar efficacy to the 8 cmH2O CPAP used in the baseline study. REM-AHI dropped from 109/hour to 1/hour. **(Table 1)** Patient compliance was evaluated using the Stop-Bang criteria. The preoperative score was 9, which decreased to 4 postoperatively. **(Table 2)**

Following the fitting and adjustment of the MAD, the patient attended annual follow-ups. No symptoms of temporomandibular joint disorder, masticatory muscle discomfort, or changes in dental occlusion were reported during the follow-up period.

3. Discussion

Mandibular advancement device (MAD) are a key treatment for snoring and mild to moderate OSA, providing an alternative to CPAP. The AASM American Academy of sleep medicine recommends MADs as first-line therapy for mild OSA and a secondary option for more severe cases. MAD advance the mandible during sleep to keep the airway open and reduce apneas, with adjustable features for personalized treatment.[7] MAD can reduce apnea and hypopnea events in severe OSA cases, though they may not fully resolve the condition. They are especially helpful for patients who struggle with CPAP due to discomfort or intolerance.[8]

A case of a 64-year-old woman with severe OSA and a retruded mandible showed that MAD therapy improved symptoms in patients who are poor CPAP candidates, particularly those with macroglossia and suitable anatomy.[9] In the reported case, the patient's mandibular protrusion of 12–13 mm allowed for effective advancement of 7–8 mm, improving her symptoms. The use of a custom-made device, along with professional guidance and follow-up, played a crucial role in treatment success.

While CPAP is the gold standard for OSA treatment, MADs often lead to better patient compliance, especially for those who find CPAP uncomfortable. Though MADs may be slightly less effective than CPAP, they are comparable in reducing apneas and improving sleep quality. Patients also prefer MADs for their comfort and convenience. Compliance with both treatments can be tracked using sleep diaries and the Stop-Bang questionnaire.

4. Conclusion

Oral appliance therapy is becoming a popular non-invasive treatment for OSA. The preferred option is a custom-made, titratable mandibular advancement device that allows gradual mandibular protrusion. Selecting suitable candidates for MAD therapy is crucial to improving its overall effectiveness.

5. Source of Funding

None.

6. Conflict of Interest

None.

References

1. Colten HR, Altevogt BM, editors. Sleep disorders and sleep deprivation: An unmet public health problem. Washington (DC): National Academies Press; 2006. Available from: https://www.ncbi.nlm.nih.gov/books/NBK19960/.
2. Lavigne GJ, Simmons M, Huynh N, Almeida FR, Vanderveken OM. Role of dentistry and otolaryngology in sleep medicine. In: Kryger MH, editor. Principles and practice of sleep medicine. 6th ed. Philadelphia (PA): Elsevier Health Sciences; 2017. p. 1398–1400. doi: 10.1016/B978-0-323-24288-2.00142-2
3. Sateia MJ. International classification of sleep disorders-third edition: Highlights and modifications. *Chest*. 2014;146(5):1387–94. doi: 10.1378/chest.14-0970.
4. Malhotra A, White DP. Obstructive sleep apnoea. *Lancet*. 2002;360(9328):237–45. doi: 10.1016/S0140-6736(02)09464-3.
5. Berry RB, Brooks R, Gamaldo CE, Harding SM, Lloyd RM, Marcus CL, et al. The AASM manual for the scoring of sleep and associated events: Rules, terminology and technical specifications. Version 2.2. Darien (IL): American Academy of Sleep Medicine; 2015. Available from: https://aasm.org/resources/pdf/scoring-manual-preface.pdf
6. Ramar K, Dort LC, Katz SG, Lettieri CJ, Harrod CG, Thomas SM. et al. Clinical practice guideline for the treatment of obstructive sleep apnea and snoring with oral appliance therapy: an update for 2015. *J Clin Sleep Med*. 2015;11(7):773–827. doi: 10.5664/jcsm.4858.
7. Practice parameters for the treatment of snoring and obstructive sleep apnea with oral appliances. *Sleep*. 1995;18(6):511–3. doi: 10.1093/sleep/18.6.511.
8. Anandam A, Patil M, Akinnusi M, Jaoude P, El-Solh AA. Cardiovascular mortality in obstructive sleep apnoea treated with continuous positive airway pressure or oral appliance: an observational study. *Respirology.* 2013;18(8):1184–90. doi: 10.1111/resp.12140.
9. Vanderveken OM, Dieltjens M, Wouters K, De Backer WA, Van de Heyning PH, Braem MJ. Objective measurement of compliance during oral appliance therapy for sleep-disordered breathing. *Thorax*. 2013;68(1);91–6. doi: 10.1136/thoraxjnl-2012-201900.

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