

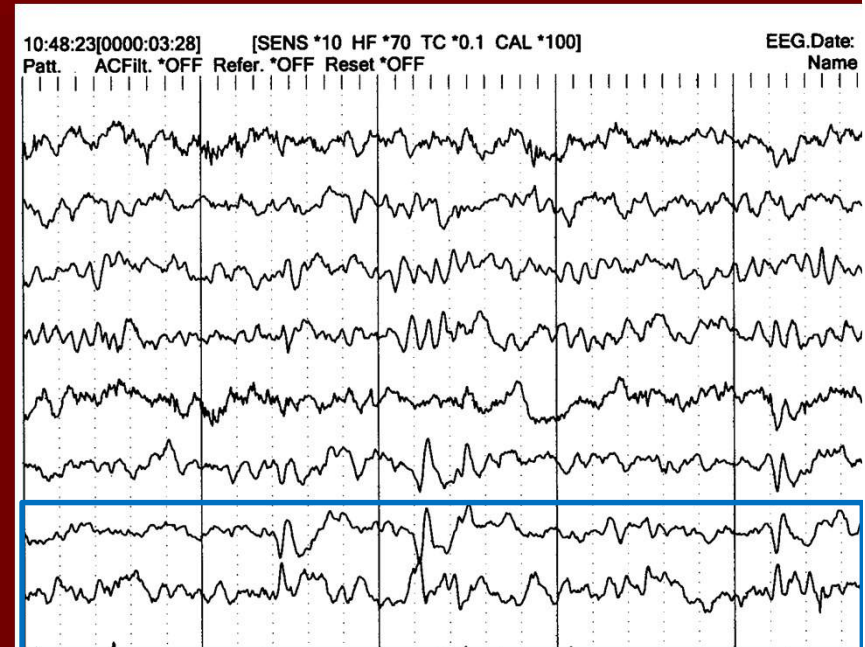
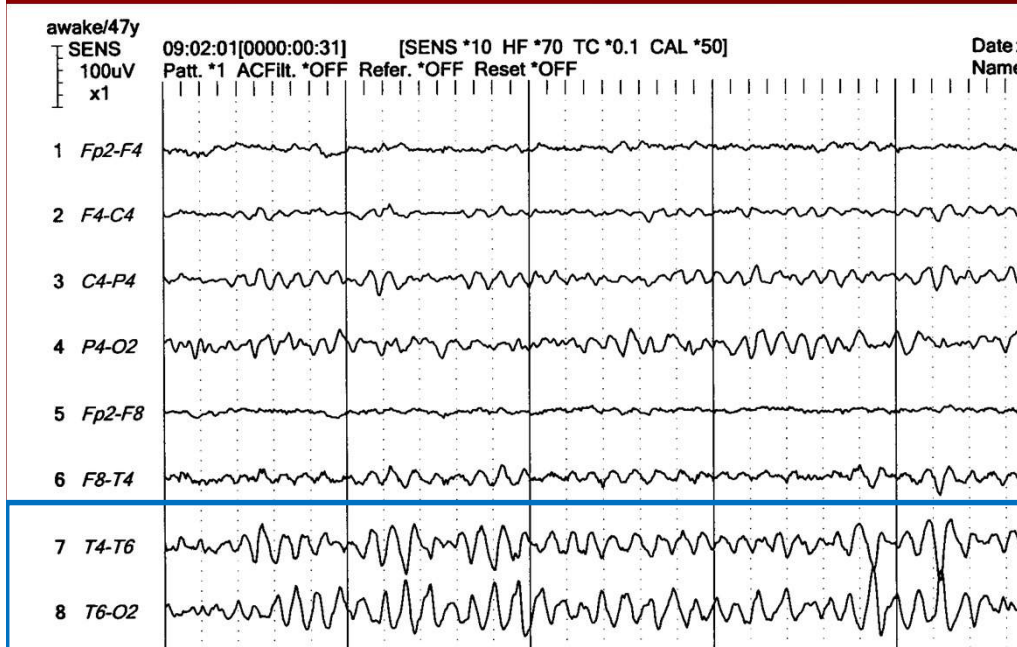
Benign Sharp Events in the EEG

Those that at first glance may
appear to be “epileptiform”

False Positive Findings in Bipolar Recordings

- Some writers implicate bipolar recordings as a cause of false positive findings
- In some instances inward phase reversals can become equivalent to abnormality, more specifically an epileptiform abnormality
- EEG reports in the “abnormal” section, “There was a phase reversal in...” without specifying the event

Misinterpretation of phase reversals



Are both the left and right examples abnormal???

Apart from ± 7 Named Patterns in “Training Manuals” there are...

“Nameless fluctuations” which seem to be very underestimated

These benign fluctuations of sharply contoured background rhythms – essentially variations of alpha

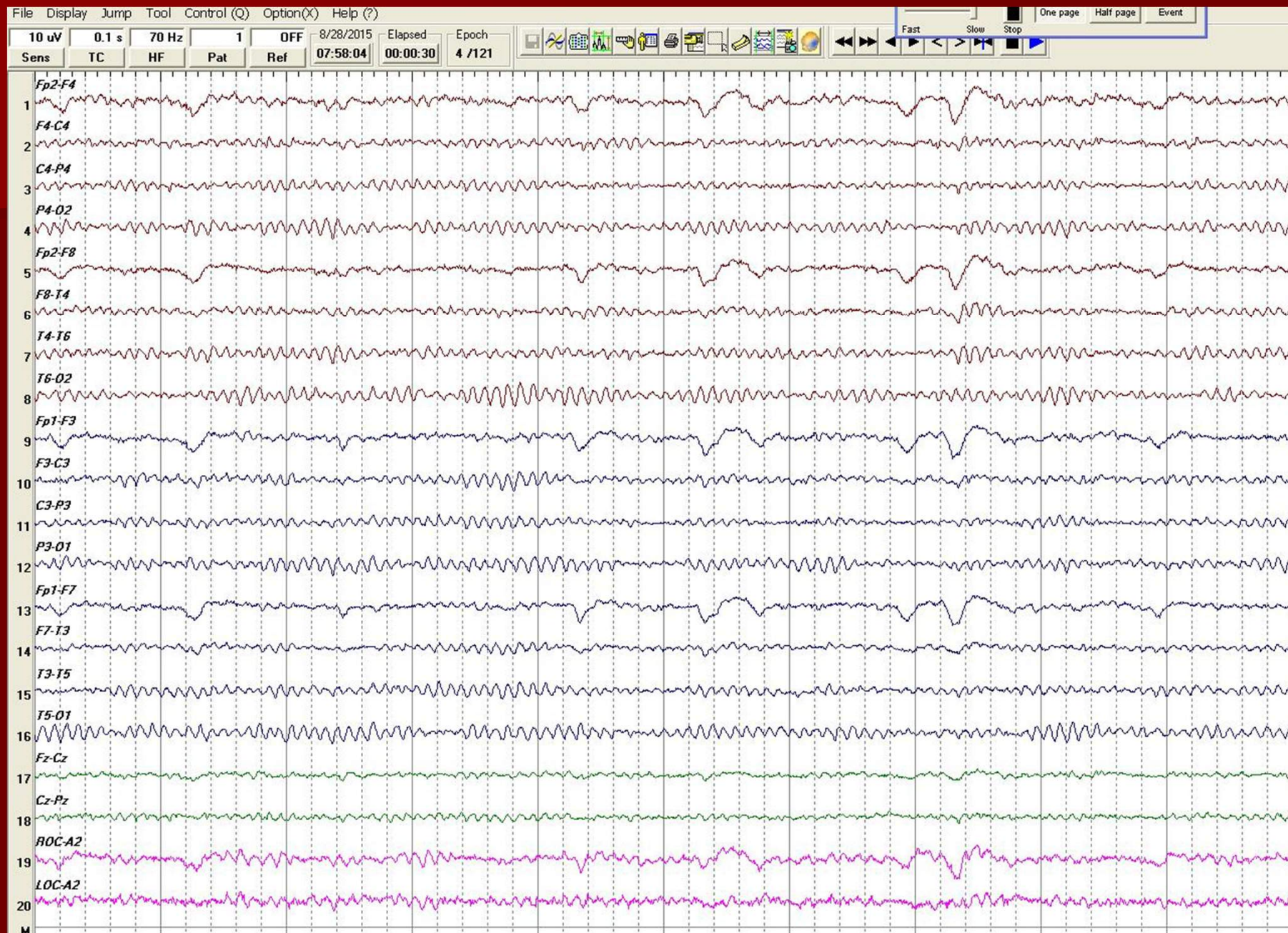
Most common over-read EEG pattern resulting in erroneous diagnoses of epilepsy.

What are these “nameless fluctuations”?

