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case report

POLYSONOGRAPHICAL EVALUATION IN A CASE OF MODERATE OSAS TREATED WITH MANDIBULAR ADVANCEMENT DEVICE

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SUMMARY
Background. The Obstructive Sleep Apnea Syndrome (OSAS) is a clinical picture characterized by partial or complete obstruction of the upper airway during sleep, associated with a reduction of oxygen saturation in the blood.
The most common symptoms are: apnea sleep, snoring, headache, sleepiness, reduced concentration and memory, irritability, increased blood pressure and dry mouth.
Materials and methods. It was examinated a not-smoker man of 54 years that suffers of roncophaty. He did physical examination, rhinoscopyexam, faringoscopy, rhinofibrolaringoscopy, gnathological evaluation and polysomnographic examination performed with multichannel polygraphy (VitalNight). From the performed examinations, it has been diagnosed a moderate form of obstructive apnea sleep syndrome. He was treated with a mandibular advancement device and it was repeated the polysomnographic exam.
Results. Comparing the results of the polysonographic examination performed before and after the treatment, the patient's clinical picture clearly improved. It has shown a clear reduction of obstructive apneas, hypopneas and snoring.
Conclusions. The use of a mandibular advancement device is certainly a valuable aid in the treatment of moderate type OSAS. The quality of diurnal life is also improved as shown with Sleepness Epworth Scale.

Key words: OSAS, mandibular advancement device, polysonography.

Introduction

The Obstructive Sleep Apnea Syndrome (OSAS) is a clinical picture characterized by partial or complete obstruction of the upper airway during sleep, associated with a reduction of oxygen saturation in the blood. It affects 4% of men and 2% of women in the general population and it manifests itself more often between the age of 30 and 60 (1).
The most common symptoms are: frequent episodes of apnea sleep, snoring, headache upon awakening, daytime sleepiness, reduced concentration and memory, irritability, increased blood pressure and dry mouth upon awakening. The most common etiologic factors present in paediatric age are tonsil and adenoidal hypertrophy, and mandibular hypos utilization, which cause a narrowing of the upper airways. On the other hand, the most frequent factors present in adulthood are: the laxity of the smooth muscles of the neck determining the collapse of the airways, obesity with accumulation of adipose tissue, especially at the facial level, enlargement of the tongue and nasal obstruction (2).
The reduction of airflow during the sleep, typical of OSAS, inevitably leads to a reduction of

oxygen saturation in the blood, with a consequent increase in blood pressure. In severe and long-term cases, there is an increase of pulmonary pressure that is transferred to the right side of the heart with the resulting occurrence of severe forms of congestive heart failure. As a matter of facts, several cases of deaths by stroke, caused by OSAS are reported in previous literature (3).

First level diagnosis investigations are aimed at evaluating the quality of sleeping.

According to the guidelines of the American Spleep Disorders Association the elective examination is a polysomnography, which allows to trackduring the sleep totally and simultaneously: the electroencephalogram, electro-myography, electrocardiogram, oximetry, chest and abdomen movements, snoring, electro-oculography and body position. Another very important exam in order to evaluate the quality of life in the daytime hours is the Epworth Sleepness Scale. The ESS is a questionnaire of eight questions about typical diurnal situations in regards to which the patient is called to give a score based on the degree of drowsiness he/she perceives in each of the reported situations.

Different forms of OSAS in pediatric age, caused by tonsil and adenoid hypertrophy, is often resolved with the surgical removal of the same. These disorders are very often associated with a constriction of the nasal airways. In these cases, the use of palatal expanders has been very useful, due to their ability to expand, by anatomical contiguity, the palatine vault in the transverse direction, as well as the nasal floor (4).

The gold standard for the treatment of severe forms of OSAS, on the other hand, requires the use of C-PAP, a machine made up of a facial mask that delivers a positive airflow to the airways during sleep (5).

Moreover, in recent years MAD (6) (mandibular advancement devices) is increasingly used. This is a removable orthodontic device able to protrude the mandible and free the posterior airways, facilitating in this way the flow of the air. These devices also positively resolve snoring issues, since the protrusion of the mandible and consequently of the tongue determine the spacing of the epiglottis from the ulcer, cancelling or reducing the vibration of the soft tissues of the palate to the passage of the air causing the snoring noise. Furthermore, the American Academy of Dental Sleep Medicine states that bi-maxillary devices are more effective than monoblocs as they allow a maxillary progression of 4-5 mm further compared to the protrusive construction bite.

