

horizontal plane had significantly higher value in NEFF group (median: 0.66, IQR: 0.89) than in EFF group (median: -1.26, IQR: 2.12) ( $P = 0.02$ ). Meanwhile, the interincisal angle had significantly smaller value in NEFF group (median: -0.83, IQR: 1.50) than in EFF group (median: 0.35, IQR: 2.51) ( $P = 0.05$ ). There were no significant differences between the two groups in other cephalometric measurements.

**Conclusion:** This study suggests that the inclination of upper incisor against Frankfurt horizontal plane or interincisal angle were possibly available to estimate the effective of OA therapy on OSA. This means that when both upper and lower incisors are significantly inclined lingually, OA therapy might probably aid the recovery on OSA.

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## Sleep Breathing Disorders

### RADIOFREQUENCY THERMOABLATION FOR SNORING TREATMENT

A. Kiani<sup>1</sup>, A. Babolian<sup>2</sup>, K. Taghavi<sup>3</sup>, N. Bandegani<sup>3</sup>, F. Razavi<sup>3</sup>, A. Abedini<sup>3</sup>. <sup>1</sup>Tracheal Diseases Research Center (TDRC), National Research Institute of Tuberculosis and Lung Diseases (NRITLD), Shahid Beheshti University of Medical Sciences, Tehran, Islamic Republic of Iran; <sup>2</sup>Department of Anesthesiology, Centre Hospitalier Universitaire Pitié-Salpêtrière, Paris, France; <sup>3</sup>Chronic Respiratory Diseases Research Center, National Research Institute of Tuberculosis and Lung Diseases (NRITLD), Shahid Beheshti University of Medical Sciences, Tehran, Islamic Republic of Iran

**Introduction:** Snoring is a long breathing sound when inhaling during sleep that is displayed with varying degrees of intensity and frequency. Snoring raises many social and everyday problems. Treatment includes medical and surgical procedures. There are some surgical procedures rarely performed due to their complications and limitations. In current study, we delivered radiofrequency thermoablation in three patients for treating snoring.

**Materials and methods:** The research was performed by a non-randomized prospective quasi-experimental method. Twenty outpatients with complaints of snoring underwent tests for inclusion criteria. After taking demographic history of the patients, the snoring scale Visual analogue scale with 10 points based on the comment of the spouse or the roommate were documented. Furthermore, Epworth Sleepiness Scale was assessed for each participant. Each patient underwent overnight polysomnography. The intensity of snoring upon overnight polysomnography and other data was documented. If the Epworth Sleepiness Scale showed mild to moderate rate of sleep apnea (11-15), the choice of radiofrequency ablation therapy was described for the patients. Three individuals who fulfill the inclusion criteria entered the study after obtaining the written informed consents. Over one session treatment, nasal drug-induced sleep endoscopy (DISE) was applied to determine snoring severity and presume site of obstruction. Thermoplasty probe was introduced at the site of nasal junction to nasopharyngeal and 10 seconds of 65 w radiofrequency energy were applied at the kissing shaped sites for four times. No repeated procedure was carried out on any of the participants (Figure 1).

**Results:** The mean age of the patients was 47 (SD=10.7) years, with a range of 25-65 years, 66.6% were men, and the mean body mass index was 29 (SD=4.5). The mean snoring score was significantly improved from 17.39 (SD=3.02) to 11.50 (SD=6.46) ( $p < 0.005$ ). The mean drowsiness score was also significantly reduced from 6.8 (SD=6.9) to 3.93 (SD=4.19) ( $p < 0.005$ ). No persistent negative impact was observed in speech or swallowing. Pain and bleeding were limited. After seven weeks of treatment, all spouses reported significant improvement of snoring in patients after one stage of treatment ( $p = 0.004$ ). Remarkable quality of life improvement was reported in patients. No post-procedure complication such as ulceration and fistula formation were reported after radiofrequency thermoablation.

**Conclusions:** Radiofrequency thermoablation as a minimally invasive method, due to tolerability and lack of pain and the ability to perform this procedure under local anesthetic is considered an outstanding and cost-effective technique for snoring treatment on outpatients.