Variants of Alpha:

- Unusually sharply contoured
- Extending into temporal derivations
- Fragmented by drowsiness
- Poorly regulated alpha
- Admixed with theta

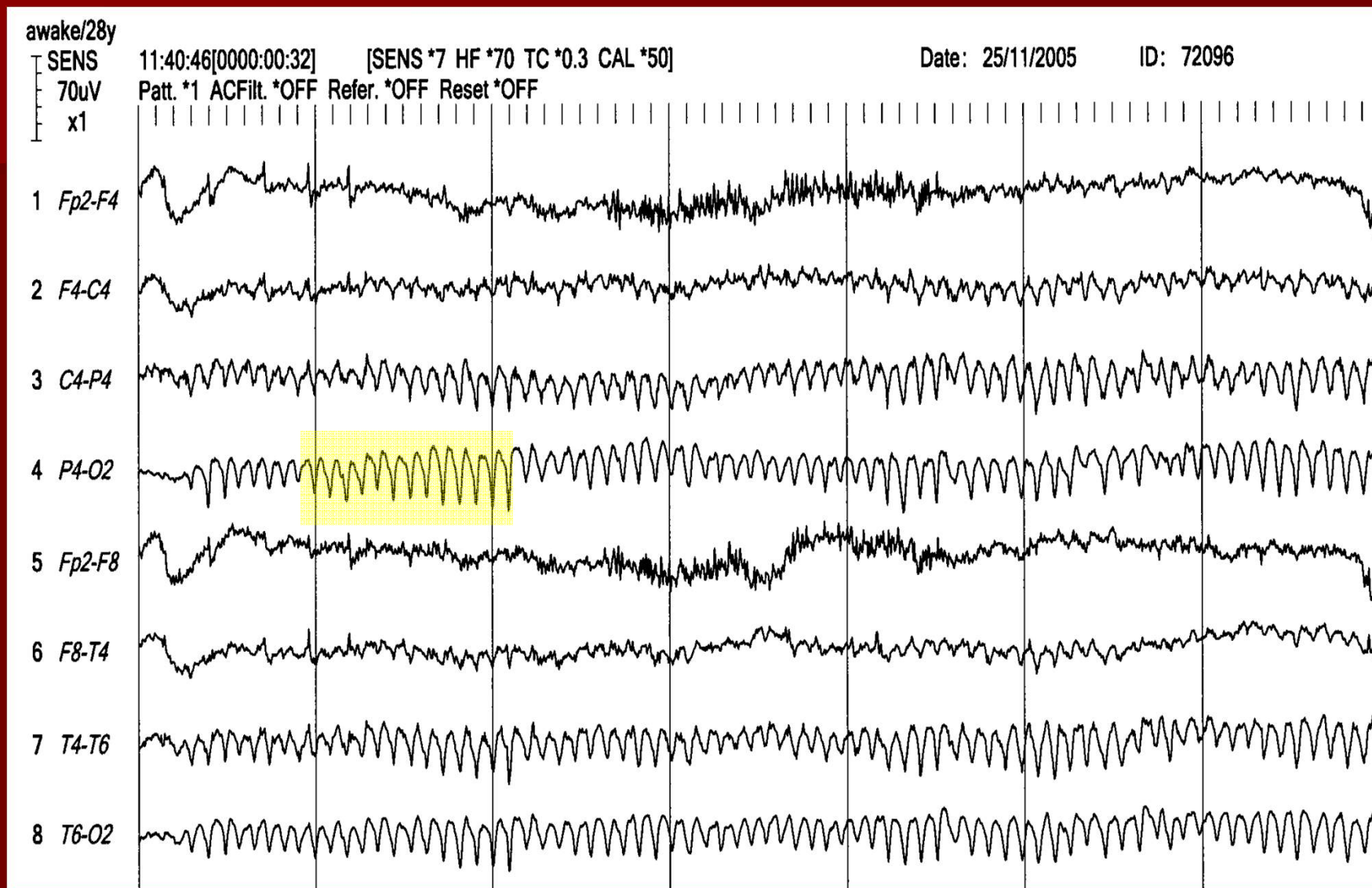
"Super" alpha is a rarity



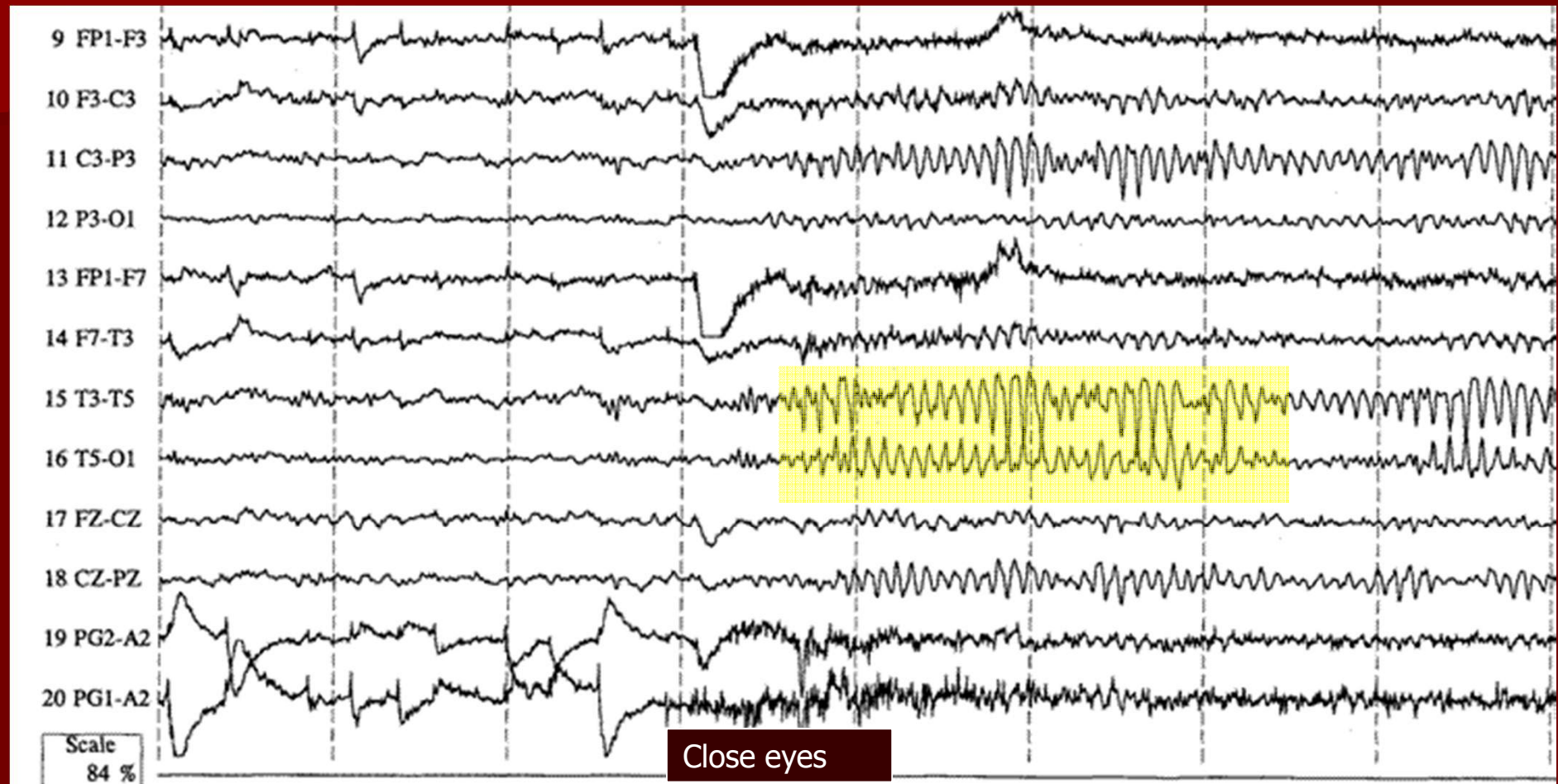
Some neglected aspects of α

- Most prominent in occipital area in 65% of adults
- In the other 35% voltage higher in parietal or posterior temporal regions.
- Mixing α and β can make the α appear sharp.
- In a extensively quoted study of “over-read” EEG patterns the above accounted for 80% of errors

