An AI-supported diagnostic tool for obstructive sleep apnea patients based on delta-alpha connectivity at the sensorimotor cortex [Abstract]

Haralampos Gouveris, Nabin Koirala, AbdulRauf Anwar, Hao Ding, Katharina Ludwig, Katharina Bahr, Tilman Huppertz, Christoph Matthias, Sergiu Groppa, Muthuraman Muthuraman

Angaben zur Veröffentlichung / Publication details:

Gouveris, Haralampos, Nabin Koirala, AbdulRauf Anwar, Hao Ding, Katharina Ludwig, Katharina Bahr, Tilman Huppertz, Christoph Matthias, Sergiu Groppa, and Muthuraman Muthuraman. 2022. "An AI-supported diagnostic tool for obstructive sleep apnea patients based on delta-alpha connectivity at the sensorimotor cortex [Abstract]." *Laryngo-Rhino-Otologie* 101 (S02): S243–44. https://doi.org/10.1055/s-0042-1747042.

CC BY-NC-ND 4.0 · Laryngorhinootologie 2022; 101(S 02): S243-S244
DOI: 10.1055/s-0042-1747042

Abstracts | DGHNOKHC
Sleeping disorders

An AI-supported diagnostic tool for obstructive sleep apnea patients based on delta-alpha connectivity at the sensorimotor cortex

Haralampos Gouveris , Nabin Koirala , AbdulRauf Anwar , Hao Ding , Katharina Ludwig , Katharina Bahr , Tilman Huppertz , Christoph Matthias , Sergiu Groppa , Muthuraman Muthuraman

› Institutsangaben

Background The modulation of delta-alpha phase-amplitude cross-frequency coupling (PACFC) may influence information processing throughout the human cerebral cortex. We investigated whether this frequency band-specific modulation is impaired in patients with obstructive sleep apnea (OSA).**Patients & Methods** In this study, the C3- and C4-electroencephalographic recordings of 170 participants (86 in main dataset: age 27-84 years, 44 subjects had moderate or severe OSA with respiratory disturbance index RDI>15/h; 84 in validation dataset: age 35 -75 years, 42 subjects with RDI>15/h) who underwent full-night polysomnography (PSG) were evaluated. We tested if the delta-alpha PACFC modulation index (MI) at the sensorimotor cortex differs between OSA patients with RDI>15/h and those with RDI≤15/h in distinct sleep stages. Further, by making use of a Support Vector Machine (SVM) algorithm, we tested if the sleep stage – specific MIs could predict RDI values of OSA patients.**Results** In both datasets, in OSA patients with RDI >15/h, the delta-alpha CFC-MI was significantly ($p< 0.05$) reduced at the sensorimotor cortex during REM and NREM1 stages, while increased during NREM2 compared to patients with RDI ≤15/h. In addition, the delta-alpha MI in REM sleep stage could provide with use of an SVM algorithm a quite reliable (82% accuracy) prediction of the RDI in OSA patients.**Conclusions** This increase in disconnection at the cortical sensorimotor areas with increasing respiratory distress during sleep further supports the concept of a cortical sensorimotor dysfunction in OSA patients. Additionally, the delta – alpha MI during REM sleep may provide an objective neurophysiologic surrogate marker of respiratory distress in OSA patients.

Publikationsverlauf

Artikel online veröffentlicht:
24. Mai 2022

Georg Thieme Verlag
Rüdigerstraße 14, 70469 Stuttgart,Germany