

MULTIDISCIPLINARY ENT-ORTHODONTIC TREATMENT IN A HYPERTENSIVE PATIENT AFFECTED BY SEVERE OSAS

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SUMMARY

A 54-year-old man affected by hypertension and severe Obstructive Sleep Apnea (OSAS), 31.2 AHI, 78% nadir, came for an orthodontic evaluation after inferior turbinate surgery and Drug Induced Sleep Endoscopy (DISE) that evaluated a III degree anterior-posterior collapse in the oropharynx and IV degree in the hypopharynx. Orthodontic treatment consisted in a mandibular advancement device (Somnodent Flex) and vertical elastics (3/16", 2oz). The post-treatment polysomnography revealed a 0.9 AHI and no episodes of oxygen desaturation lower than 90%.

Key words: OSA, orthodontics, DISE, MAD.

Introduction

Obstructive Sleep Apnea Syndrome (OSAS) is a breathing sleep disorder characterized by upper airways obstruction, with a reduction of arterial oxygen saturation value and an increase in the hematic carbon dioxide. Completed obstruction defines apnea episodes while partial obstruction defines hypopnea episodes. Apnea and hypopnea episodes during the sleep consist in an effort breathing and consequent alteration in the heart rate, sleep fragmentation and increase in the arterial pressure (1).

OSAS symptoms during the sleep are: snoring, sleep pause referred by the partner, suffocation perception, nocturia, dry mouth and intensive sweating (2).

In patients affected by OSAS, there are episodes with partial awakening night, so the apneas do not permit the achievement of a deep sleep and REM phase. The reduced sleep quality determines the majority of OSAS daytime consequences that are: tiredness, headache, diurnal

somnolence, higher risk of car accident, cognitive impairment (in particular memory, concentration and attention disturbance), depression and sexual impotence (3-8).

These aspects can affect seriously patients' quality of life, and they may evolve in severe pathological conditions such as hypertension, ischemic cardiomyopathy, heart attack, stroke and arrhythmia. The objectives of medical treatment are the removal of the predisposing factors.

In overweight patients, adipose tissue accumulation in the neck region and in the retropharyngeal area may contribute in the decrease airways total volume. Weight loss can be obtained with a balanced diet and an appropriate physical activity and in these patients it may improve the symptoms to a complete resolution of the pathology. In those patients presenting severe overweight and obesity the weight loss can be obtained with a surgical treatment consisting in gastric reduction or intestinal bypass.

Another non-surgical approach consists in behavioral changes: opt for a lateral position dur-

ing the sleep, avoid of alcohol drinking, smoking and drugs assumption before sleep time.

Continuous Positive Airway Pressure (CPAP) reduces the symptomatology with a reduction of the apnea and hypopnea episodes but it is generally not well tolerated by the patients for the encumbrance and the noise (9, 10).

Surgical treatments remove the obstructions in the anatomical structures or increase the airways volume with a lingual base reduction. Mandibular advancement is a particularly relevant maxillo-facial surgical treatment for OSAS patients.

Orthodontic treatment consists in the application of a Mandibular Advancement Device (MAD). MAD choice is related with the comfort and mandibular advancement.

Diagnosis and etiology

A 54-year-old Caucasian man affected by severe OSAS came at the Padua University Hospital Dental Clinic after an ENT evaluation to consider an alternative treatment to lateral faringoplasty and adenotonsillectomy (Figure 1). At the medical history the patient referred arterial hypertension actually under pharmacological control. He referred snoring and apnea episodes during the night and daytime sleepiness. Epworth scale score resulted 9 suggesting further clinical evaluation.

From an occlusal point of view the patient showed an angle first molar and canine class and moderate crowding on both dental arches. The



Figure 1
Pre-treatment photographs.

maximum protrusion and retrusion were 6 mm each resulting in a functional mandibular range of 12 mm.

Moreover in OSA patients an important parameter is the neck circumference (normal value is lower than 38 cm) and in this patient was 37 cm. The first polysomnography revealed a moderate OSAS (15.7 AHI) and a moderate positional component (22.2 supine AHI) and snoring time at 56.6%. Oxygen average saturation was 95.6%, oxygen desaturation index (ODI) was 17 and nadir resulted 87%.

Report of case

Ten months after the first evaluation, the patient underwent an operation of the lower turbinate and Drug Induced Sleep Endoscopy (DISE) which evidenced a III degree anterior-posterior collapse in the oropharynx and IV degree at the hypopharynx level. The second polysomnography revealed 31.2 AHI score, oxygen average saturation 94.8%, 78% nadir and ODI 32.1% (Table 1).

Patient was diagnosed severe OSAS and a faringoplasty and CPAP treatment was suggested. The patient required a less invasive treatment so, after a drug induced sleep endoscopy (DISE), a MAD (Somnodent Flex associated with vertical elastics 3/16" 2 oz) was delivered (11).

The treatment consisted in the following stages:

1. dental impression and casts were taken in order to build the device in a dental technician laboratory
2. two months later the appliance was delivered to the patient with an activation of 70% of maximum protrusion for a total advancement of 9 mm. Patient was instructed to make one other activation every day for ten days (every activation consists in a 0.20 mm mandibular advancement) (Figure 2).

Results

Two months later, the patient referred a better sleep quality, a reduction in snoring and daytime sleepiness. Six months after the MAD application, the patient made 45 activations. A third polysomnography revealed 3.9 AHI (7.9 supine AHI and 0.8 non-supine AHI) (12).

Mean oxygen desaturation was 96.3%, ODI was 8.9 and there were no episodes of oxygen desaturation lower than 90%. Snoring time was 18.2% (Table 1).

No other activations were required, the symptomatology improved and the patient referred a better quality of life and sleep.

