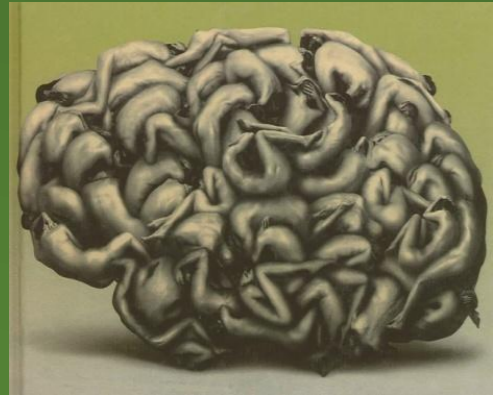


Assessment of olfactory function by using psychometric and electrophysiological methods in patients with Obstructive Sleep Apnea Syndrome



S. De Salvo¹, LR. Pisani¹, N. Muscarà¹, L. Bonanno¹, S. Marino^{1,2}, P. Bramanti, F. Caminiti¹

¹ Neuroimaging Laboratory – IRCCS Centro Neurolesi “Bonino – Pulejo” – Messina, Italy

² Department of Biomedical and Dental Sciences and Morphofunctional Imaging – University of Messina, Messina, Italy



Background

Obstructive sleep apnea syndrome (OSAS) is a chronic disease characterized by typical signs and symptoms, but also from non-specific ailments. Recent data literature show an involvement of sense of smell in subjects with OSAS (1). In this study, psychometric and electrophysiological methods of measure of smell were used to evaluate the olfactory function in adult patients with OSAS.

Materials and Methods

We enrolled 60 subjects aged 18-65 years old. The Visual Analogue Scale (VAS), which measures the intensity of snoring was also used. We created four groups, namely:

Group I: 15 non-snorer healthy controls with Apnea-hypopnea index (AHI) < 5 and snoring VAS=0; Group II: 15 non-apneic snorers with AHI<5 and snoring VAS >7; Group III: mild-moderate OSAS with AHI 5-30; Group IV: severe OSAS with AHI >30 (Table 1). In addition, the subjects were classified as obese (body mass index (BMI) ≥ 28 Kg/m²) and non-obese (BMI < 28 Kg/m²). All patients were assessed with a detailed otorhinolaryngologic examination and were undergo to specific clinical scales. We performed a polysomnography and an olfactory function evaluation by using Sniffin Sticks Test (SST) (Figure 1). Olfactory Event-Related Potentials (2) (OERPs). The Epworth Sleepiness Scale (ESS) was completed by each patient. It was carried out a statistical analysis intra/inter-group between clinical data, SST scores, OERPs parameters, polysomnography results and ESS scores.

	AHI	VAS
Group I	<5	0
Group II	<5	>7
Group III	5-30	-
Group IV	>30	-

Table 1: Clinical characteristics of subjects of 4 groups.



