When is a spike a spike?

When is a spike one with likely clinical significance?


File Display Jump
5 uV
0.3 s
Sens
TC
HF
Pat
4/15/2015
16:54:35
Elapsed
00:08:47
Epoch
53 /56
Fp2-C4
C4-O2
Fp2-T4
T4-O2
Fp1-C3
C3-O1
Fp1-T3
T3-O1
Fz-Cz
Cz-Pz
PG2-A2
PG1-A2
1
2
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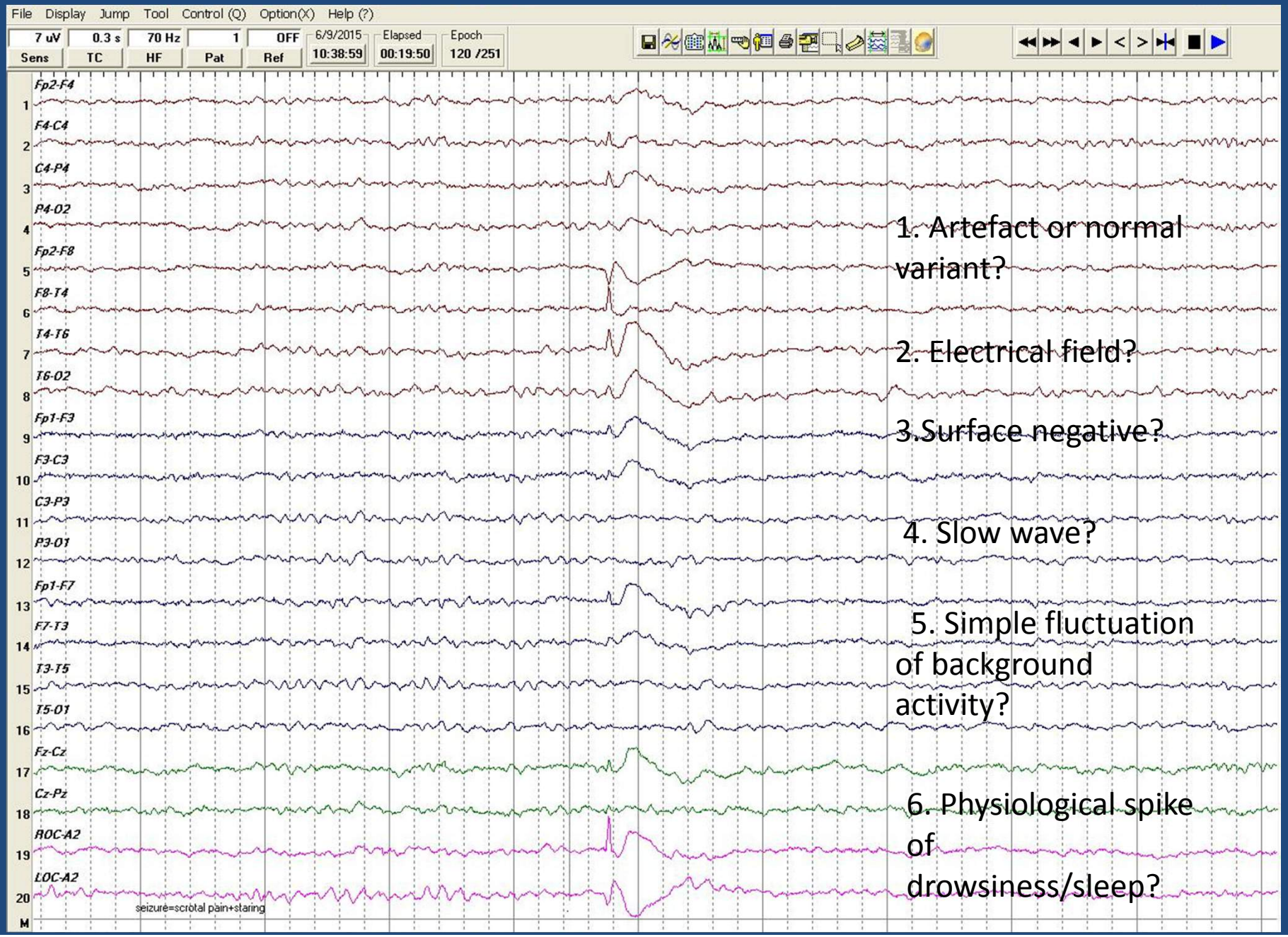
M

EEG analysis and layers of complexity

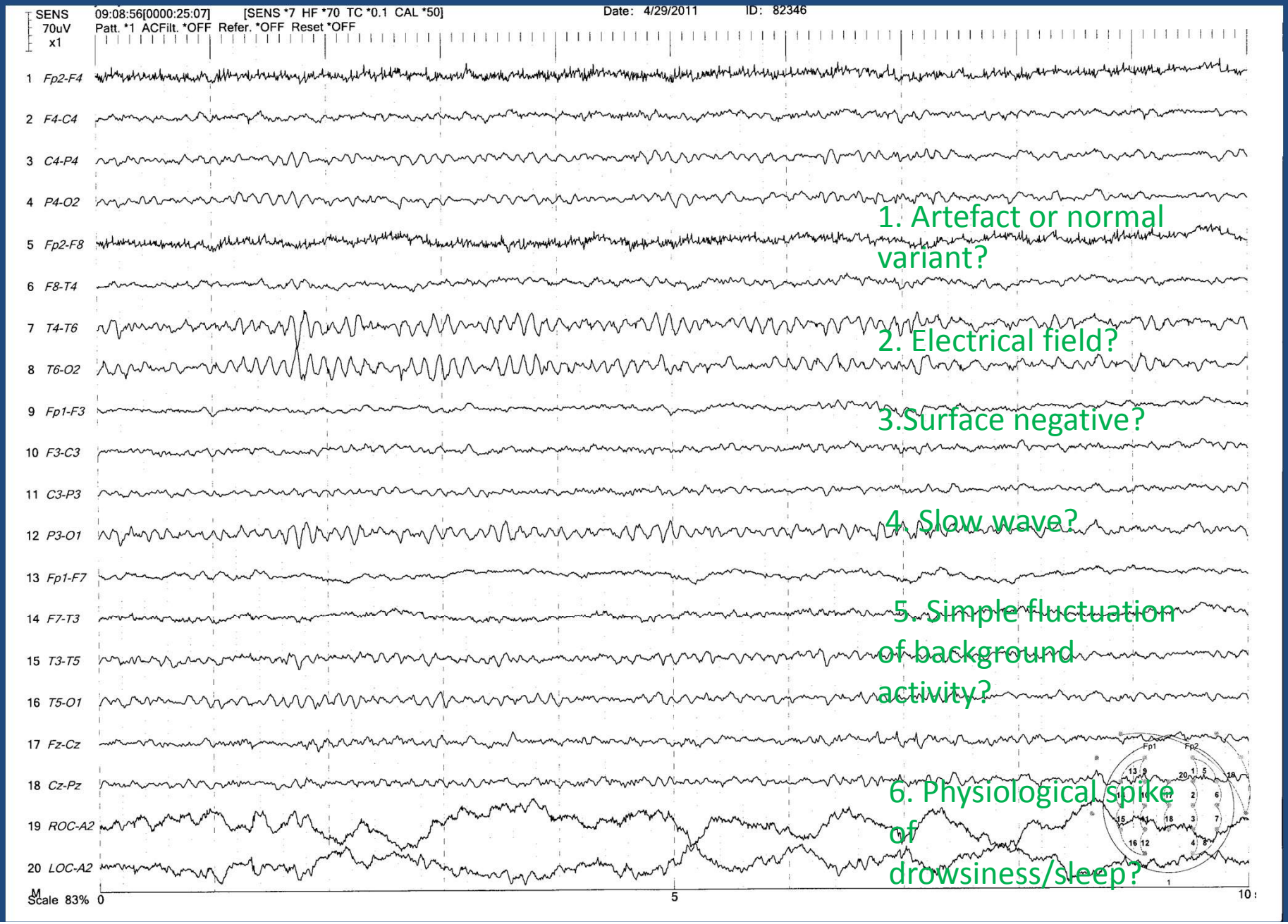
1. Sleep
2. Artefacts
3. Benign variants that look epileptiform

