



Pathophysiology of sleep bruxism in children



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https://researchmap.jp/read0111598_hrfc15

Abstract

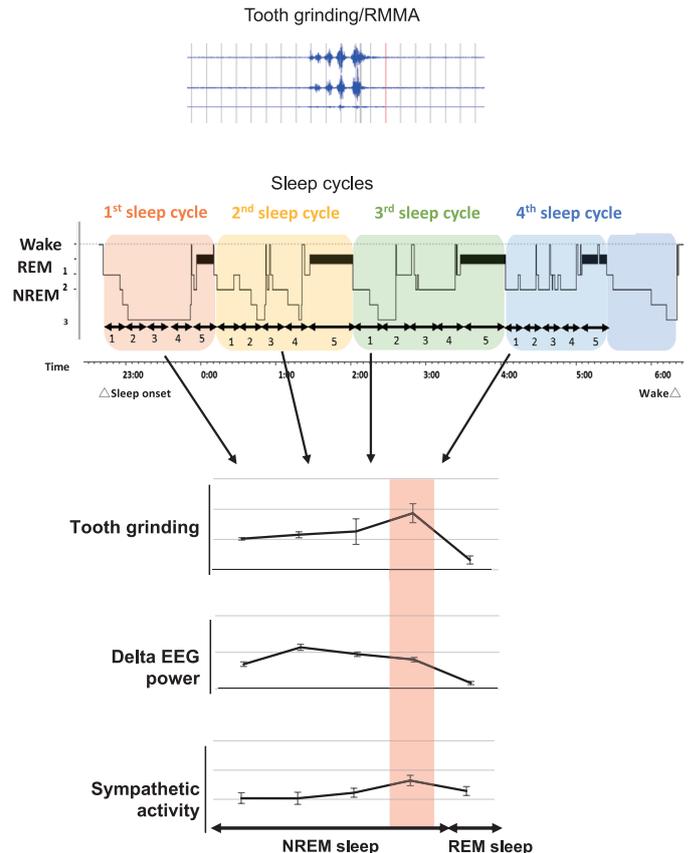
Tooth grinding is reported by 20% of children. However, pathophysiology of Sleep bruxism (SB) in children remains to be clarified. In this study, polysomnographic recordings were done in 44 healthy children in sleep research laboratory. Then, sleep depth and autonomic activity were quantified, and tooth grinding and arousals were scored. The values were compared between children with or without tooth grinding. Approximately 27% of children was diagnosed as having SB. Tooth grinding was found to occur in the cluster in the light NREM sleep during the transition from deep NREM sleep to REM sleep. The periods were characterized by the decrease of delta EEG power, the raise in sympathetic activity and the increase of arousals. Tooth grinding was also associated with cortical and movement arousals. Therefore, the study first documented in children that the occurrence of tooth grinding is fluctuated in relation to physiological changes within sleep cycles.

Background & Results

Sleep bruxism is characterized by the frequent occurrence of tooth grinding during sleep. Prevalence of tooth grinding is approximately 20% in children. Severe and frequent tooth grinding can be associated with tooth wear and orofacial pain in children. However, the mechanism of tooth grinding has not been clarified. In addition, no appropriate diagnosis and treatment have been established. To elucidate the mechanisms of sleep bruxism, we need to collect multiple physiological data from healthy children, and analyze the physiologic changes in relation to jaw muscle EMG activity. However, the research in children has not progressed at all due to the difficulties in recruiting and recording children in sleep laboratory and the requirements of specific knowledge for pediatric sleep medicine. In this study, sleep laboratory was set up for recording polysomnography, a gold standard of sleep recording, for research purpose. Then polysomnography was performed for 44 children from 6 to 15 years old. Analyzing cortical electroencephalographic activity and heart rate variability in relation to jaw muscle activity, we found that tooth grinding occurred in cluster in the light NREM sleep during the transition from deep NREM sleep to REM sleep. This period was characterized by the decrease of delta EEG power, the raise in sympathetic activity and the increase of arousal events. Therefore, the study first documented in children that the occurrence of tooth grinding is cyclically fluctuated in relation to sleep cycles.

Significance of the research and Future perspective

The results provide a new insight of pediatric sleep bruxism for the future development of diagnosis and treatment strategies.



**Light NREM sleep period shifting
deep NREM to REM sleep
Tooth grinding↑
Sleep depth (δpower) ↓
Sympathetic activity↑**

Patent

Treatise

U R L

Keyword

Shiraishi, Y; Tachibana, M; Shirota, A et al. Relationships between cortical, cardiac, and arousal-motor activities in the genesis of rhythmic masticatory muscle activity across sleep cycles in primary sleep bruxism children. Sleep. 2021; 44(11): zsab156. doi: 10.1093/sleep/zsab156

sleep, bruxism, development, children, EEG

Life science