

# N3 sleep

N3 sleep is a regenerative period where your body heals and repairs itself. The first episode of Stage N3 lasts from 45-90 minutes. Subsequent episodes of N3 sleep have shorter and shorter time periods as the night progresses. N3 sleep decreases with age such that elderly people may have no measured N3 sleep at night.

Cserpan et al. selected 16 whole-night scalp EEG recordings of paediatric patients with a focal structural epilepsy. They used an automated clinically validated High-frequency oscillations (HFO) detector to determine HFO rates (80-250 Hz). They evaluated the reproducibility of HFO detection across intervals.

HFO rates were higher in N3 than in N2 and REM (rapid eye movement) sleep and highest in the first sleep cycle, decreasing with time in sleep. In N3 sleep, the median reliability of HFO detection increased from 67% (interquartile range: iqr 57) to 78% (iqr 59) to 100% (iqr 70%) for 5-, 10-, and 15-min data intervals, improving significantly ( $p = 0.004$ ,  $z = 2.9$ ) from 5 to 10 min but not from 10 to 15 min.

They identified the first N3 sleep stage as the most sensitive time window for HFO rate detection. At least 10 min N3 data intervals are required and sufficient for reliable measurements of HFO rates.

The study provides a robust and reliable framework for scalp HFO detection that may facilitate their implementation as an EEG biomarker in pediatric epilepsy<sup>1)</sup>.

<sup>1)</sup>

Cserpan D, Rosch R, Lo Biundo SP, Sarnthein J, Ramantani G. Variation of scalp EEG high frequency oscillation rate with sleep stage and time spent in sleep in patients with pediatric epilepsy. Clin Neurophysiol. 2022 Jan 12;135:117-125. doi: 10.1016/j.clinph.2021.12.013. Epub ahead of print. PMID: 35085923.

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