- Displaying the EEG

A “straight-forward” focus



Add another component of background



Add sleep features

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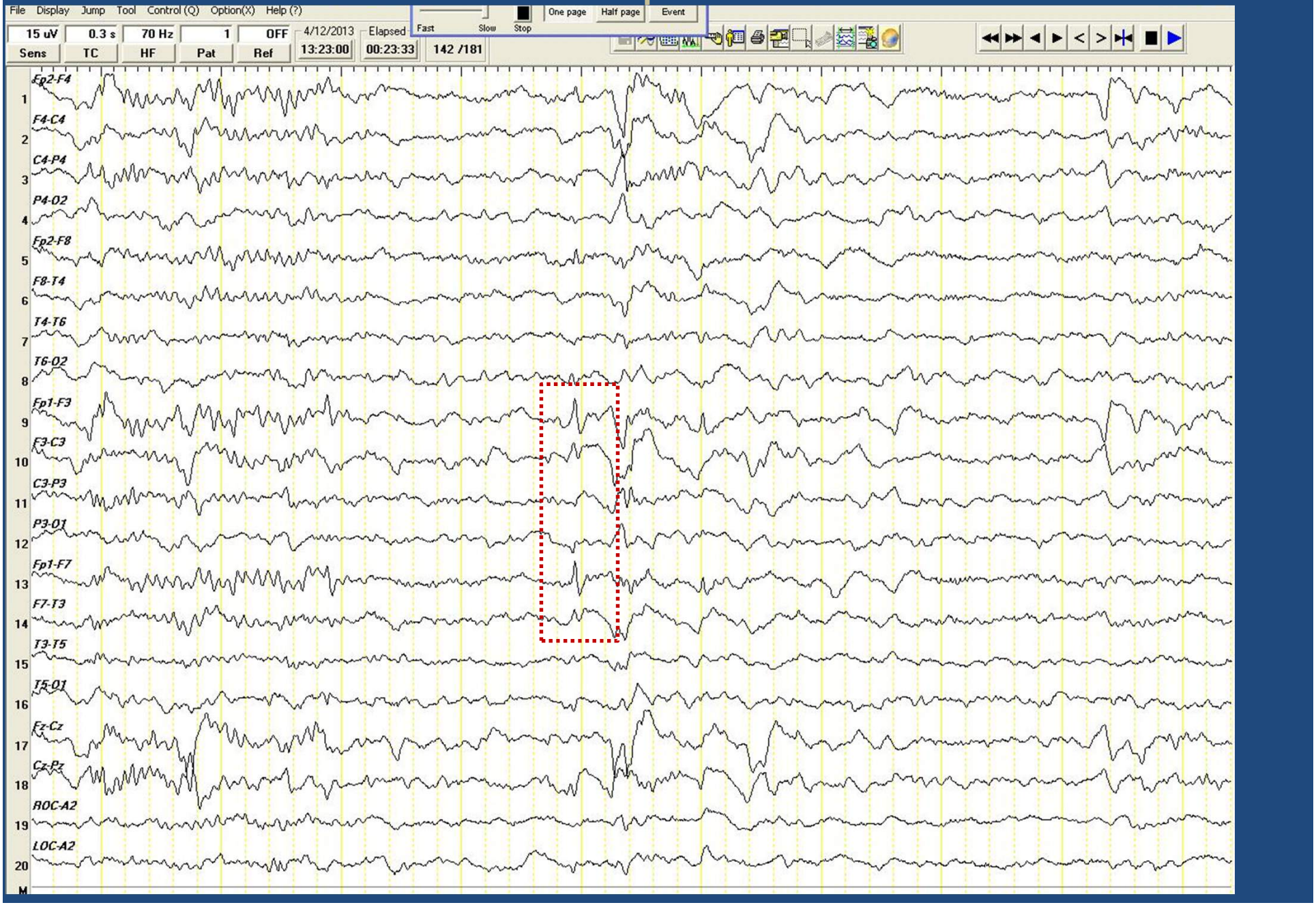
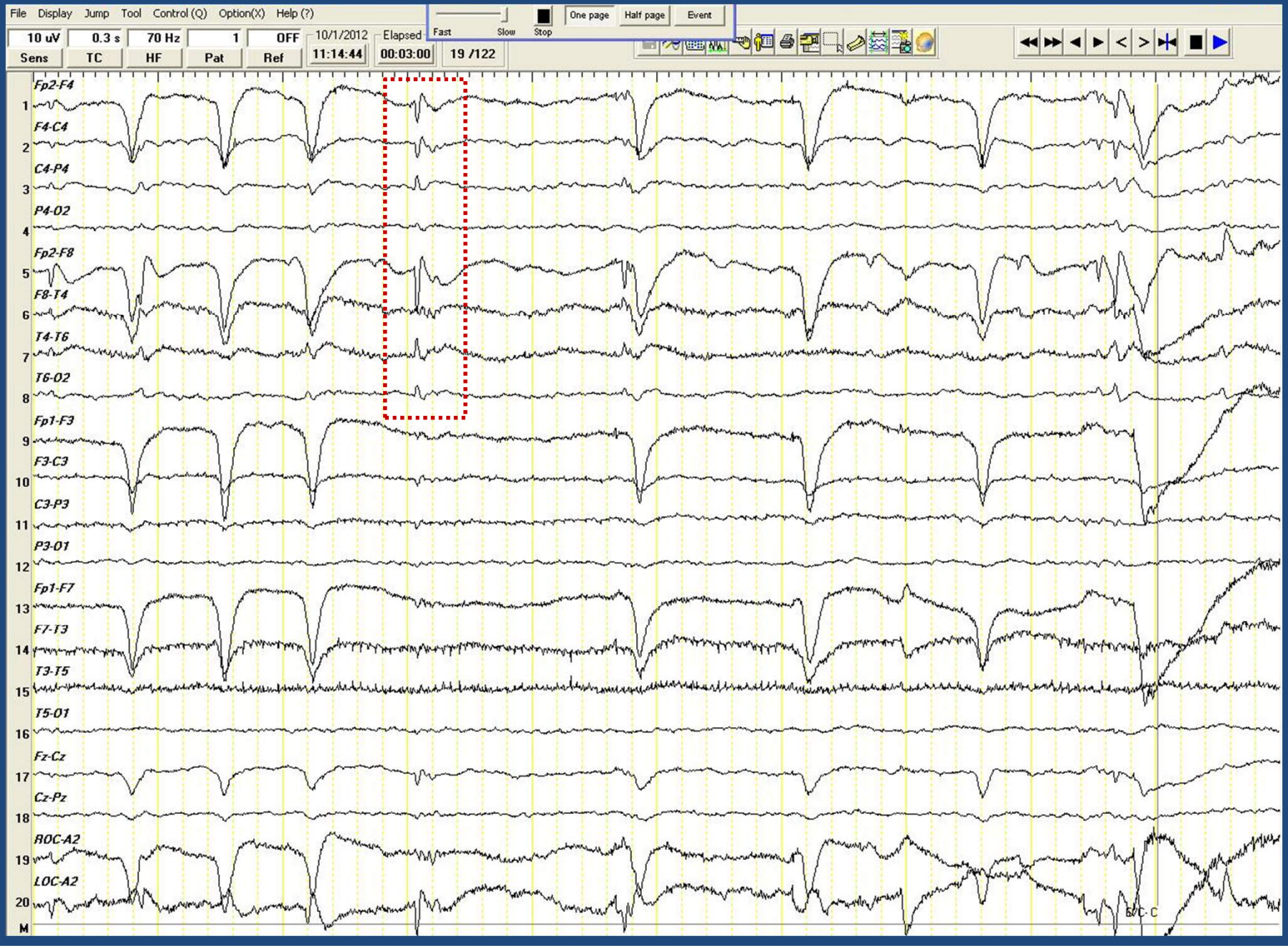
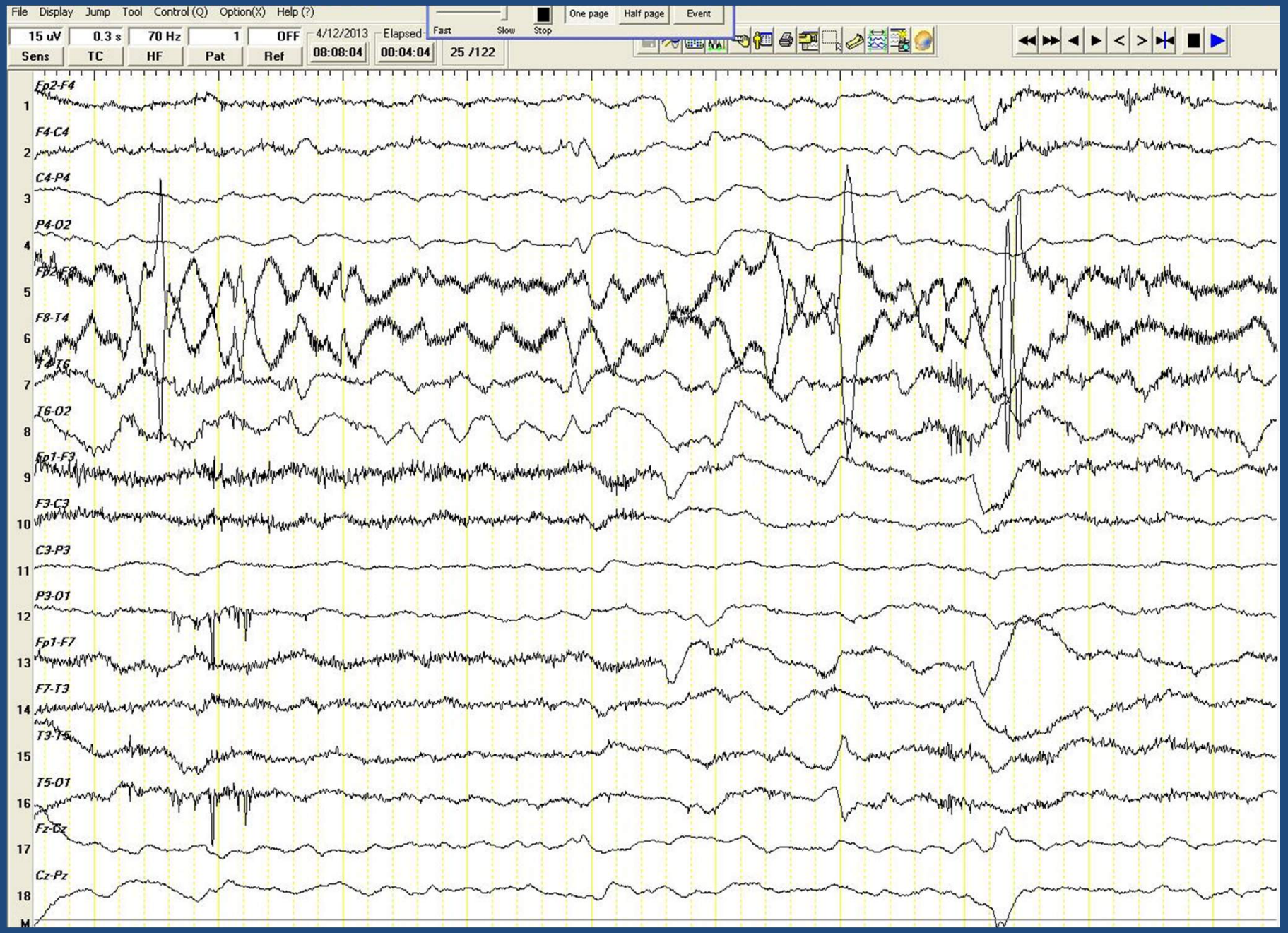


Add artefacts.

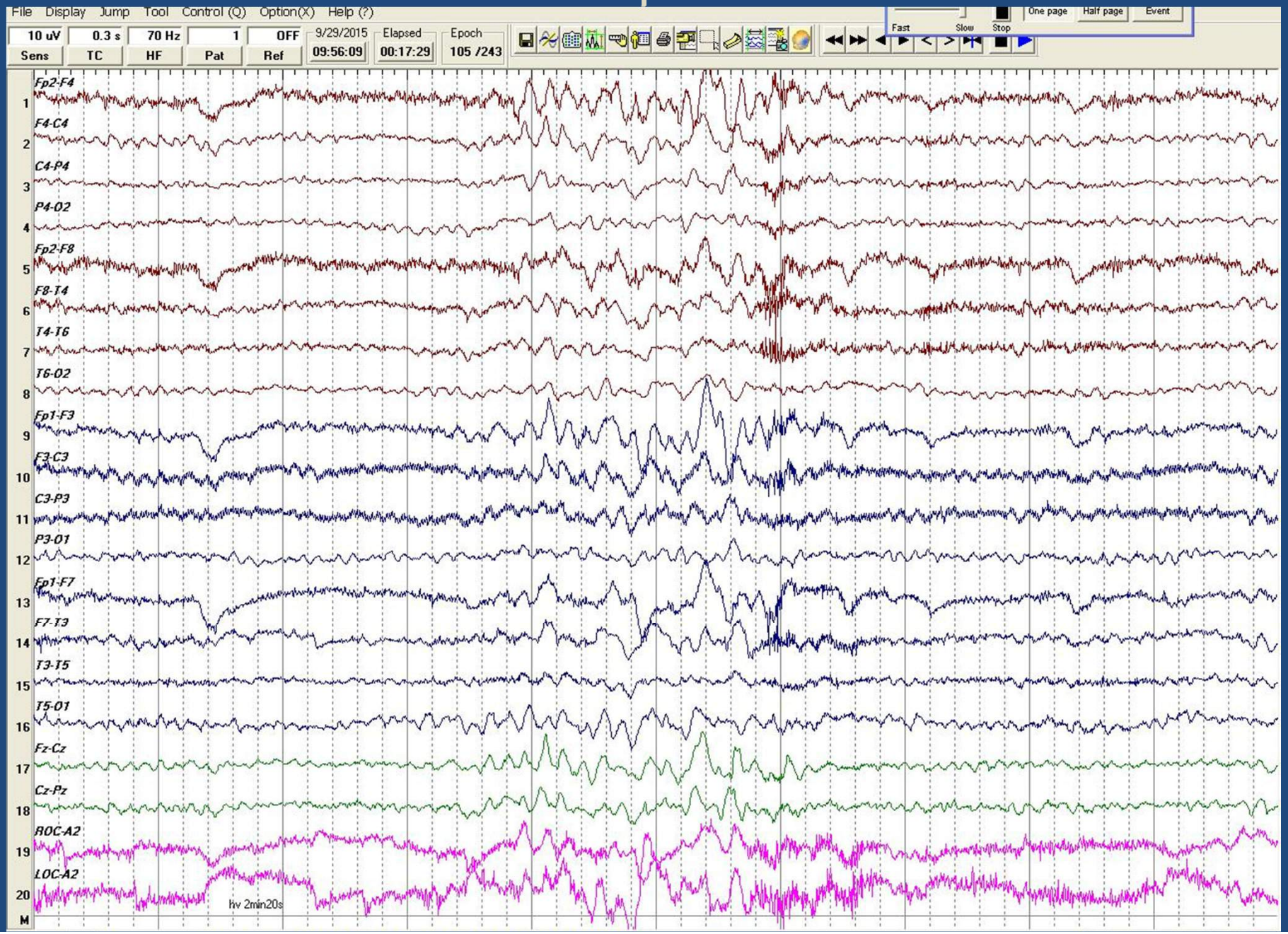


Add artefacts.