Sharply profiled alpha



Sharply profiled alpha and also maximal posterior temporally



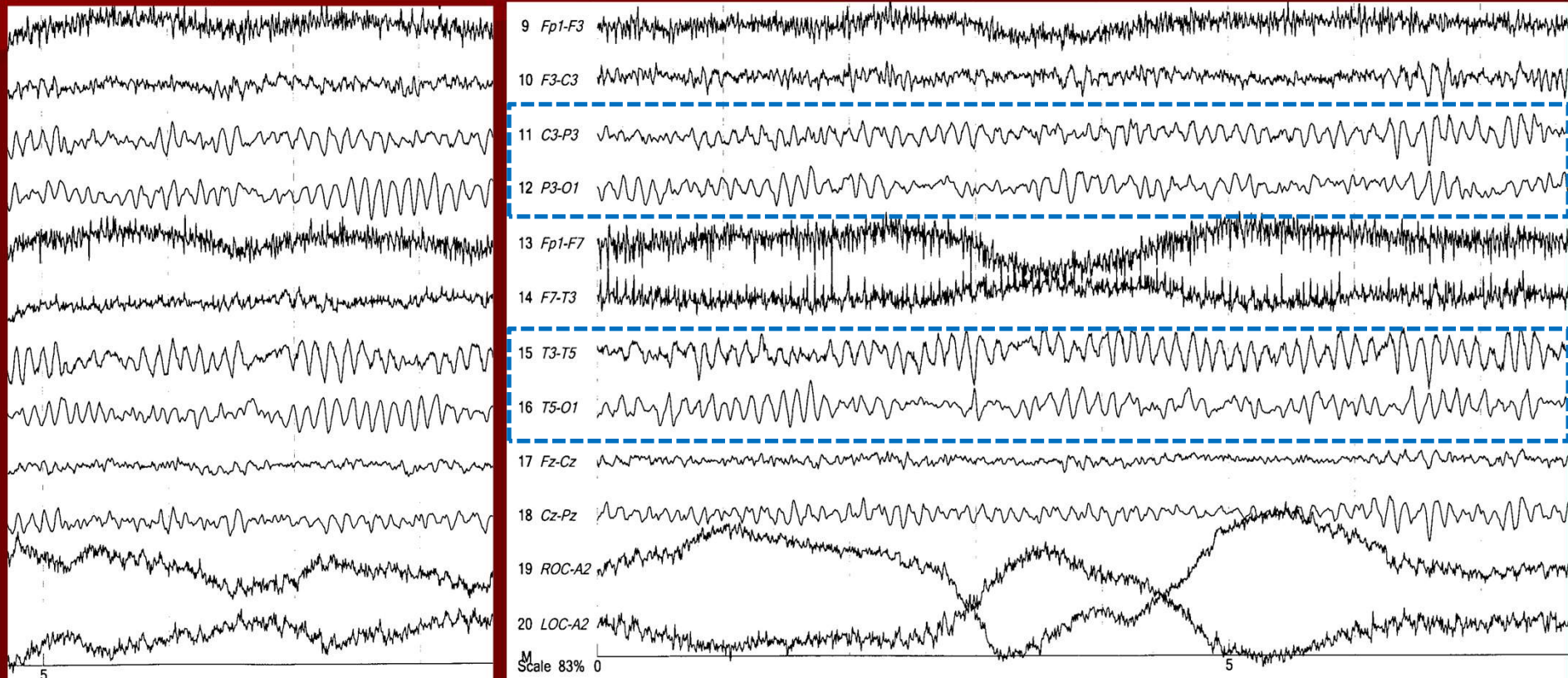
Fragmented alpha

awake/drowsy/47y

Page 1

SENS 13:39:05[0000:29:00] [SENS *7 HF *70 TC *0.3 CAL *50]
70uV Patt. *1 ACfilt. *OFF Refer. *OFF Reset *OFF
x1

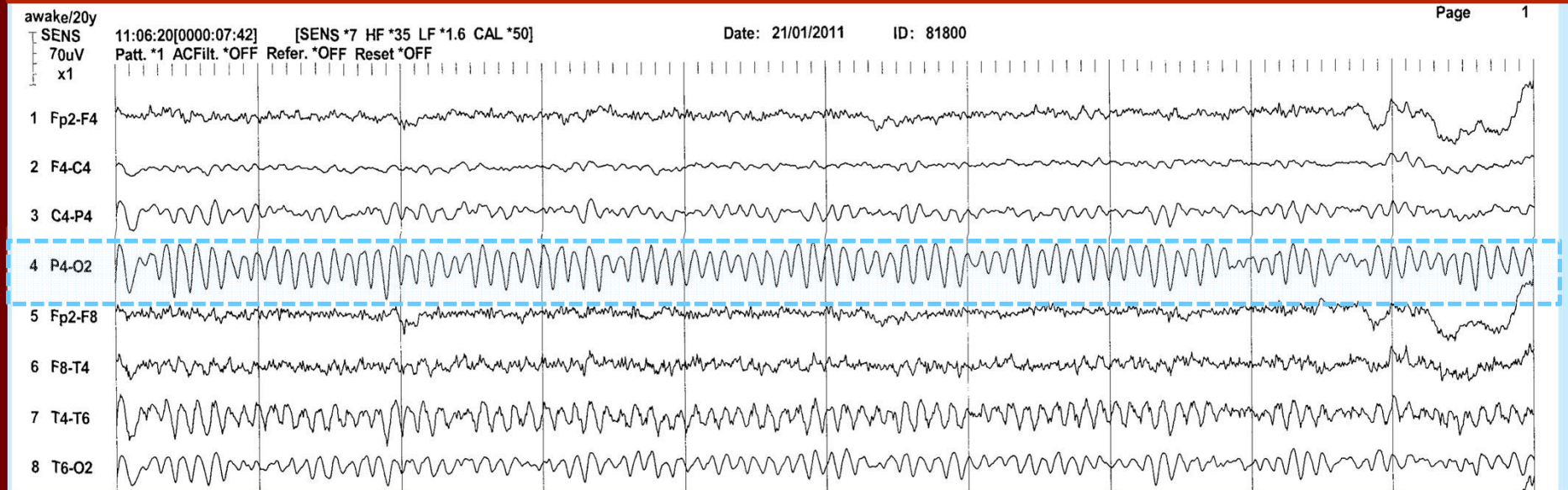
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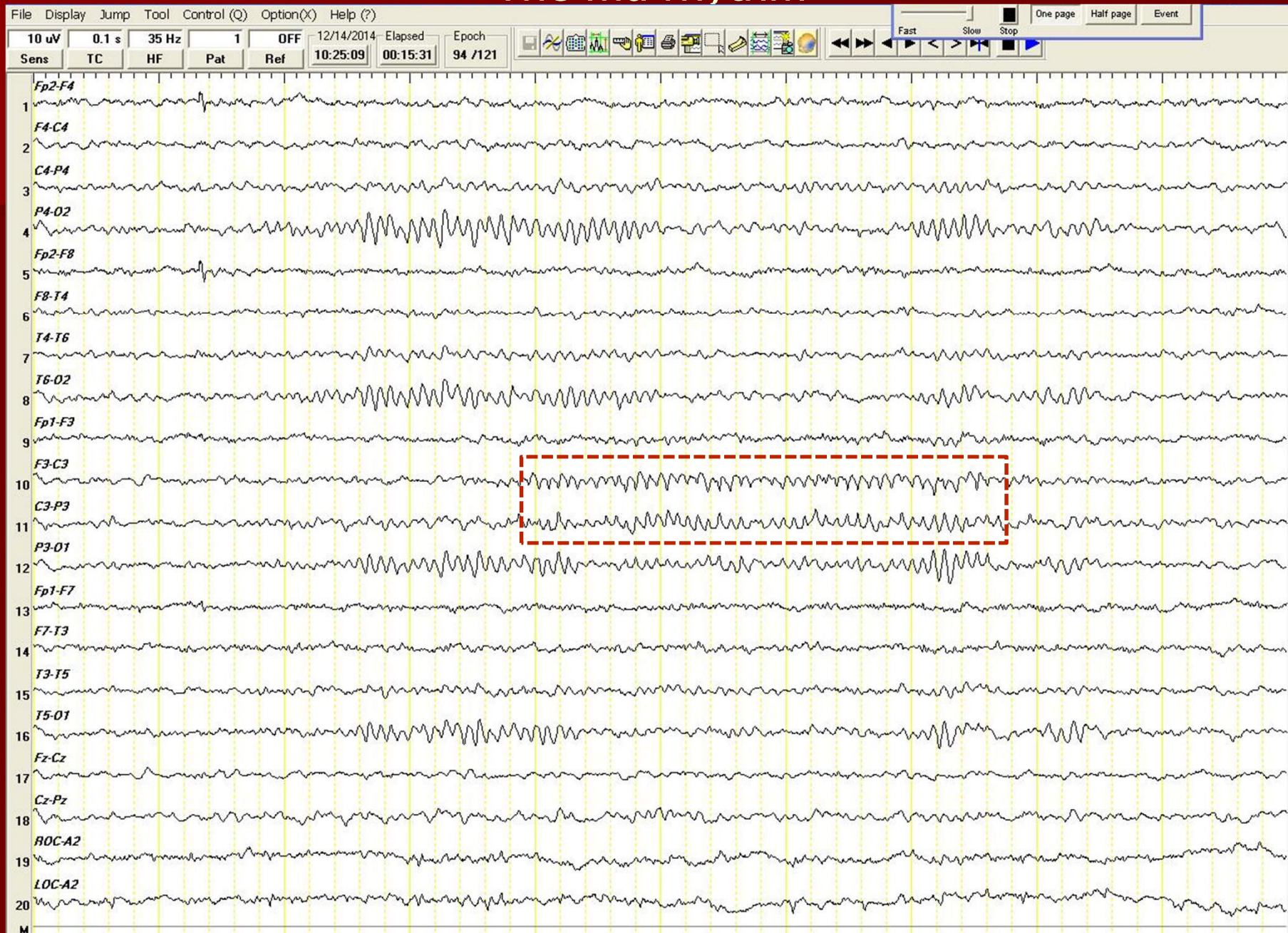
More awake