Fig. 1: Sniffin' Sticks Test

Results

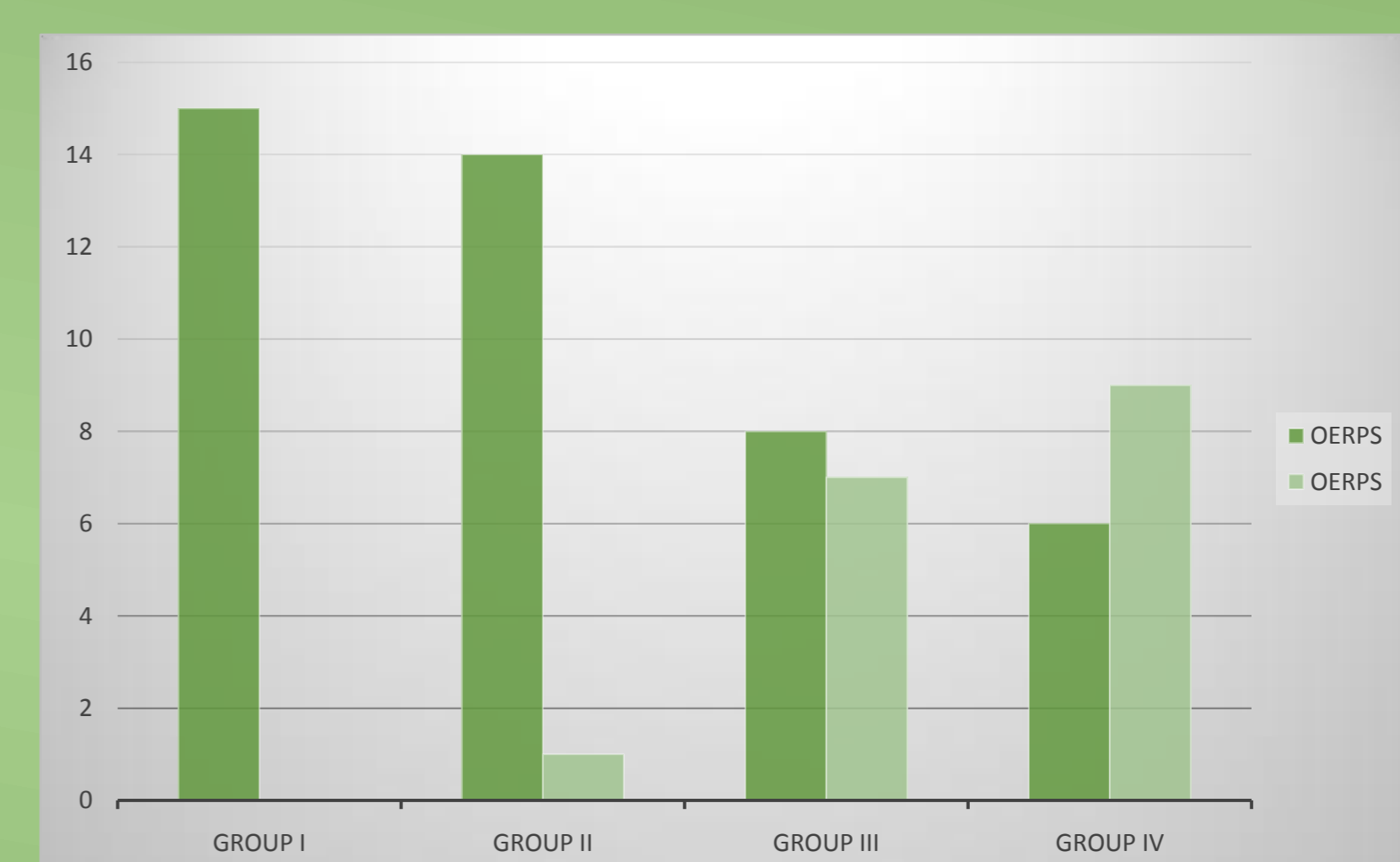
The lower scores of SST and a more absence of OERPs was found in third and fourth group of patients (Table 2)(Graphic 1). The statistical significant correlations were obtained between olfactory psychometric/electrophysiological and arterial oxygen saturation, AHI, AHI-REM and ESS.

No correlation between olfactory parameters and AHI non-REM was found.

A negative correlation was highlighted between tongue size and all olfactory parameters but these ones were unchanged respect to tonsillar volume. No differences was found between obese and no-obese. No significant differences in 4 groups for age and sex was highlighted (p>0.05).

	TDI score	OERPs	
		Present	Assent
Group I	Good	15	0
Group II	Good	14	1
Group III	Middle	8	7
Group IV	Bad	6	9

Table 2: Presence or absence of OERPs in four groups



Graphic 1: Frequency of OERPs presence / absence of in four groups

Discussion/Conclusion

The results obtained confirm that the olfactory function changes related to severity of disease (3). Furthermore, the data obtained suggest that OERPs parameters, respect to psychometric tests, are more sensitive about the severity of OSAS. The our study demonstrated that the patients with OSAS should be carefully assessed for olfactory dysfunction and the correlation between severe OSAS and olfactory parameters, in future, could be used as a marker to predict the presence/severity of OSAS.

References

1. Emre Gunbey, Aygul Guzel, Rifat Karli, Recep Unal. The relationships between the clinical and polysomnographic findings and the olfactory function in patients with obstructive sleep apnea syndrome. *Sleep Breath* 2015;19(4):1301-7.
2. Fabrizia Caminiti, Rosella Ciurleo, Simona De Salvo, Placido Bramanti, & Silvia Marino. Post-traumatic olfactory loss: Psychophysical, electrophysiological and neuroradiological findings in three single case studies. *Brain Inj.* 2014, 28(13-14):1776-80.
3. Salihoglu M, Kenderli MT, Altundag A, Tekeli H, Saglami M, Cayonu M, Senol MG, Ozdag F. The effect of obstructive sleep apnea on olfactory functions. *Laryngoscope* 2014; 124(9):2190-2194.