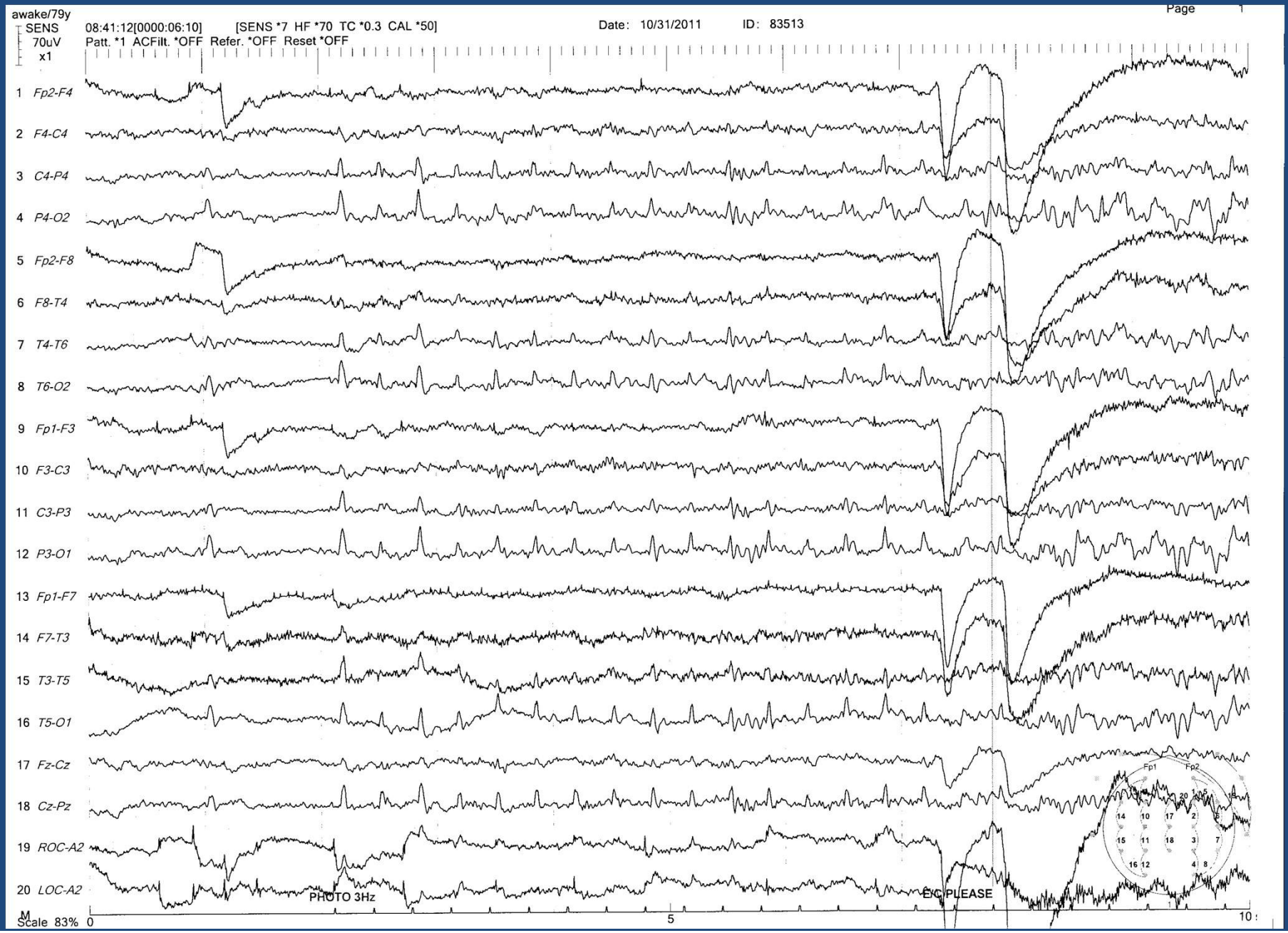


Same patient as previous slide – artefact resolved.