More drowsy

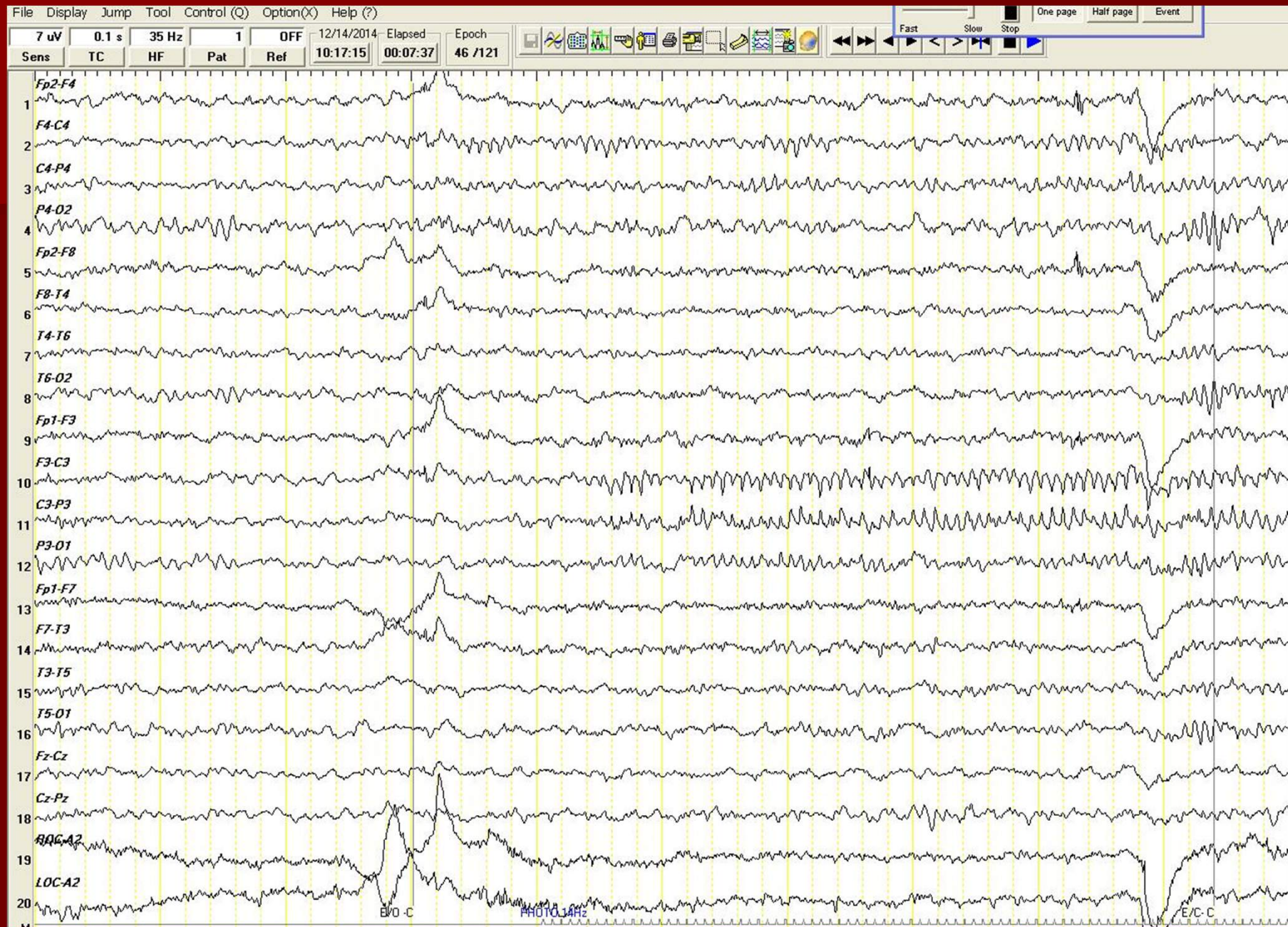
Poorly regulated compared to well-regulated alpha