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## Aging and Developmental Issues

### CIRCADIAN BIOMARKERS IN ASYMPTOMATIC OFFSPRING OF PATIENTS WITH LATE-ONSET ALZHEIMER'S DISEASE AND THEIR RELATIONSHIP WITH COGNITIVE PERFORMANCE

C. Abulafia<sup>1,2,3</sup>, B. Duarte-Abritta<sup>2</sup>, S.M. Sánchez<sup>2,3</sup>, M.F. Villarreal<sup>2,3</sup>, M.S. Ladrón de Guevara<sup>2,3</sup>, G. Sevlever<sup>4</sup>, L. Fiorentini<sup>2,5</sup>, S.M. Guinjoan<sup>2,3,5</sup>, D.E. Vigo<sup>1,3,6</sup>. <sup>1</sup>Institute of Biomedical Research (UCA-CONICET), Chronophysiology Laboratory, Argentina; <sup>2</sup>Fundación FLENI, Grupo de Investigación en Neurociencias Aplicadas a las Alteraciones de la Conducta, Argentina; <sup>3</sup>The National Scientific and Technical Research Council, Argentina; <sup>4</sup>Departamento de Docencia e Investigación, Argentina; <sup>5</sup>Servicio de Psiquiatría, Fundación FLENI, Buenos Aires, Argentina; <sup>6</sup>Department of Psychology and Educational Sciences, Katholieke Universiteit Leuven, Leuven, Belgium

**Introduction:** Early neuropathological changes characteristic of late-onset Alzheimer's disease (LOAD) impact structures that regulate circadian rhythms and particularly sleep. Indeed, sleep pattern is emerging as a potential biomarker, mechanistic pathway and treatment target in LOAD. We hypothesized that circadian rhythm anomalies would already be present in asymptomatic, middle-aged offspring of patients with LOAD (O-LOAD) prior to cognitive decline.

**Materials and methods:** We tested 35 subjects with at least one parent with LOAD (O-LOAD) and 31 healthy individuals without family history of Alzheimer's disease (control subjects, CS) with a series of cognitive tests, as well as actigraphy measures of sleep-wake rhythm, cardiac autonomic function via heart rate variability (HRV), and bodily temperature.

**Results:** O-LOAD displayed subtle yet significant deficits in verbal episodic memory (RAVLT learning  $48.32 \pm 1.59$  vs.  $44.12 \pm 1.21$ ,  $p = 0.005$ ; delayed recall  $10.55 \pm 0.38$  vs.  $8.68 \pm 0.52$ ,  $p = 0.005$ ) and language (Vocabulary  $50.5 \pm 1.06$  vs.  $45.06 \pm 1.48$ ,  $p = 0.004$ ) compared to CS. O-LOAD showed a more extended sleep duration ( $439.26 \text{ min} \pm 9.41$  vs.  $473.66 \text{ min} \pm 10.57$ ,  $p = .018$ ) and reduced sleep efficiency ( $97.07 \% \pm .41$  vs.  $95.75 \% \pm .48$ ,  $p = .042$ ). No significant differences were found for body temperature or HRV variables. Correlations between increased sleep duration and poorer cognition were found in CS but not in O-LOAD. Improved cognitive performance was associated to indicators of greater sympathetic activity.

**Conclusions:** Our results support the hypothesis that sleep pattern disturbances are already present very early on in relatively young asymptomatic subjects. The unexpected reduced cognitive results found in O-LOAD suggest that cognitive decline could start earlier than anticipated in the form of subtle cognitive changes within the clinically normal range. It is widely accepted that sleep pattern disturbances would result in cognitive alterations. Taken these information together with the correlations between sleep duration and cognition present in CS but absent in O-LOAD suggest some impairment in the mechanisms underlying the sleep-cognitive relationship. Sleep pattern deserves further study as a potential biomarker in LOAD, even in healthy middle-aged individuals.

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## Sleep Breathing Disorders

### GENDER DIFFERENCES IN PATIENTS WITH DEPRESSION AND OBSTRUCTIVE SLEEP APNEA

J. Acker<sup>1,2</sup>, R. März<sup>3</sup>, J. Herold<sup>4</sup>, J. Ficker<sup>5,6</sup>, G. Niklewski<sup>7</sup>, K. Richter<sup>7,8,9</sup>. <sup>1</sup>Klinik für Schlafmedizin, Bad Zurzach, Switzerland; <sup>2</sup>University of Bayreuth, Bayreuth, Germany; <sup>3</sup>Faculty of social sciences, Georg Simon Ohm University of Applied Sciences, Nuremberg, Germany; <sup>4</sup>Private Sleep Laboratory, Roth, Germany; <sup>5</sup>Department of Respiratory Medicine, Allergology and Sleep Medicine, General Hospital Nuremberg, Germany; <sup>6</sup>Paracelsus Medical University, Germany; <sup>7</sup>Department of Psychiatry and Psychotherapy, Paracelsus Medical University Nuremberg, Germany; <sup>8</sup>Faculty of social sciences, Georg Simon Ohm University of Applied Sciences Nuremberg, Nuremberg, Germany; <sup>9</sup>Faculty of Medicine, Goce Delcev University, Stip, The Republic of Macedonia