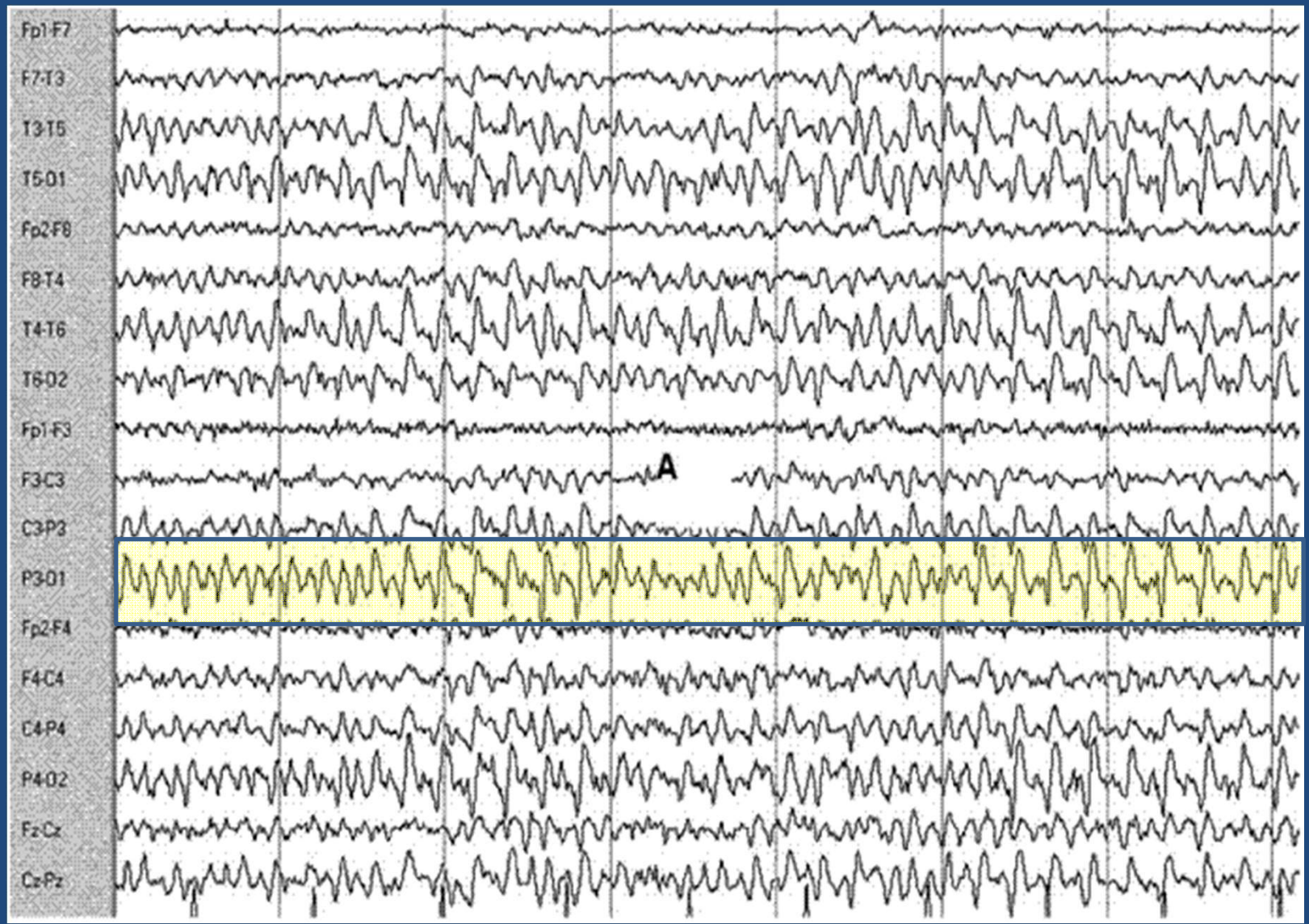
Add activation procedures - hv



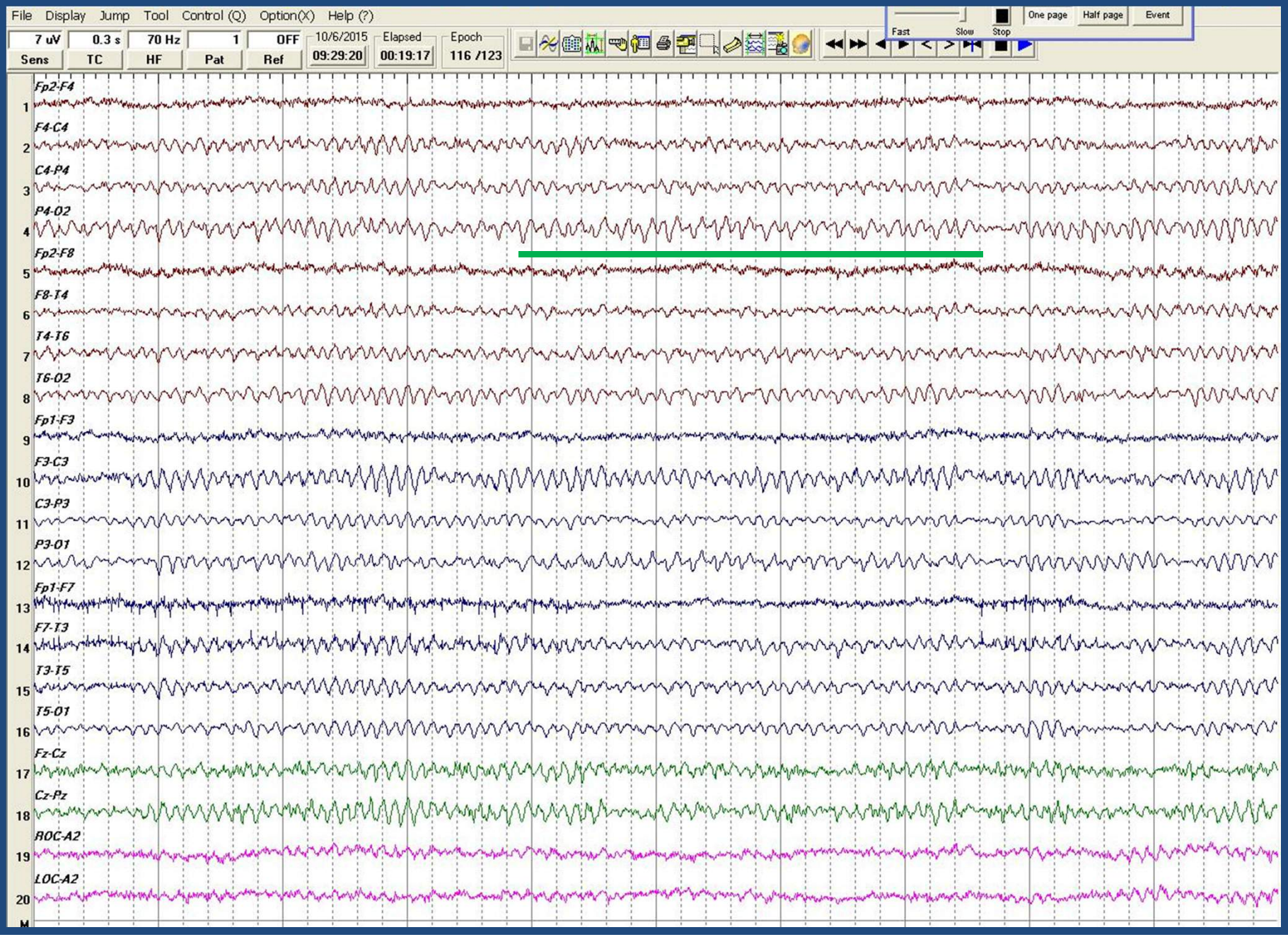
Add activation procedures - ips



Analysis problem from *Neurology* 2011

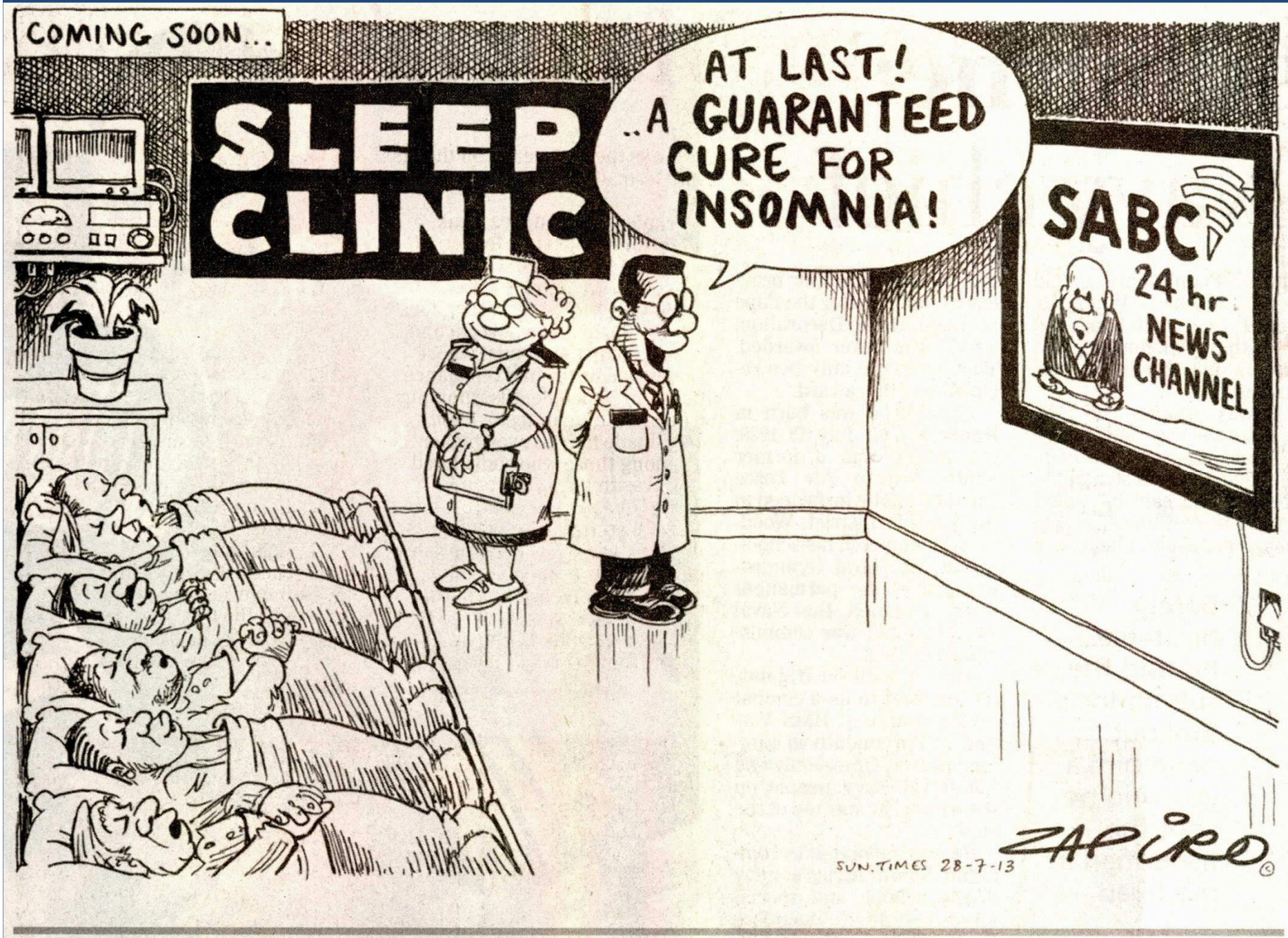


Familiar display of slow alpha variant



Sleep and Clinical EEGs

1. Why sleep is so important in clinical EEGs
2. Normal sleep features possibly confused with an epileptiform event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SLEEP CLINIC
AT LAST! ..A GUARANTEED CURE FOR INSOMNIA!
SABC 24 hr NEWS CHANNEL
SUN.TIMES 28-7-13
ZAPIRO

EPILEPTIFORM FEATURES ACTIVATED BY SLEEP

- Sleep highly effective for eliciting both generalized and focal interictal epileptiform discharges (IEDs).

  Overall far more so than HV or IPS

- In some people with epilepsy IEDs only occur during sleep, e.g. in up to 1/3 of patients with complex partial epilepsy.

- When IEDs occur in daytime sleep they tend to occur within 15-30 min of sleep onset.

Sleep and Clinical EEGs

Sleep is a two-edged sword:

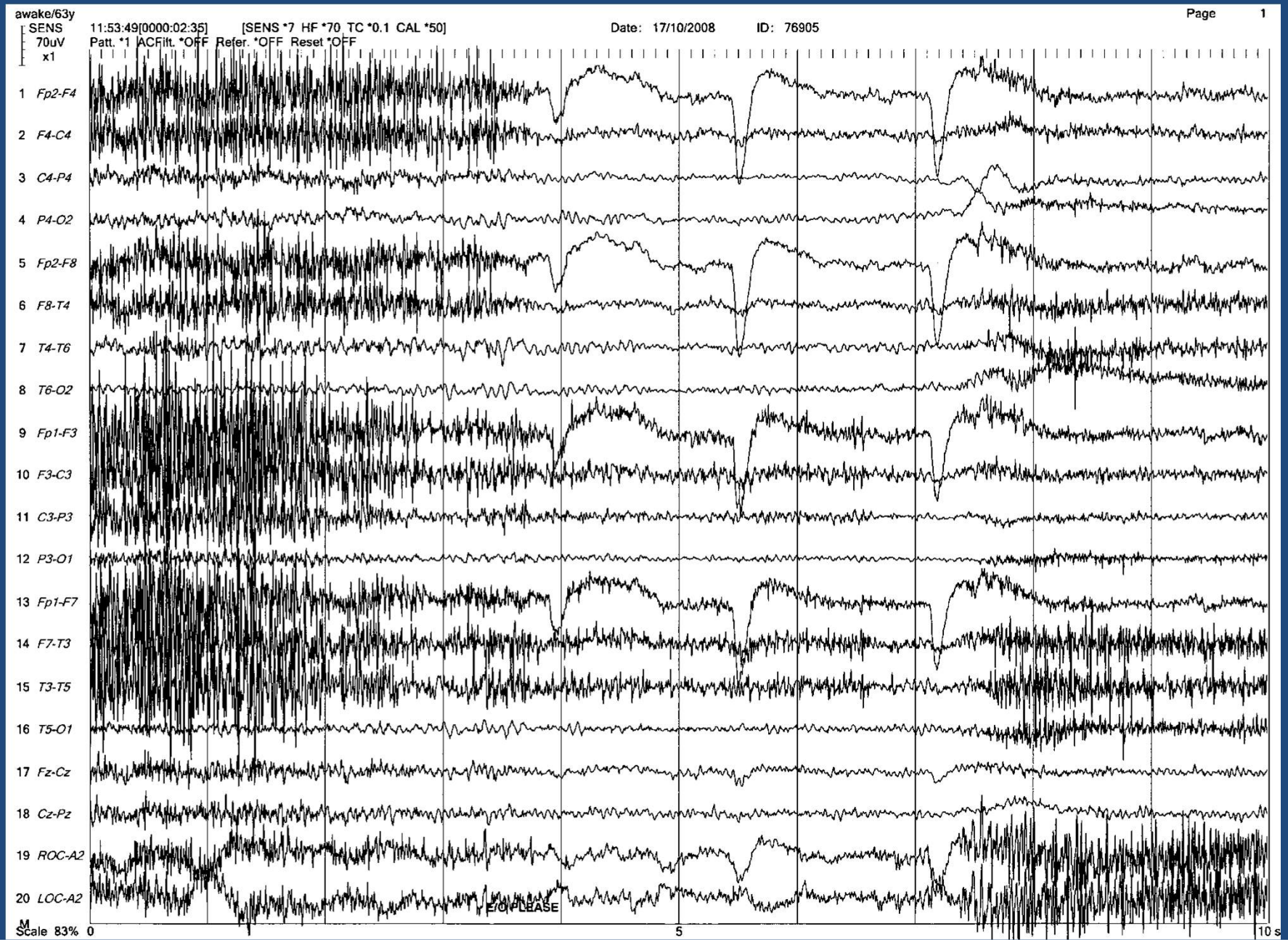
- activates some abnormalities
- makes interpretation more complex