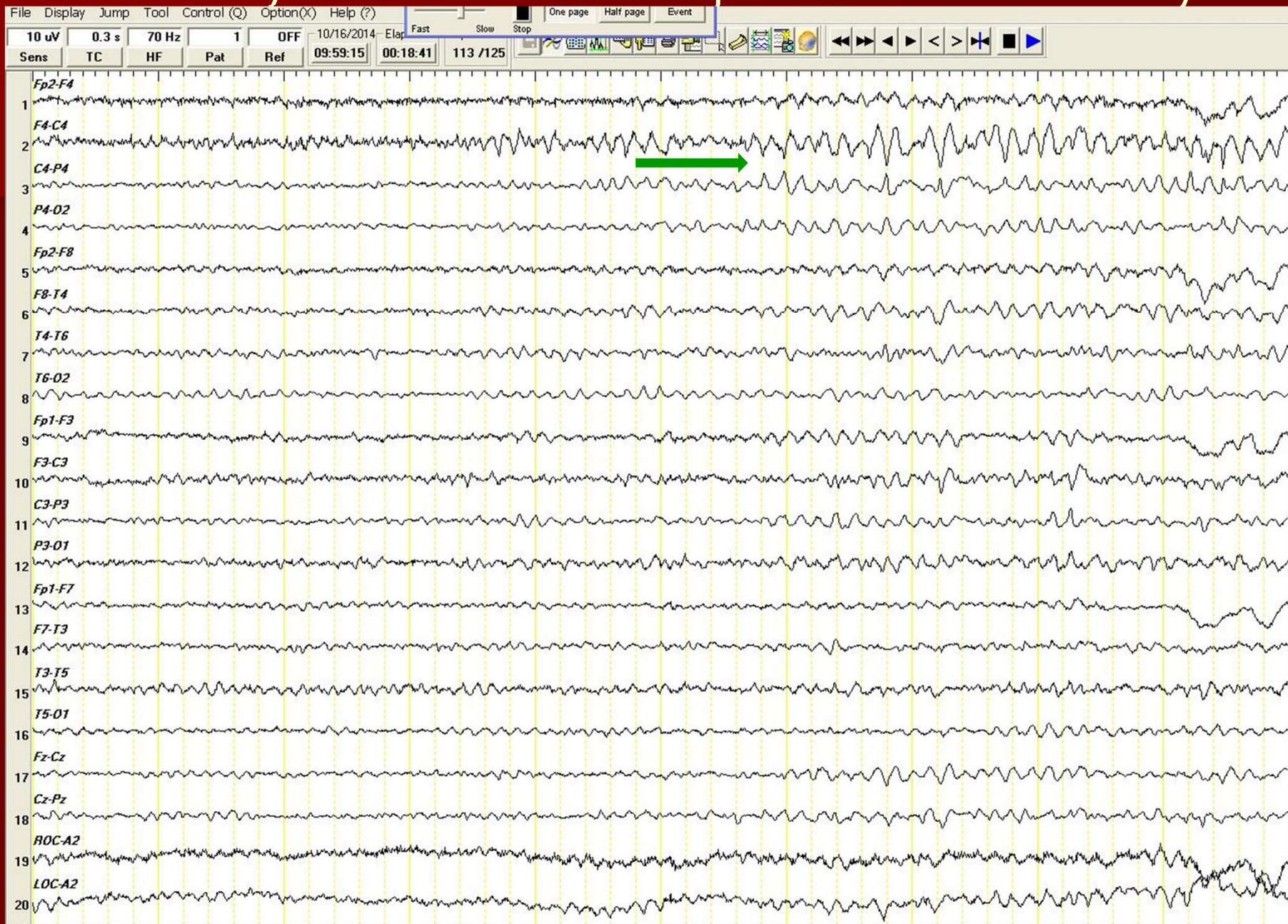
The mu rhythm



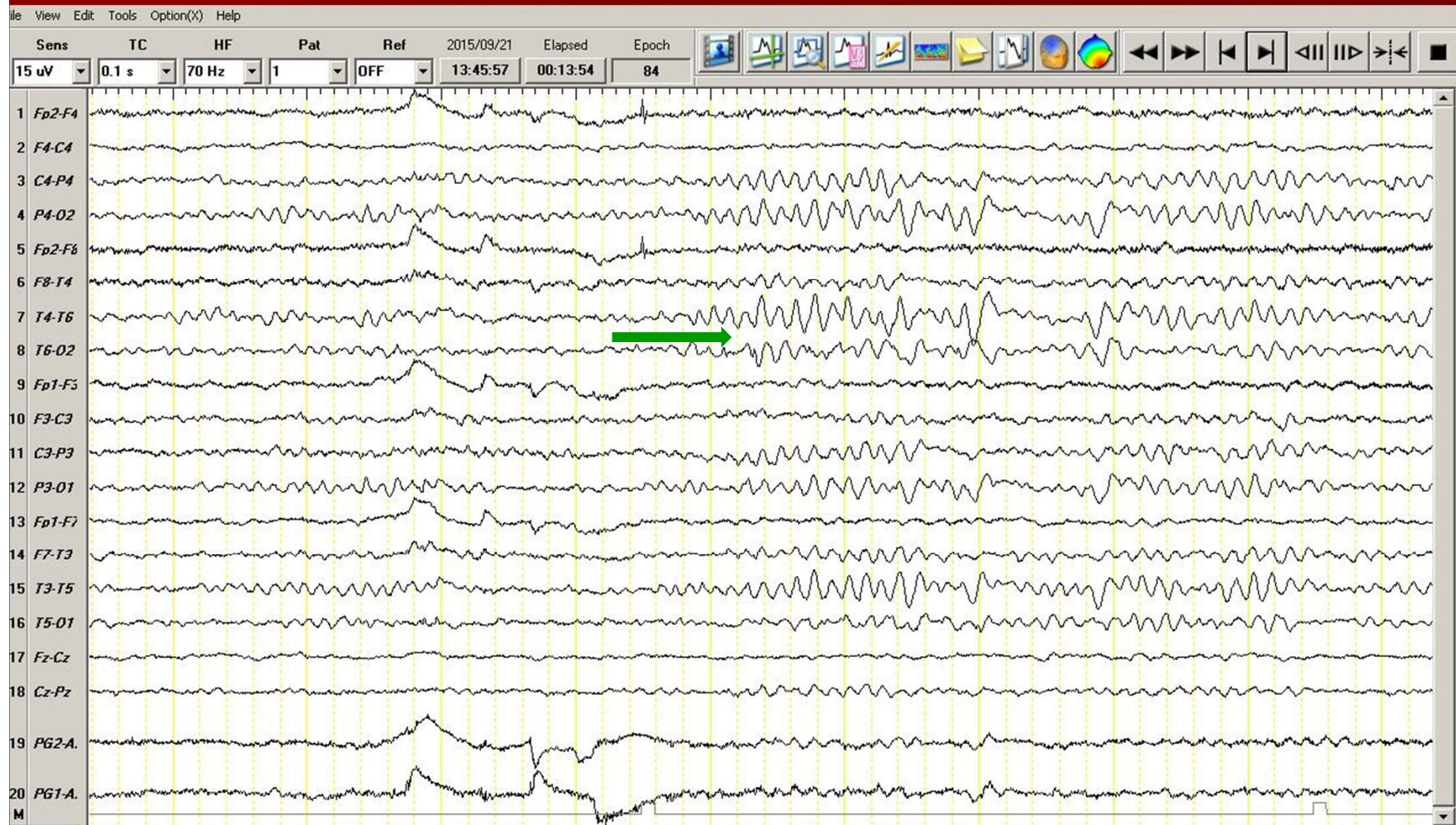
The mu rhythm



Other activity in wakefulness with phase reversals: mu rhythm



Furthermore: "fused slow transients"



Usual Culprits in False Positive EEGs – “Text” Books & Review Papers

1. Wicket waves/“spikes”
2. BSSS (benign sporadic sleep spikes)
3. RMTTD (rhythmic mid-temporal theta of drowsiness)
4. 14 & 6/s positive rhythm/“spikes”
5. Hypnagogic hypersynchrony (esp. with spikes)
6. Hyperventilation-induced slowing
7. 6/s “phantom” spike and wave



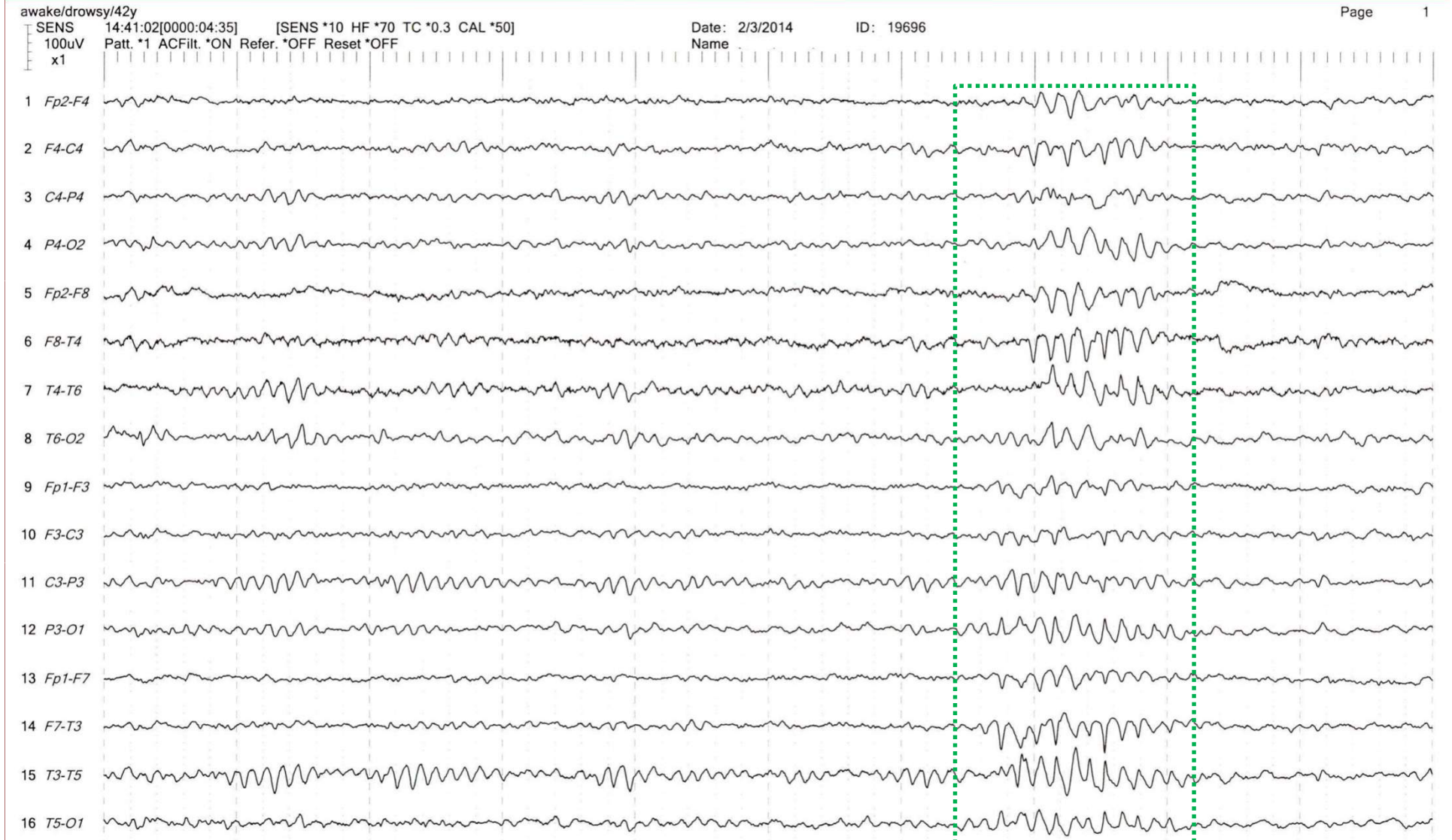
**Usually
maximal
temporally**



**Typically
Wide-
spread**

Wicket waves/rhythm

6-11 Hz, arch-shaped, medium-high voltage waves, maximal temporally, often alternating between right & left.

