

based on FFT power spectrum analysis of the EEG

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Introduction

"Waveform recognition" to specify the frequency element of the EEG has been used for scoring of sleep stages in experimental animals.

However, this method implies some difficulties for defining adequate parameters based on subjective scoring by skillful researchers. In this study, we suggest much more efficient and time-saving method to improve time consuming procedure of sleep-scoring for basic researchers.

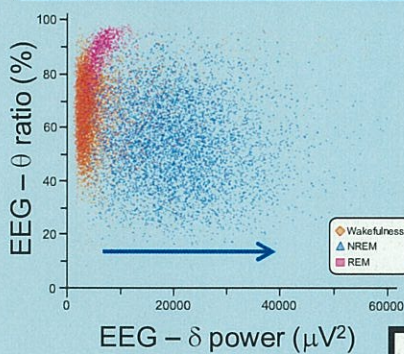
Conclusion

We developed new algorithm that is used the objective parameters such as FFT analysis and locomotion activity.

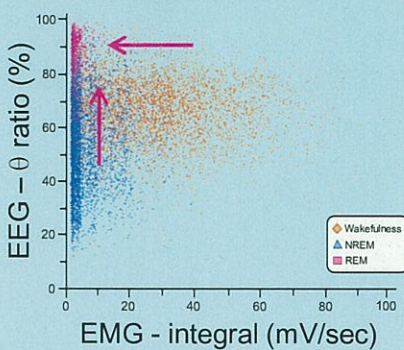
It was in **>90% agreement with visuals** and decreased in **the processing time of 1/6**.

Parameters to score

δ (0.75~4Hz) power \rightarrow NREM



θ (4~10Hz) ratio
EMG integral \rightarrow REM



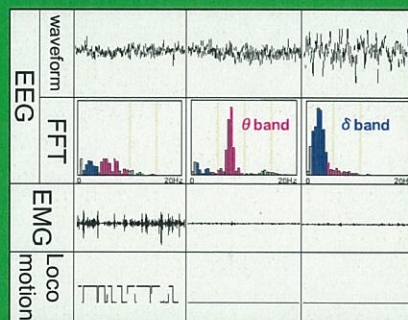
To exclude Artifact



The stage was misidentified as NREM state because the swinging noise is included in the δ band.

Wakefulness state was identified by the locomotion activity to be 54% of this state specified by the visuals.

FFT algorithm



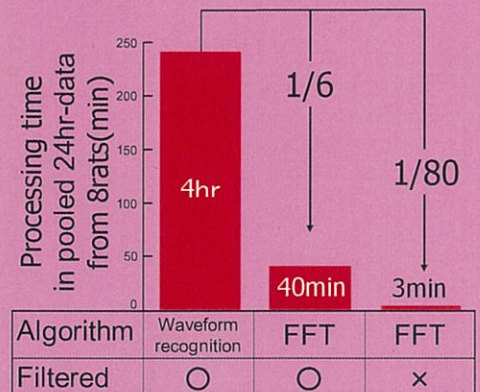
Calculation of parameters to score
SleepSign (KISSEI COMTEC)

Wakefulness REM NREM

Percent agreement between FFT algorithm and visuals (n=10)

Wake	93.4 ± 5.6 %
REM	82.5 ± 2.4
NREM	85.0 ± 3.7
All states	90.9 ± 4.0

Processing time



Hypnogram and time course of parameters