Materials and methods

The patient, a man of 54 years, suffering from nocturnal roncopathy, went for treatment to the "Center For The Diagnosis And Therapy Of Sleep Disorders" of the UOC, Diseases of the Respiratory Apparatus of the Hospital "S. Maria Goretti" of Latina.

On physical examination, he is overweight and with arterial hypertension. Results from a rhinoscopyexam show that there is a moderate hypertrophy of the inferior turbinates and a slight deviation to the left of the cartilaginous septum. The faringoscopy highlighted a moderate hypertrophy of the uvula. From rhinofibrolaringoscopy, performed with flexible optics introduced into both nasal cavities, it can be seen a free rhinopharyngeal cord, the base of the normotrophic tongue, and the normal air space are appreciated.

Through the polysomnographic examination performed with multichannel polygraphy (VitalNight) and during a nocturnal recording, it was possible to detect the number of apneas, of which central, obstructive and mixed; of the number of hypopneas; of the AHI index; of the desaturation index; of the number of snoring and of the average pulsations.

The patient also answered the Epworth Sleepness Scale Test, which provides a correct indication of the patient's drowsiness during main activities during the day.

From the performed examinations, it has been diagnosed a moderate form of obstructive apnea

sleep syndrome, and it was recommended to the patient to undergo an odontostomatological evaluation for a possible treatment of the case with a nocturnal device of mandibular advancement.
Once the dental observation was completed, a gnathological evaluation was performed.
At the palpation of the Atm and the associated muscles (temporal, masseters, pterygoids, muscles of the oral floor, cervical, sternocleidomastoid and trapezius) there were no achiness.
Looking at the opening of the mouth, the opening wasn't reduced; no clicks or joint scratches were detectable. The intraoral examination showed the absence of elements 4.4 and 3.6 and chronic periodontal disease (Figures 1-6). Since no contraindications arise after examination, a mandibular advancement device in order to clear the posterior airway was recommended to the patient as treatment (4-6).
After one week the patient did not report any discomfort but he referred a drastic reduction of the roncopathy.
After six months of treatment a polysomnographic examination was repeated with the inserted MAD device and the compilation of the Epworth Sleepness Scale Test.

Results

Comparing the results of the polysomnographic examination performed before treatment and repeated with the inserted mandibular advancement device showed that the patient's clinical picture clearly improved.
Before treatment (Figure 7):

- 49 nocturnal apneas were all obstructive
- 73 hypopneas
- AHI index equal to 14
- Desaturation index equal to 11.3

Figure 1
Central view.

Figure 2
Right view.

Figure 3
Left view.

Figure 4
MAD, frontal view.

Figure 5
MAD, right view.

Figure 6
MAD, left view.

Figure 7
Right profile without MAD.

Figure 8
Right profile with MAD.

- 1151 snoring and
- 67 average pulses per minute.

With the occlusal device inserted (Figure 8, Table 1):

- 2 obstructive apneas were detected
- 59 hypopneas
- AHI index equal to 7
- desaturation index equal to 12
- 144 snoring and average pulsations equal to 61 per minute.

See Table 1 for complete data. The Ep Worth Sleepness Scale performed before treatment showed a score of 4, while after treatment it was 0 (Table 2).

Conclusions

The use of a mandibular advancement device is certainly a valuable aid in the treatment of moderate type OSAS. The comparison of polysomnographic examinations performed before and

Table 1 - Polysonographical values without and with MAD.

	Pre-treatment	Post-treatment
Central apneas	0	0
Obstructive apneas	49	2
Mixed apneas	0	0
Total apneas	49	2
Hypopneas	73	59
AHI	14	7
Desaturation index	11.03.00	12
Snoring	1151	144
Pulsation average/min	67	61
Pulsation variations	94	77
Average saturation	91	94
CSR	0	N.A.

Table 2 -Ep Worth Sleepnees Scale without and with MAD.

Probability of falling asleep	Pre-treatment	Post-treatment
Reading while sitting	1	0
Watching TV	1	0
At the cinema	1	0
By car as a passenger	0	0
In the bed	1	0
Sitting chatting	0	0
Sitting after dinner	0	0
While driving	0	0

after treatment shows a clear reduction of obstructive apneas, hypopneas and snoring. The quality of diurnal life is also better, as demonstrated by the Ep Worth Sleepness Scale test, with a reduction in the possibility of falling asleep during the main daily activities.

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