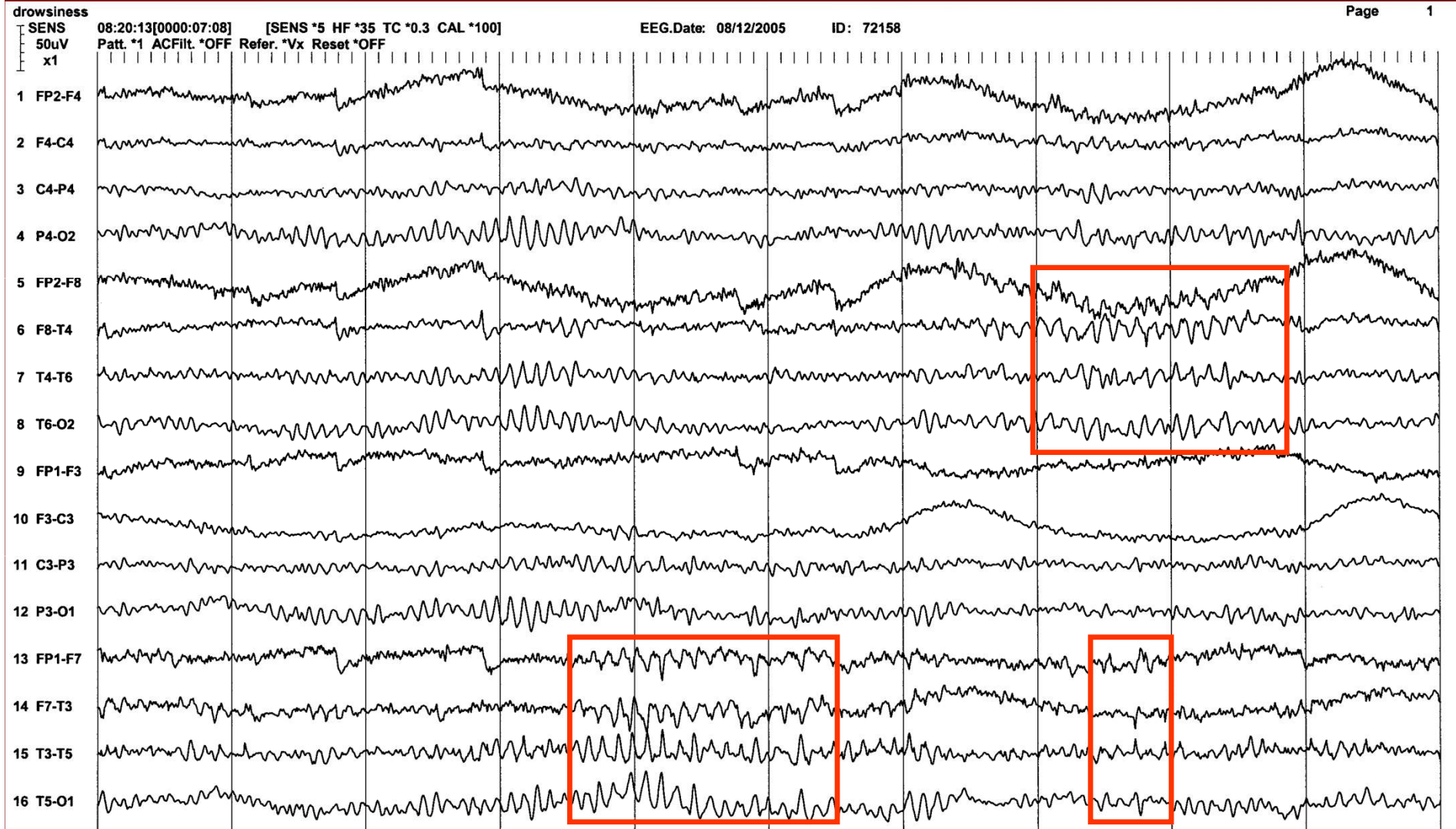


What's the problem?

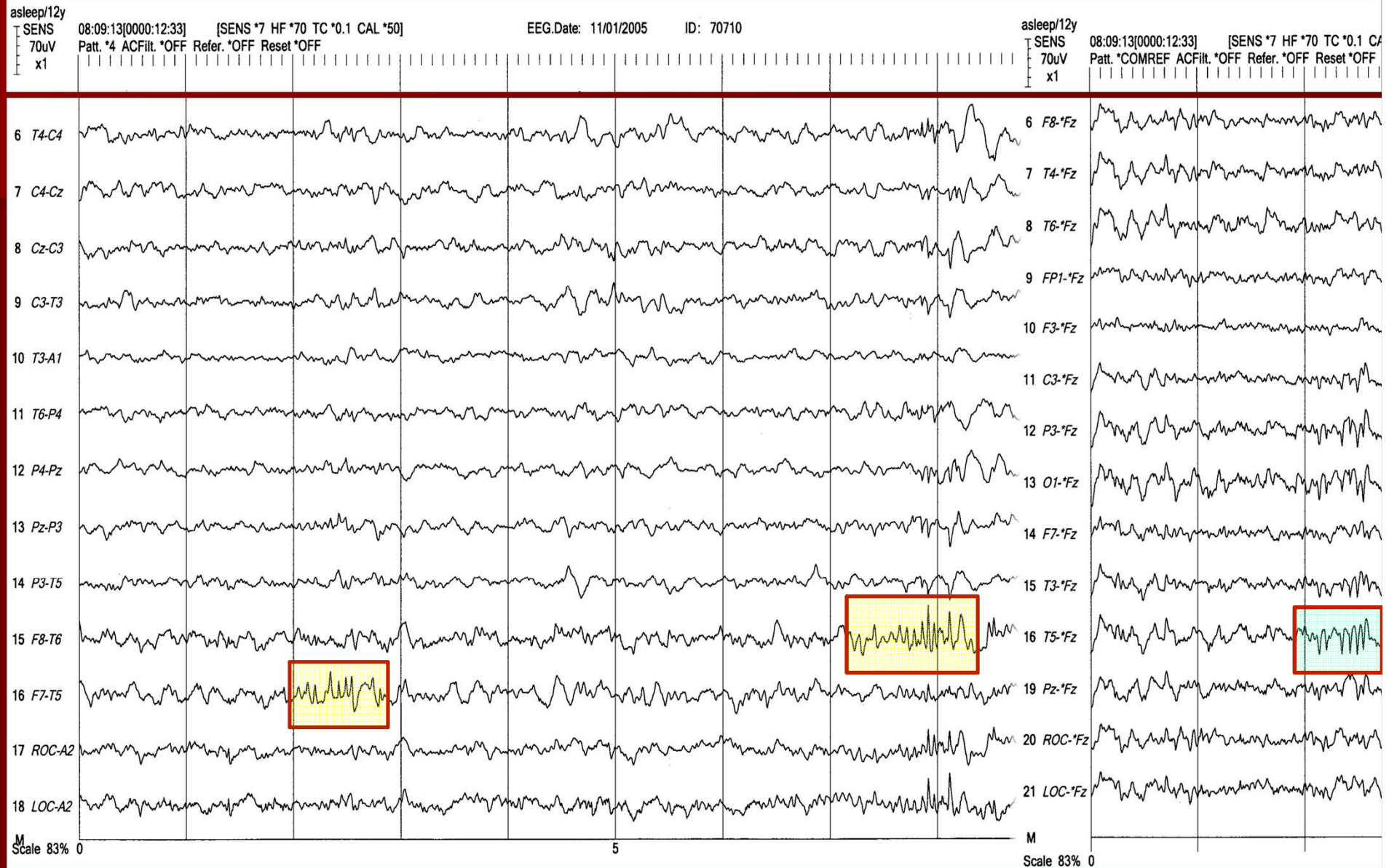
Can be confused with epileptiform spikes or sharp waves.

- Johns Hopkins Neurophysiology re-analyzed EEGs from other units.
- 54% of wicket waves had been misinterpreted as “epileptiform” & contributed to misdiagnosis of epilepsy.
- What these patients really had: Syncope, near-syncope, psychogenic non-epileptic seizures, hyperventilation syndrome, migraine etc.