- Benefits for interpretation

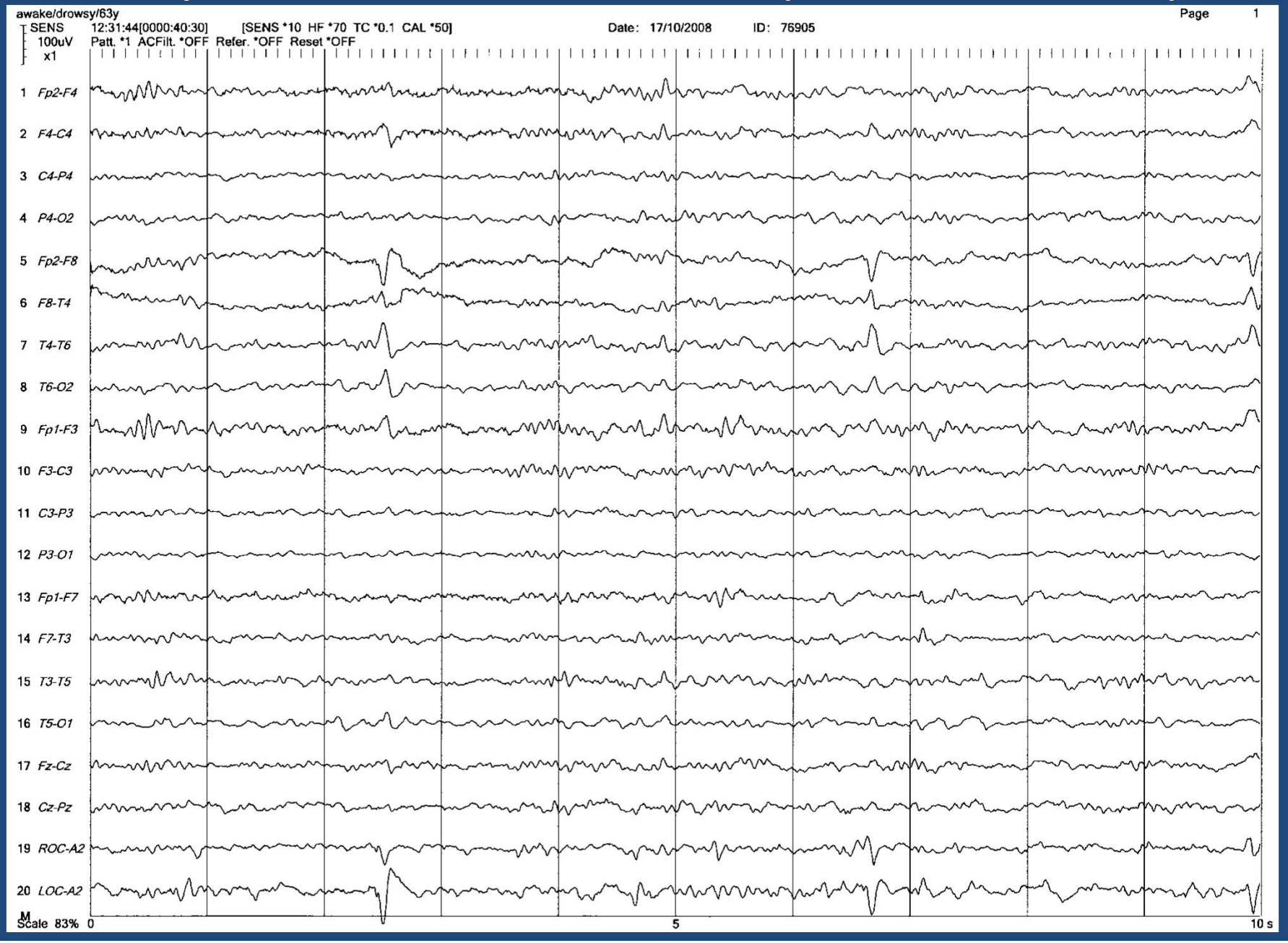
  - suppression of artefacts especially in restless or tense pts

  - attenuation of some background activity that may conceal an abnormality, e.g. sharp or high voltage alpha

63-year-old – evaluated for suspected TLE: Awake



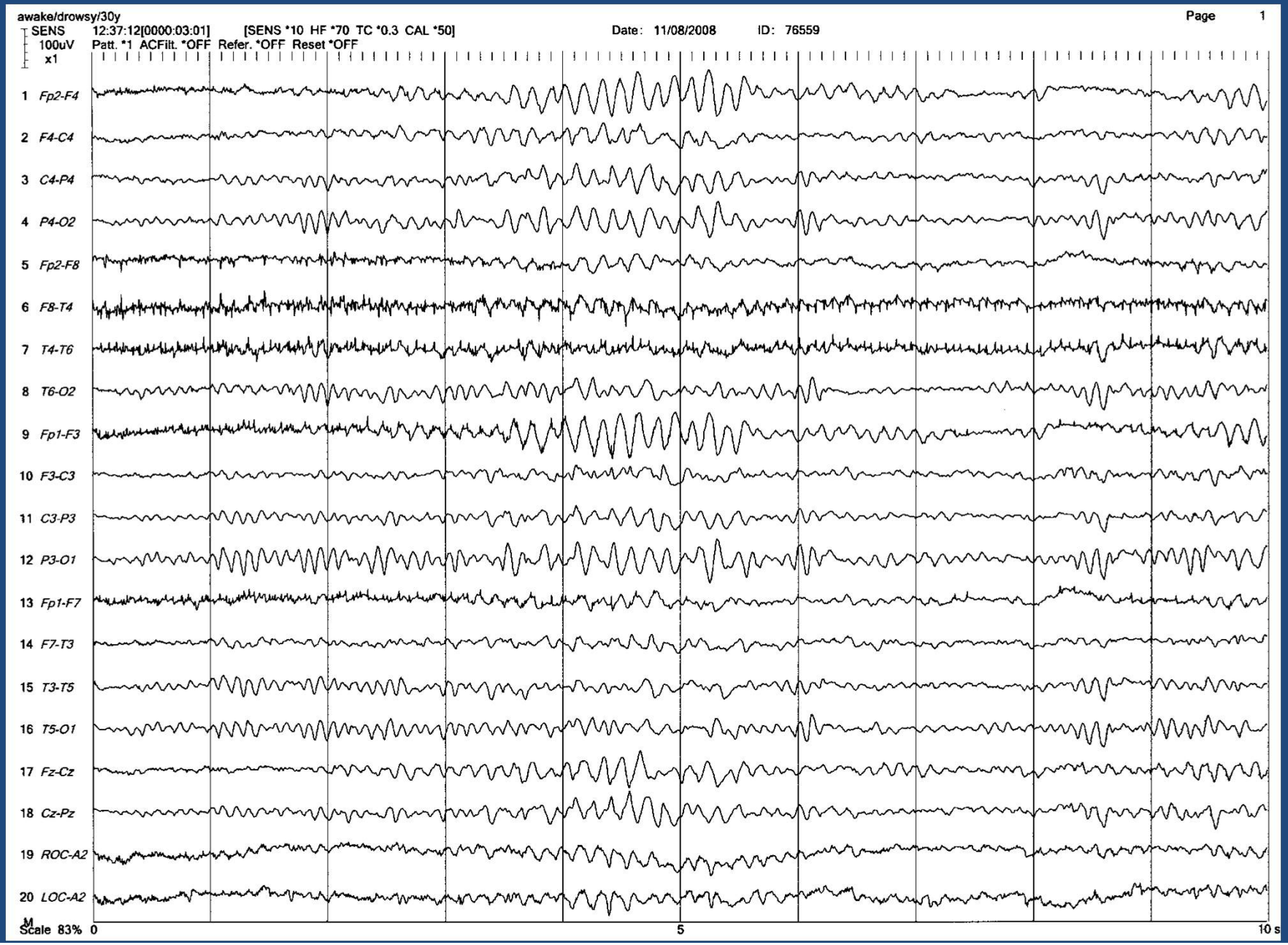
63-year-old – evaluated for suspected TLE: Asleep



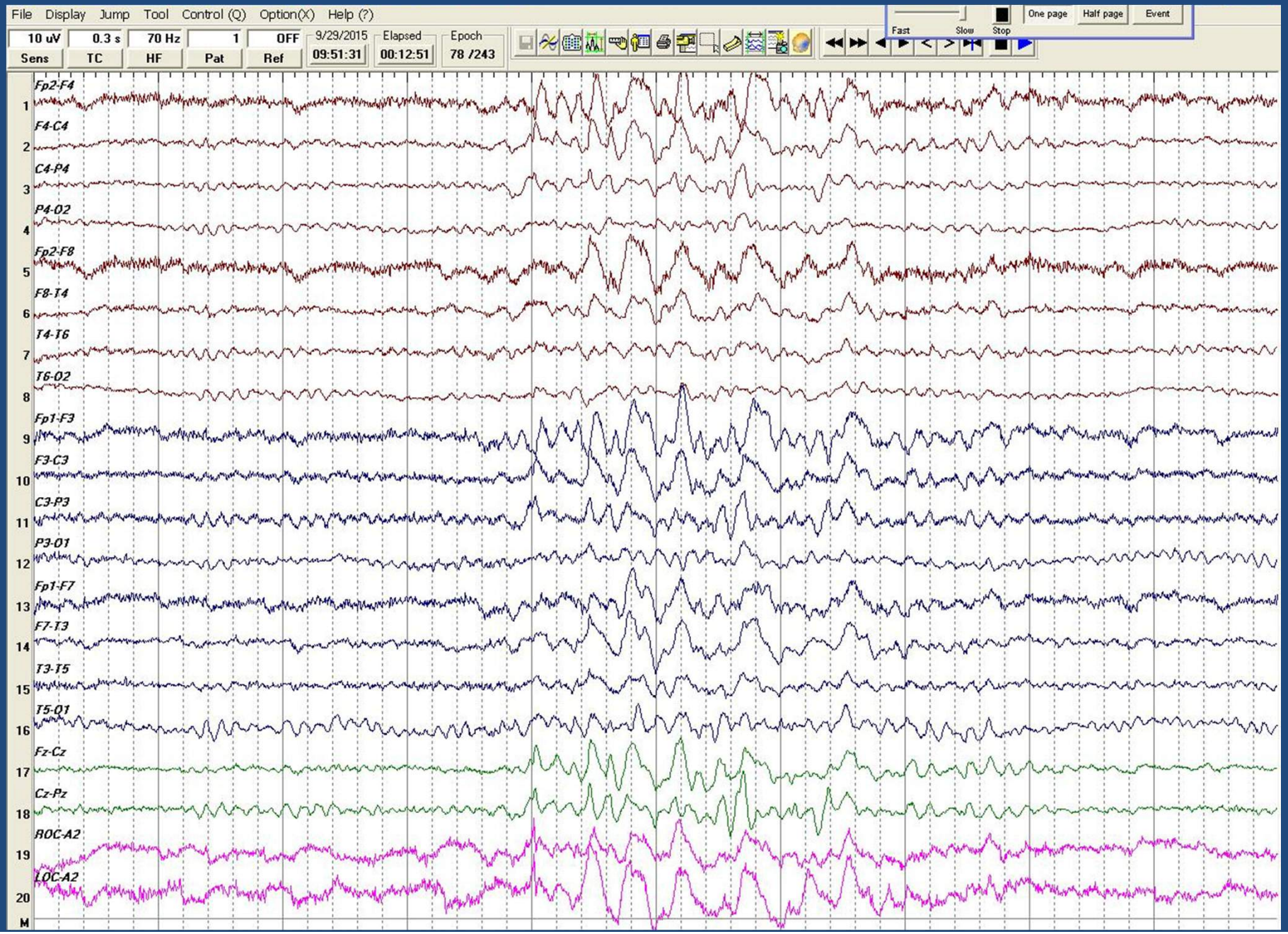
Drowsiness

- Complexity is underestimated
- Much more can happen than simply the attenuation of the alpha rhythm
- Events specifically restricted to the temporal areas will be addressed in a separate session.
- To follow will be some widespread bilateral events.