Six months later, the control polysomnography revealed a 0,9 AHI score, an average saturation of 98%, ODI was 0,6, CT90 was 0 and there were no episodes of oxygen desaturation lower than 90% (Table 1).

Table 1 - Polysomnography records.

Day of the polysomnography	17/10/16	08/04/17	14/10/17
Total recording time (min)	476	416,9	480
Snoring time (min)	218	75,8	56,1
Time in the supine position (%)	57,4	43,5	36,8
AHI (h)	31,2	3,9	0,9
Average saturation (%)	94,8	96,3	98
Nadir (%)	78	90	94
ODI	32,1	8,9	0,6
CT90 (%)	3	0	0

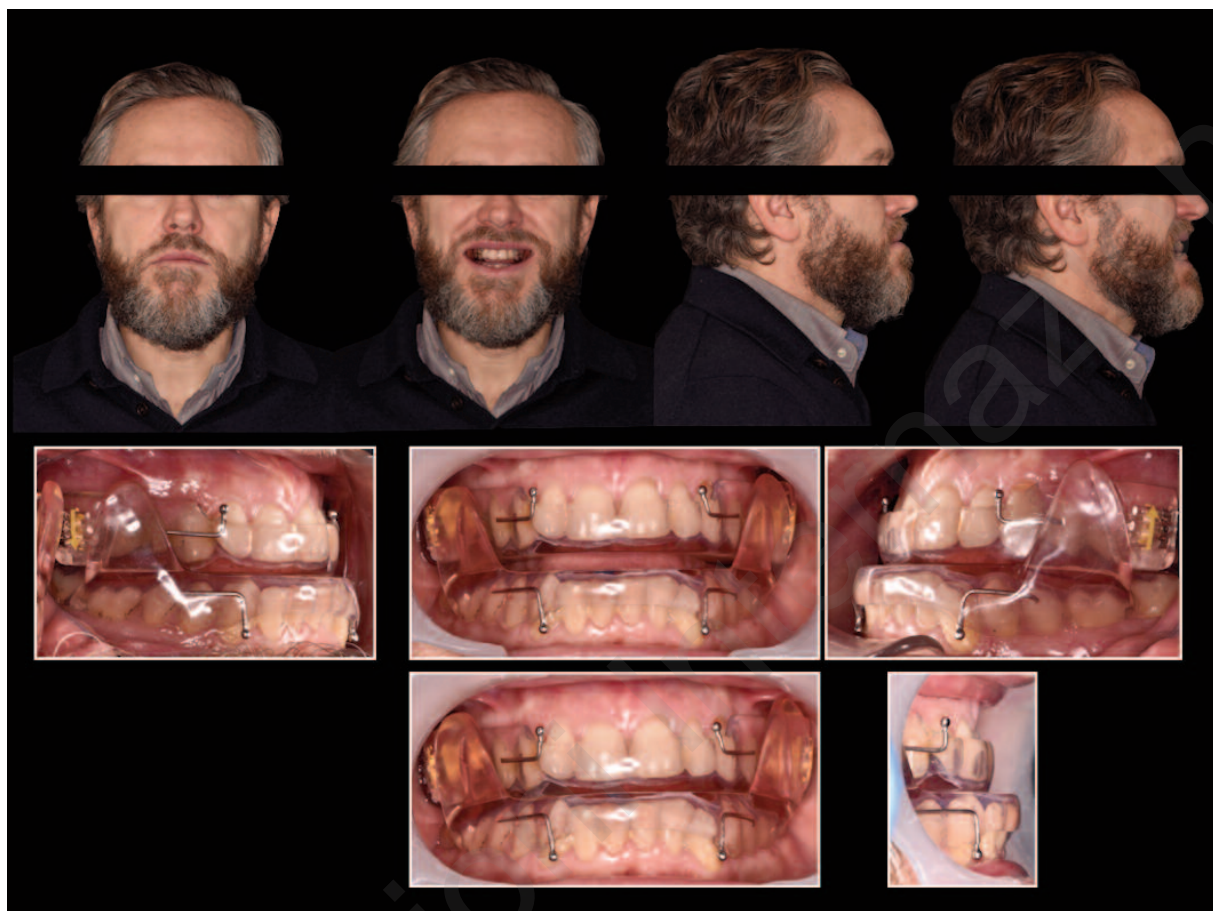


Figure 2
Post-treatment photographs.

Discussion

Combined orthodontic and ENT evaluation are necessary for a proper management of an adult OSA patient in order to improve the AHI score, oxygen saturation and daytime sleepiness (1-3). DISE is a diagnostic procedure that is used to evaluate the antero-posterior collapse of the upper airways structures with particular interest at the hypopharynx level. It can also be used to predict the efficacy of a mandibular advancement appliance (2-5). Orthodontic evaluation is necessary not only for the manufacturing of the appliance but also to decide the appropriate mandibular protrusion and to exclude periodontal problems and temporomandibular disorders (11).

Analyze the patient's chief complaint during the motivational interview is a fundamental aspect to decide the best treatment alternative since different treatment protocols can be used (11, 12). In patients affected by severe OSAS the gold standard treatment actually remains the CPAP use during the sleep time even though this kind of appliance is not well tolerated by the majority of the patient. In this case, MAD represents a valid alternative to improve the clinical symptoms. This case report shows how drug induced sleep endoscopy is useful to predict the positive clinical outcome of a mandibular advancement therapy in removing the obstruction (9, 11). Furthermore, mandibular advancement treatment in a severe OSA patient confirms, if supported by an adequate diagnosis and compliance, satisfactory results in alternative to CPAP use.

Conclusion

A multidisciplinary approach between the orthodontist and the ENT is essential for a satisfactory outcome of OSA patients, in particular when the patient excludes the treatment with CPAP of maxillofacial surgery.

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