Wicket waves left and right temporally



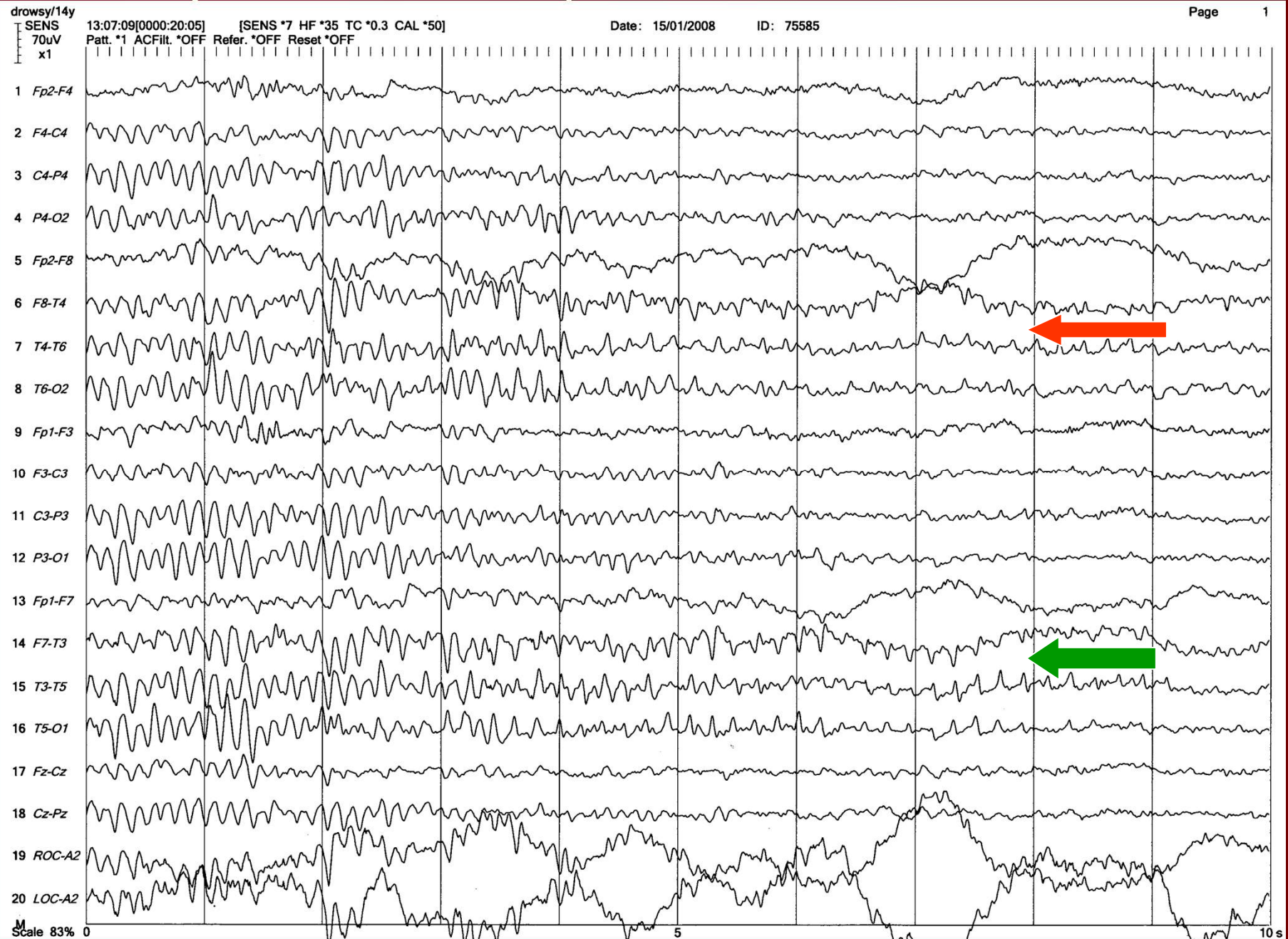
Another rare culprit: 14/s & 6/s positive bursts



Bipolar: Alternating right & left temporal

Referential

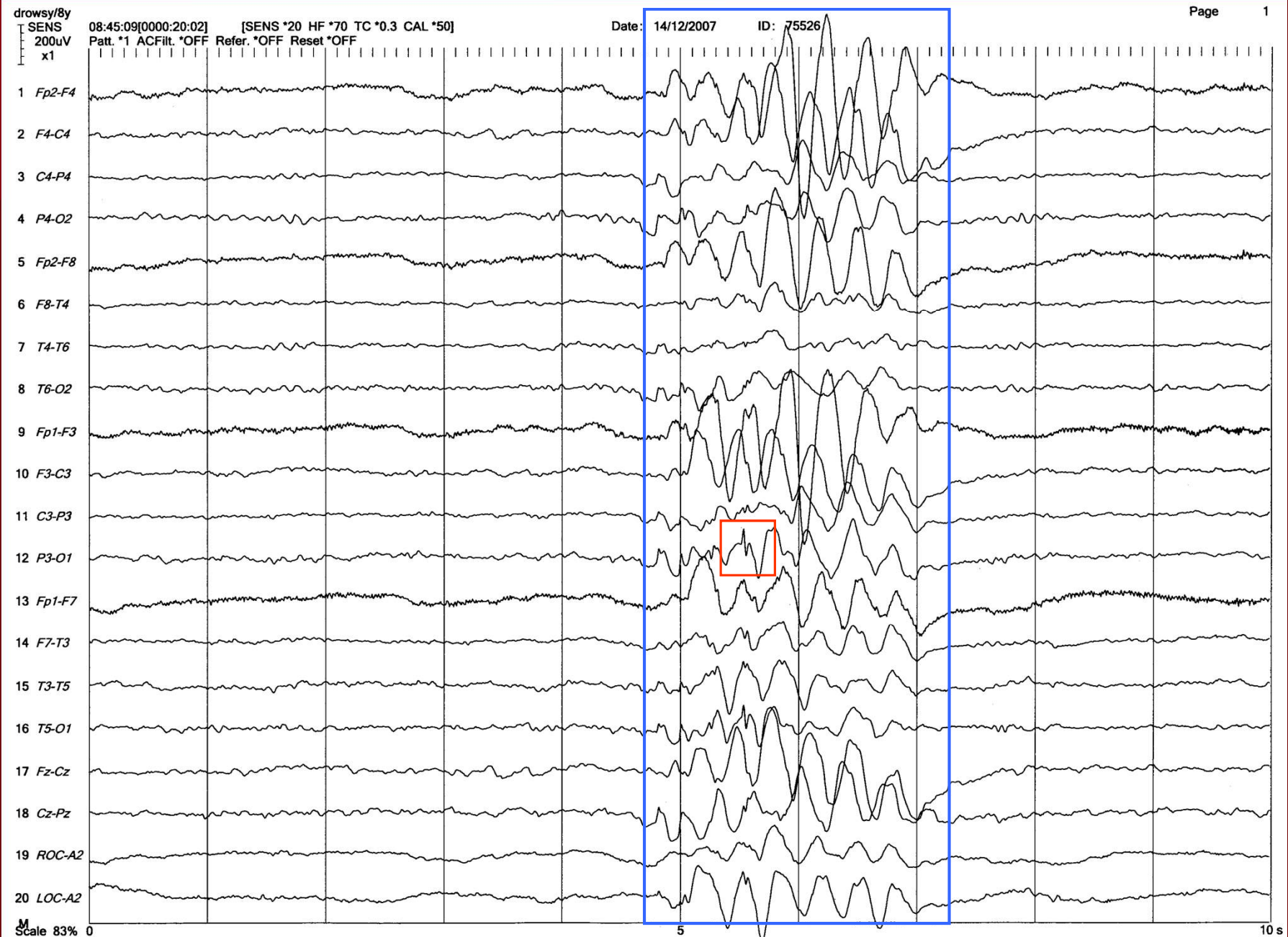
Rhythmic Mid-Temporal Theta of Drowsiness