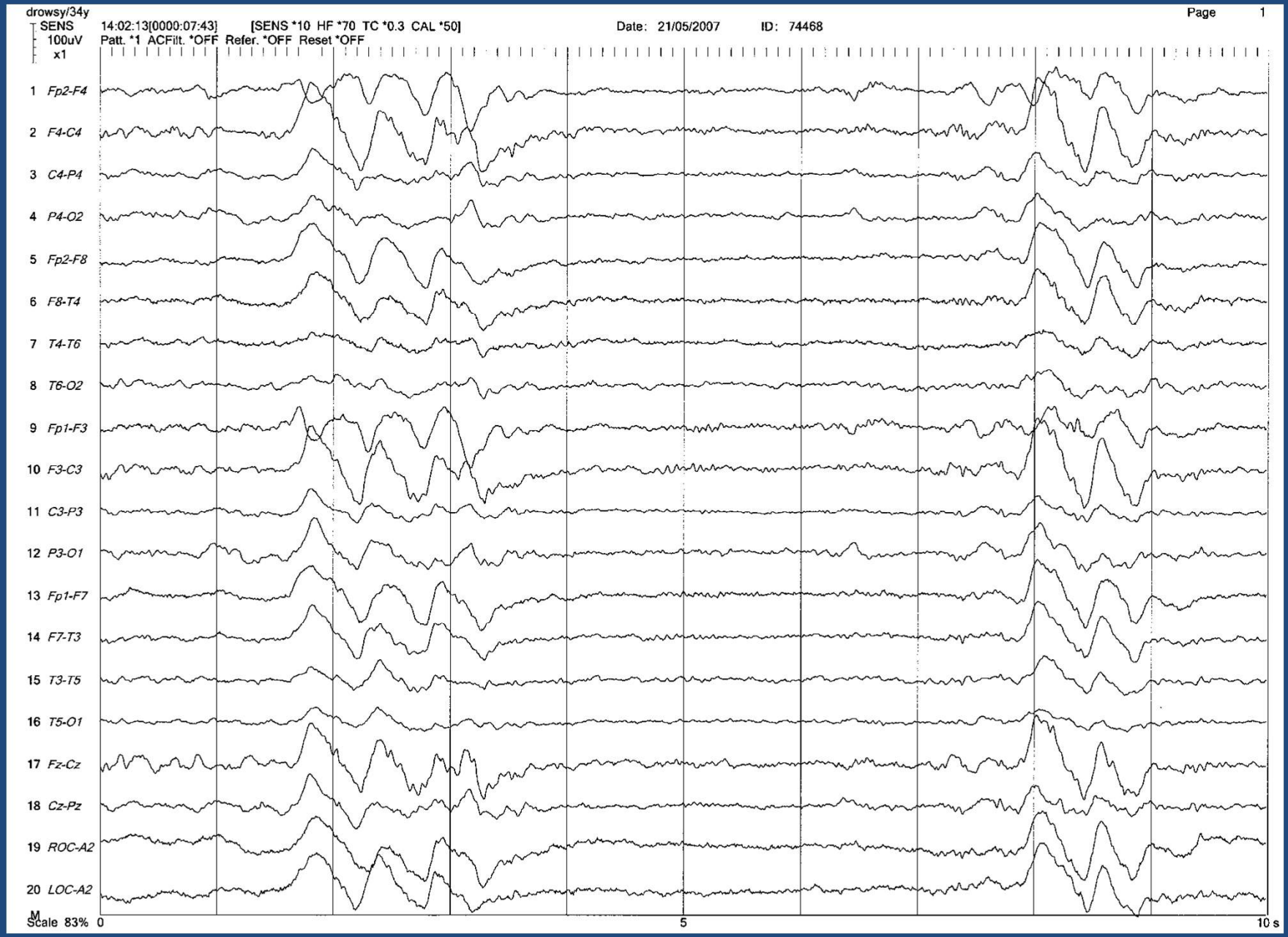
Appearance of theta activity



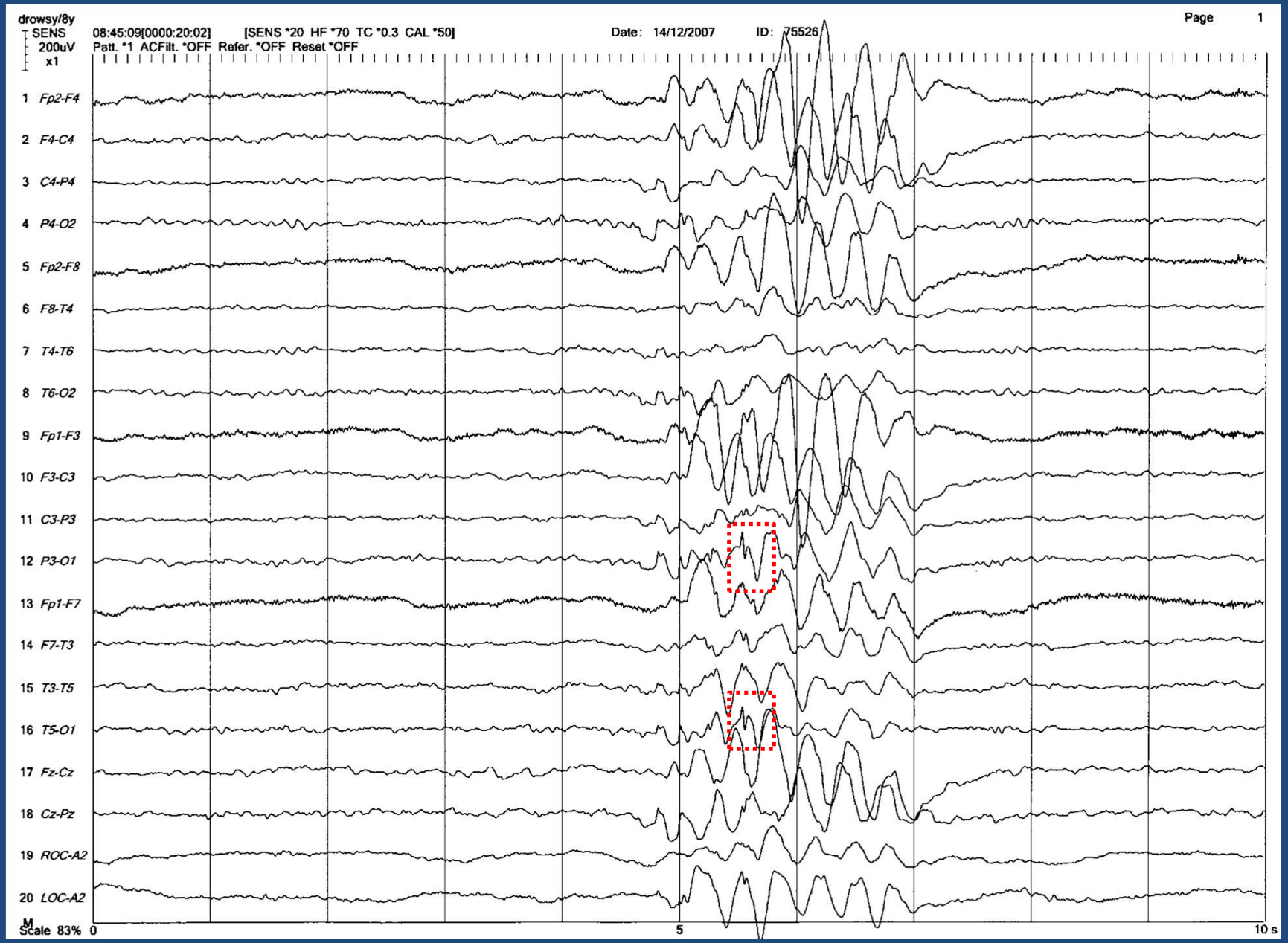
Burst patterns of drowsiness with sharp transients



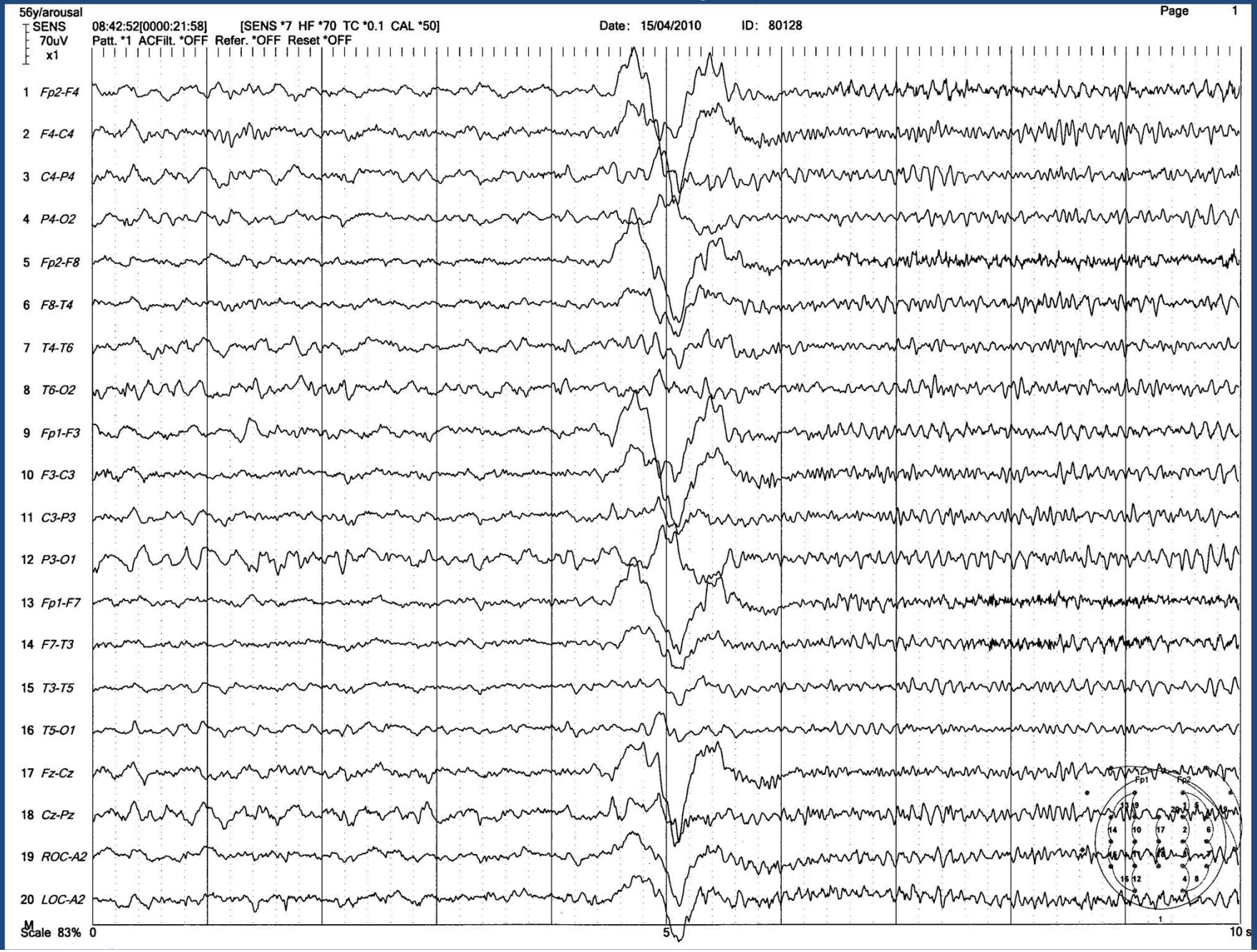
Burst patterns of drowsiness – Adult [9734 1.7]



