insomnia and sleep disturbances. Parametric and nonparametric test were used to compare differences between and within groups.

**Results:** In our study, adolescents with CFS stayed in bed longer and had a significantly delayed mid sleep time during work days compared to the healthy controls. Further, adolescents with CFS also scored significantly worse on insomnia (mean 3.4 vs 4.9), sleepiness (mean 3.7 vs 5.0) and awakening problems (mean 2.5 vs 4.9) on KSQ. Moreover, they report longer sleep onset latency than healthy controls (mean 75 min vs 31 min).

**Conclusions:** Our findings suggest that adolescents with CFS subjectively have more insomnia-, sleepiness- and awakening symptoms than their healthy peers. Objectively we found a sleeping pattern that indicates delayed sleep rhythm.

**Disclosure:** Nothing to disclose.

**P414**

EEG complexity as an indication for sleep-wake patterns in patients with disorders of consciousness

T. Wielek1, J. Lechner1, P. Ott2, S. Wegenkitt3 and M. Schabus1
1University of Salzburg, CCNS, 2University of Salzburg, Salzburg, Austria

Circadian rhythms in patients suffering from disorders of consciousness (DOC) are likely to yield diagnostic and prognostic value. Eye opening and closing might correlate with sleep-wake cycles yet are too inaccurate in order to draw a conclusive picture.

Here, we studied 24 hours EEG recordings in two lights condition in a sample of 35 patients (18 UWS, 17 MCS). Additionally, 8 hours healthy recording containing both wake periods and sleep, were performed. We analysed EEG complexity by using Permutation Entropy (PE) on 12 scalp electrodes. PE estimates complexity by extracting specific patterns from the signal and quantifying their probability of occurrence. PE can be seen as way to quantify the number of patterns present in the signal rather than their magnitude.

Across all groups, the ‘rest state’ (light OFF in VS/UWS, MCS and sleep in healthy) was characterized by reduced PE compared to the ‘active’ (light ON in VS/UWS, MCS and wake in healthy). Especially the difference between rest and active state was strongest for healthy individuals ($I_{30} = 9.070$, $P < 0.001$, $r = 0.88$), followed by MCS ($I_{16} = 2.438$, $P = 0.027$, $r = 0.52$) and smallest, yet marginally significant for VS/UWS ($I_{17} = 1.795$, $P = 0.091$, $r = 0.4$).

Results suggest preserved, however impaired, circadian reactivity in patients, with VS/UWS patients showing the strongest deterioration of the sleep-wake cycle. Present results add to a recent study by Thul et al. (2016) who have shown reduced EEG complexity in DOC patients during the active waking state.

**Disclosure:** Nothing to disclose.

**P415**

Sleepiness and fatigue in multiple sclerosis - same same but different? A systematic review on the Epworth Sleepiness Scale as an assessment tool

R. Popp1, A. Fierbeck1, H. Knüttel3, N. König1, R. Rupprecht1, R. Weissert2 and T. C. Wetter1
1Department of Psychiatry and Psychotherapy, Center of Sleep Medicine, University of Regensburg, 2University Library of Regensburg, 3Department of Neurology, University of Regensburg, Regensburg, Germany

**Objectives:** Fatigue is a frequent and distressing symptom in patients with multiple sclerosis (MS). In contrast, sleepiness, characterized by difficulties to stay awake and alert during the day, seems to be less prevalent in MS; however exact studies are lacking. In addition, there is a semantic confusion of the concepts of “fatigue” and “sleepiness”, which are often used interchangeably.

**Methods:** We conducted a systematic review of studies using the Epworth Sleepiness Scale (ESS) for the assessment of daytime sleepiness in patients with MS.

**Results:** The summarized results of 48 studies demonstrate that sleepiness, as indicated by elevated ESS scores, is less prevalent and less severe than fatigue but is present in a significant proportion of patients with MS. In most cross-sectional and longitudinal studies, there was a moderate association between ESS scores and various fatigue rating scales. Longitudinal studies on the effect of wakefulness-promoting agents failed to show a consistent improvement of sleepiness or fatigue as compared to placebo. It has also been shown that daytime sleepiness is frequently associated with comorbid sleep disorders that are often underrecognized and undertreated in MS.

**Conclusions:** Sleepiness and potential sleep disorders may also precipitate and perpetuate fatigue in patients with MS and should be part of the differential diagnostic assessment. To support an appropriate decision-making process, we propose an algorithm for the evaluation of sleepiness as compared to fatigue in patients with MS.

**Disclosure:** Nothing to disclose.