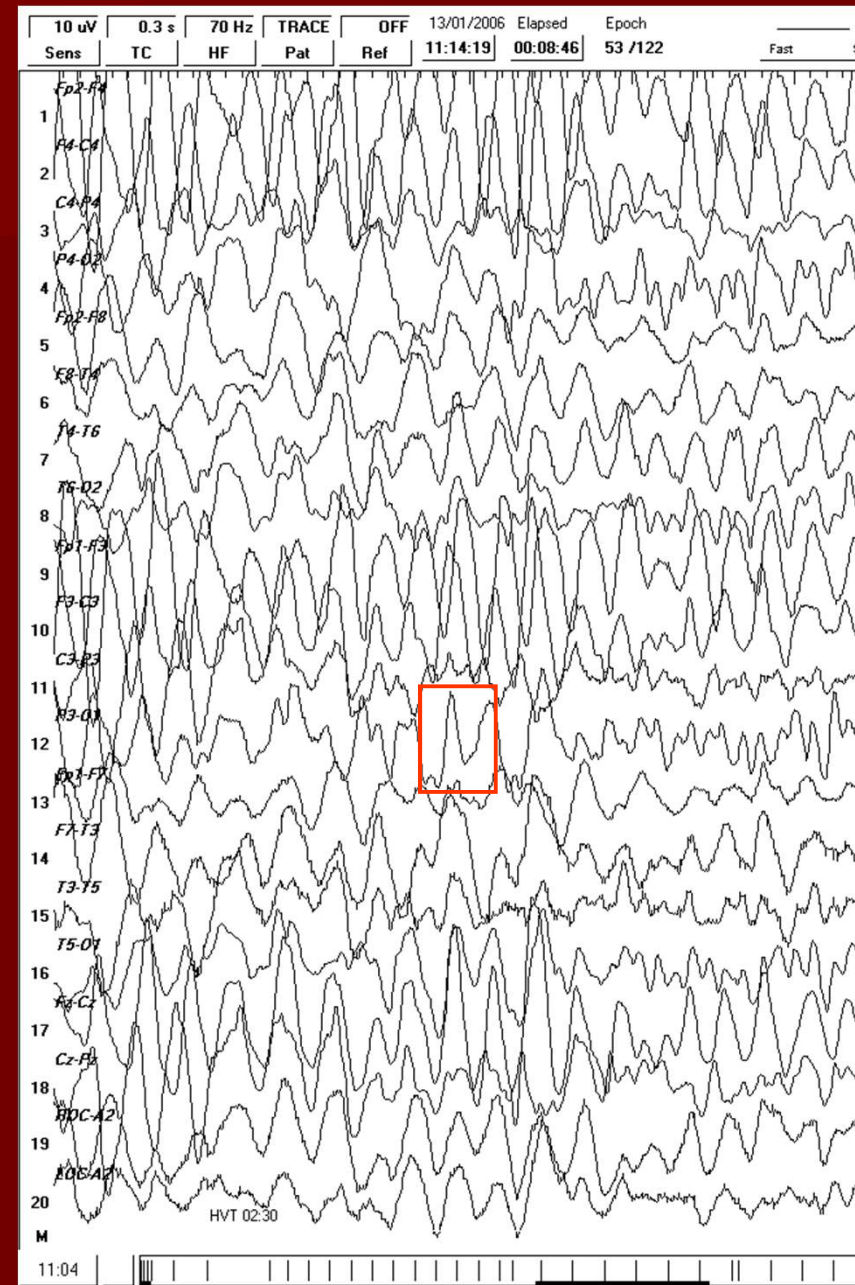
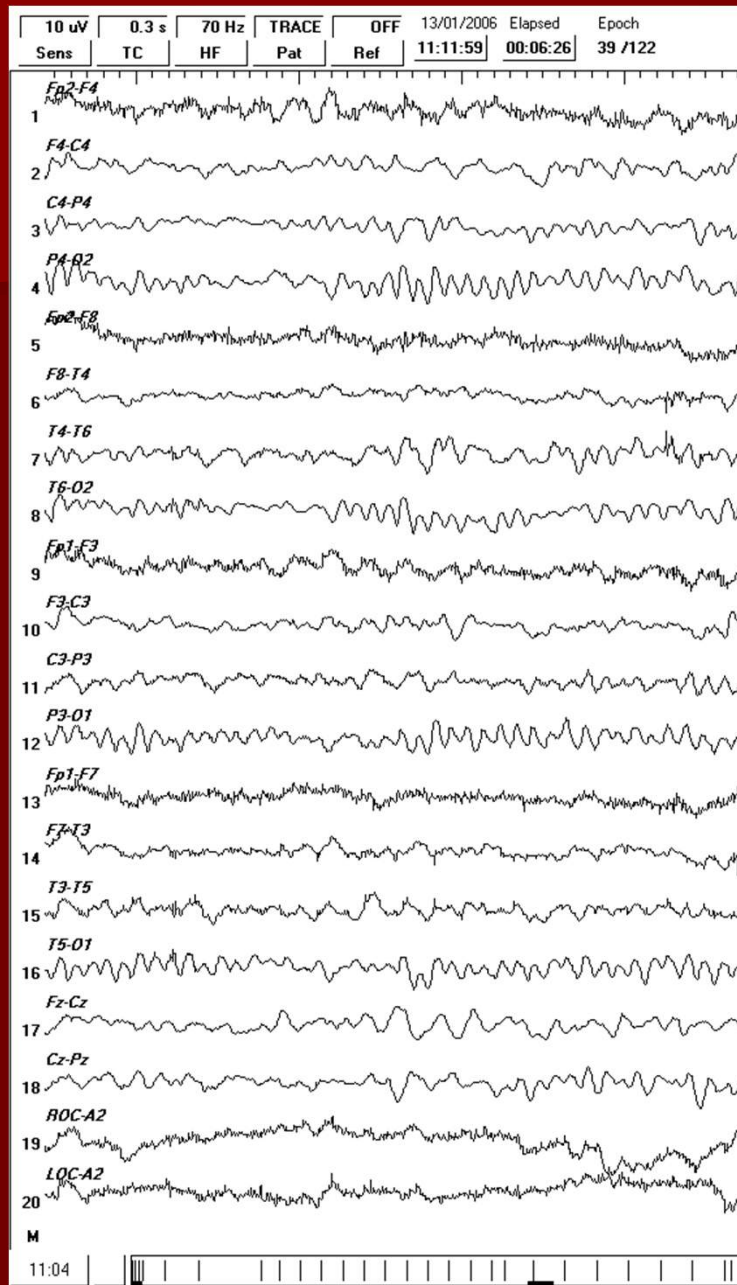
Benign Sporadic Sleep Spikes (BSSS)



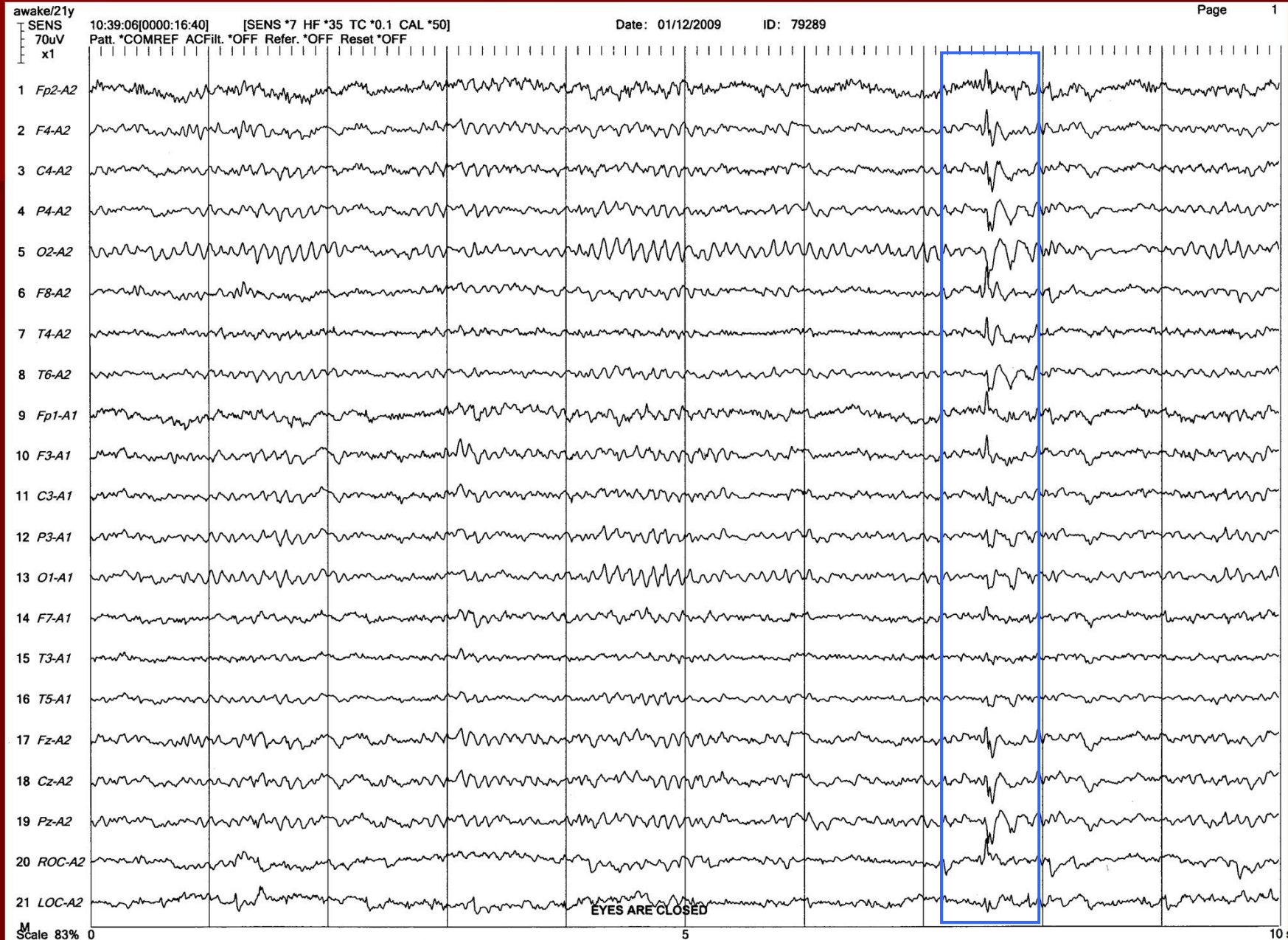
Hypnagogic hypersynchrony (with spikes)



Hyperventilation-induced slowing (adult)



6 Hz spike and (theta) wave ("phantom" spike and wave)



The MAULSBY Guidelines for Assessing Spikes (1971)

5. Ignore spikes which can be explained by simple alterations in the voltage of existing background rhythms or by superimposition of fast, usually beta, activity.