Burst patterns of drowsiness – Child [9936 1.05]



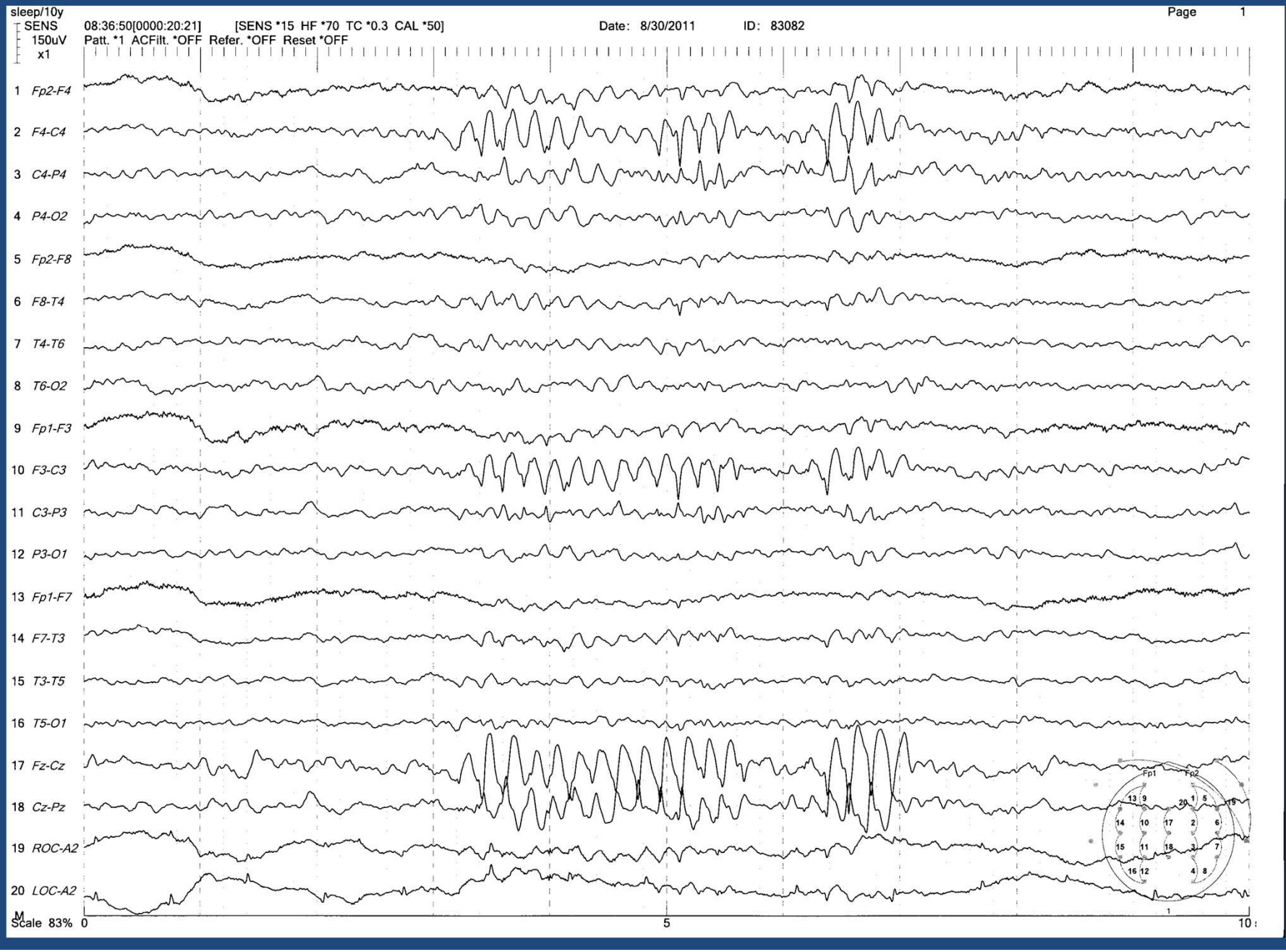
Arousal – delta burst at the sleep-wakefulness interface



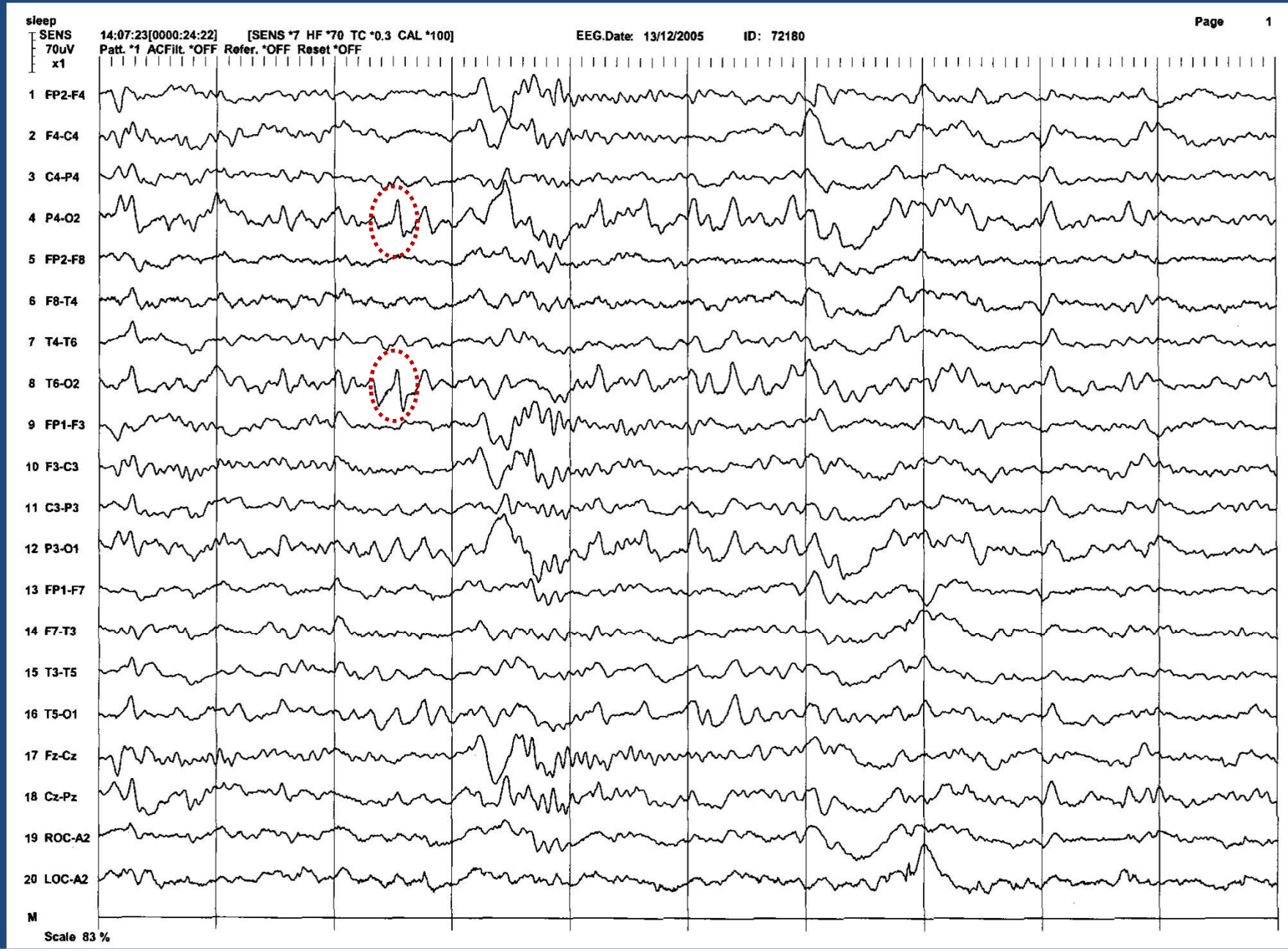
Sleep features: Sharp & possibly misinterpreted

- Vertex sharp transients
- POSTS (positive occipital sharp transients of sleep)
- Sharp sleep spindles
- K complex with a prominent sharp component.

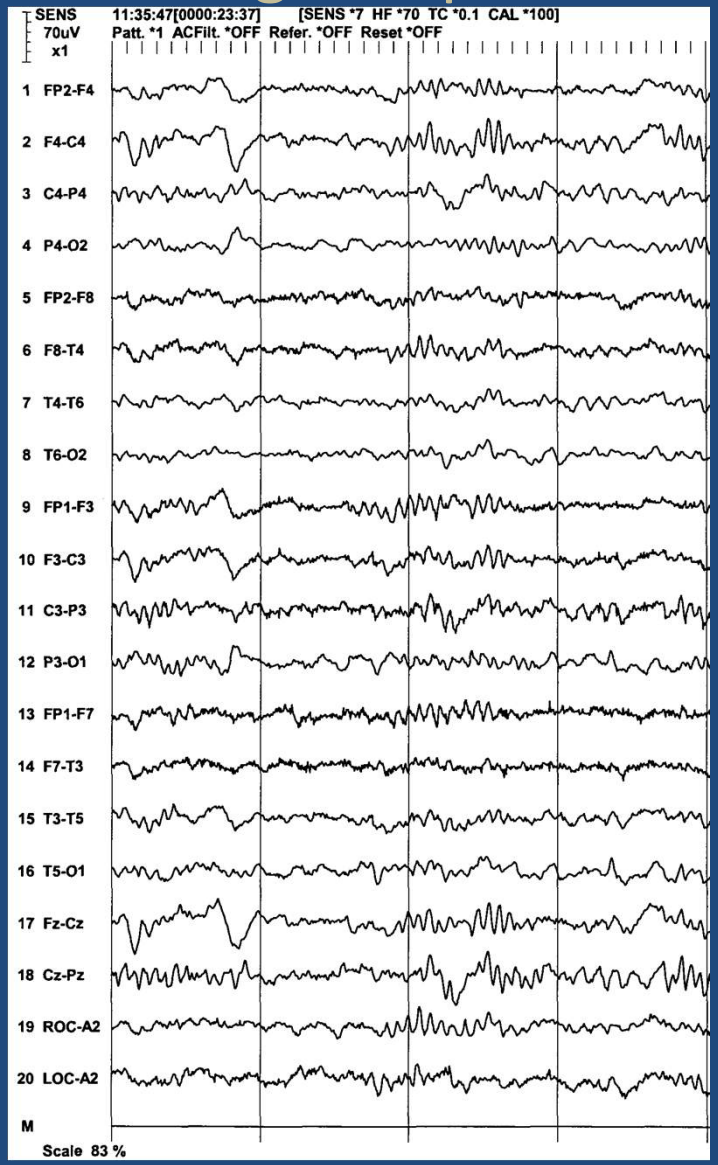
Vertex sharp transients – really sharp

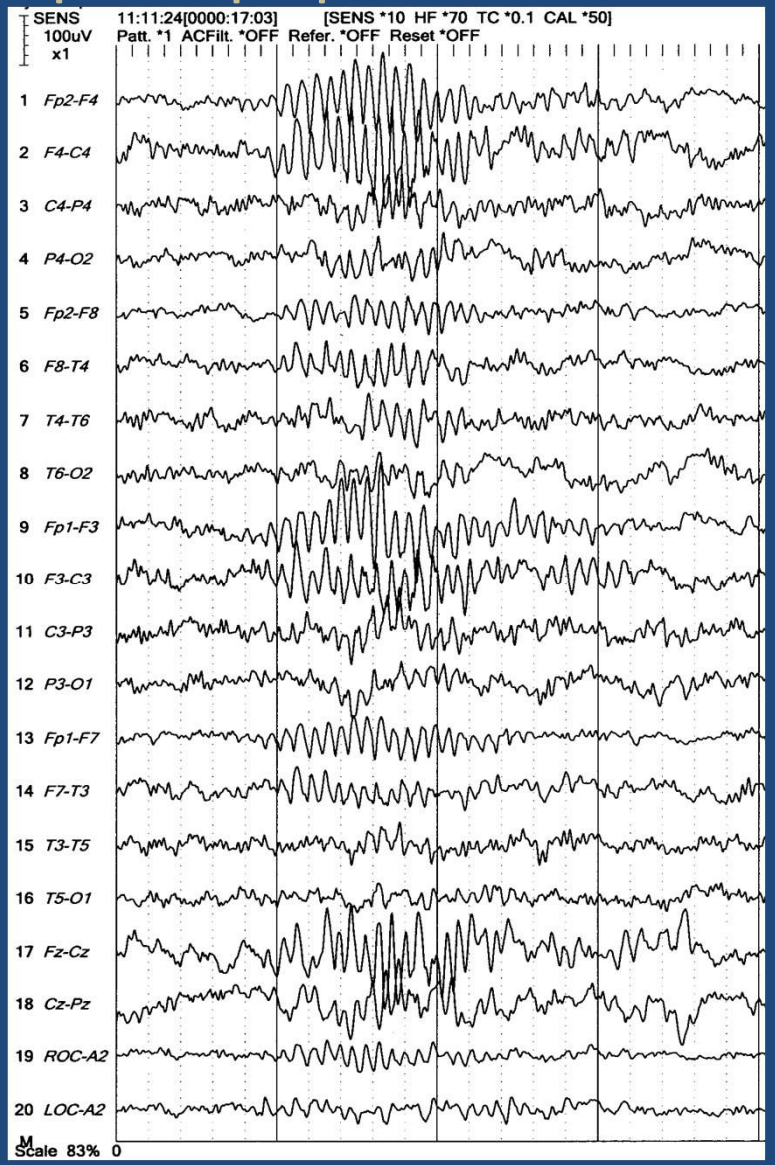


Positive occipital sharp transients of sleep (POSTS)



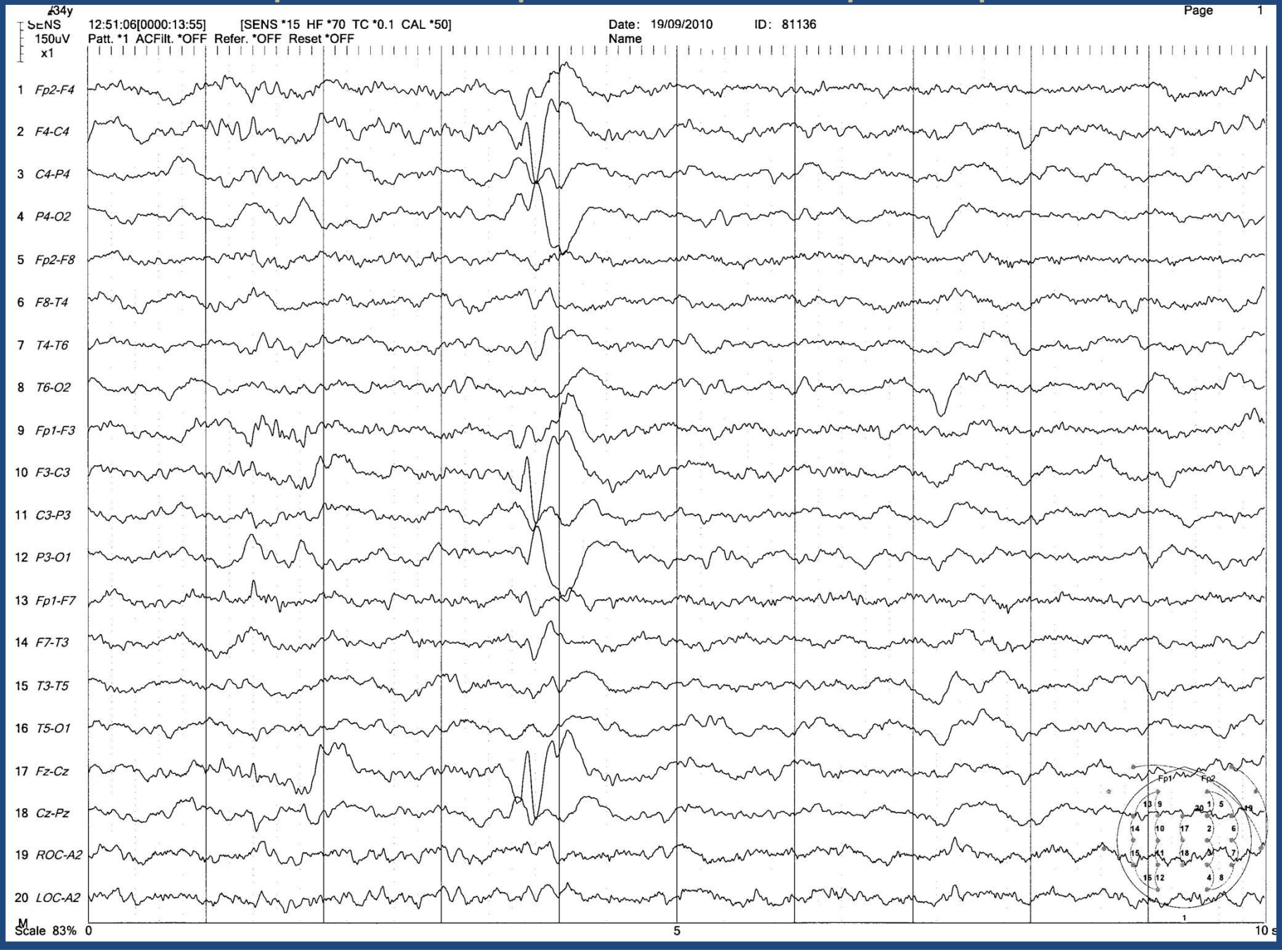
High amplitude or sharp sleep spindles





Sleep spindles in a 30-year-old patient (left panel, see 3rd second) contrasted with a much higher amplitude spindle in a 2-year-old child (right panel, see 2nd second).

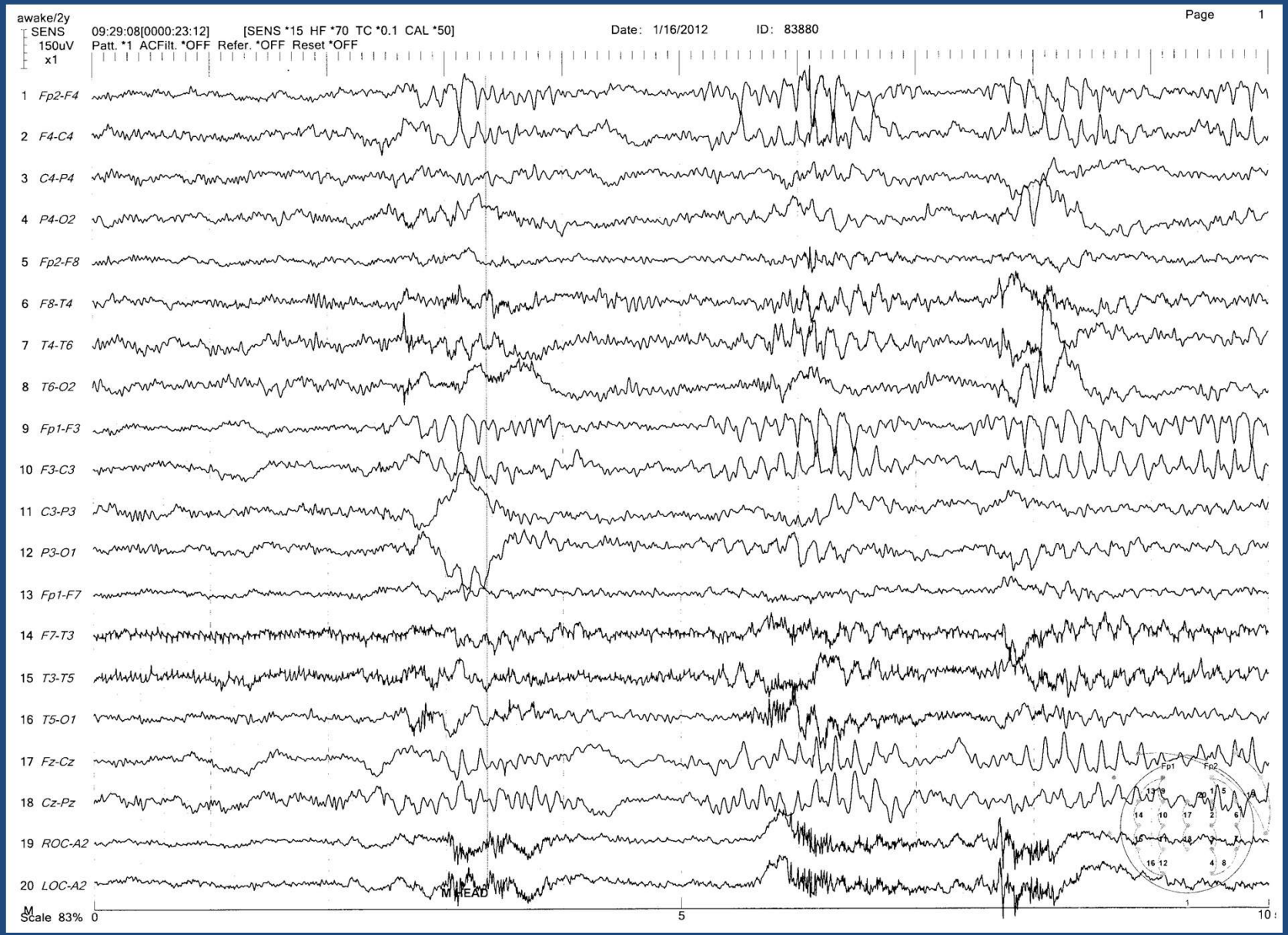
K complex with a prominent sharp component



Frontal arousal rhythm in children

- Bursts/trains of rhythmic waves of varying frequency, lasting up to 20 sec
- Frequently sharp or notched
- Has a “superficial resemblance to a rhythmic discharge pattern”
- Initially linked to “minimal cerebral dysfunction” – currently considered to have no clinical significance

Frontal arousal rhythm in a 2-year-old



Asleep

Spontaneous arousal