

Sleep in Epilepsy

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(Until 30.09.13)



Acknowledgment

RMNC

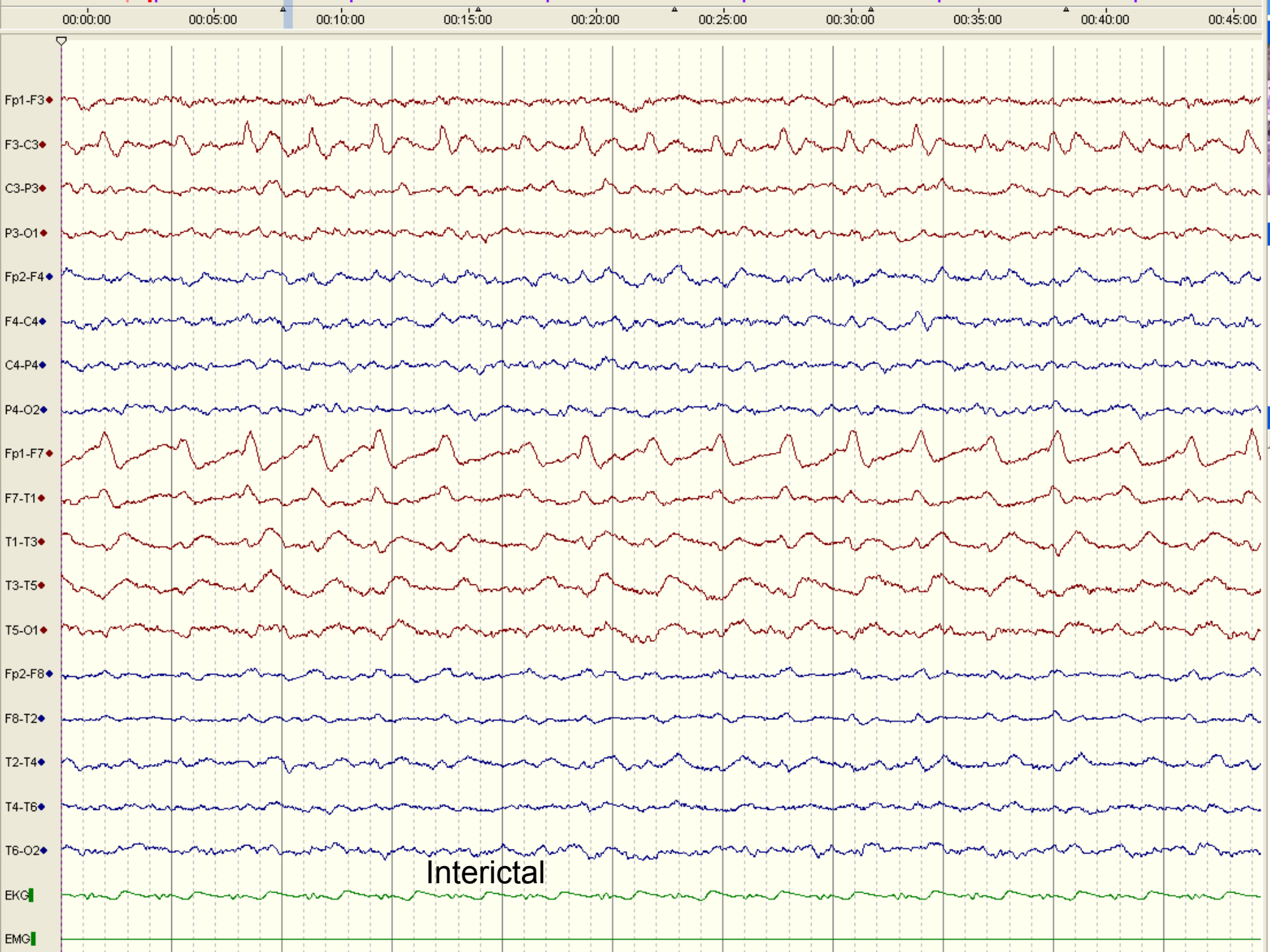
R. Madhavan Nayar Center for Comprehensive
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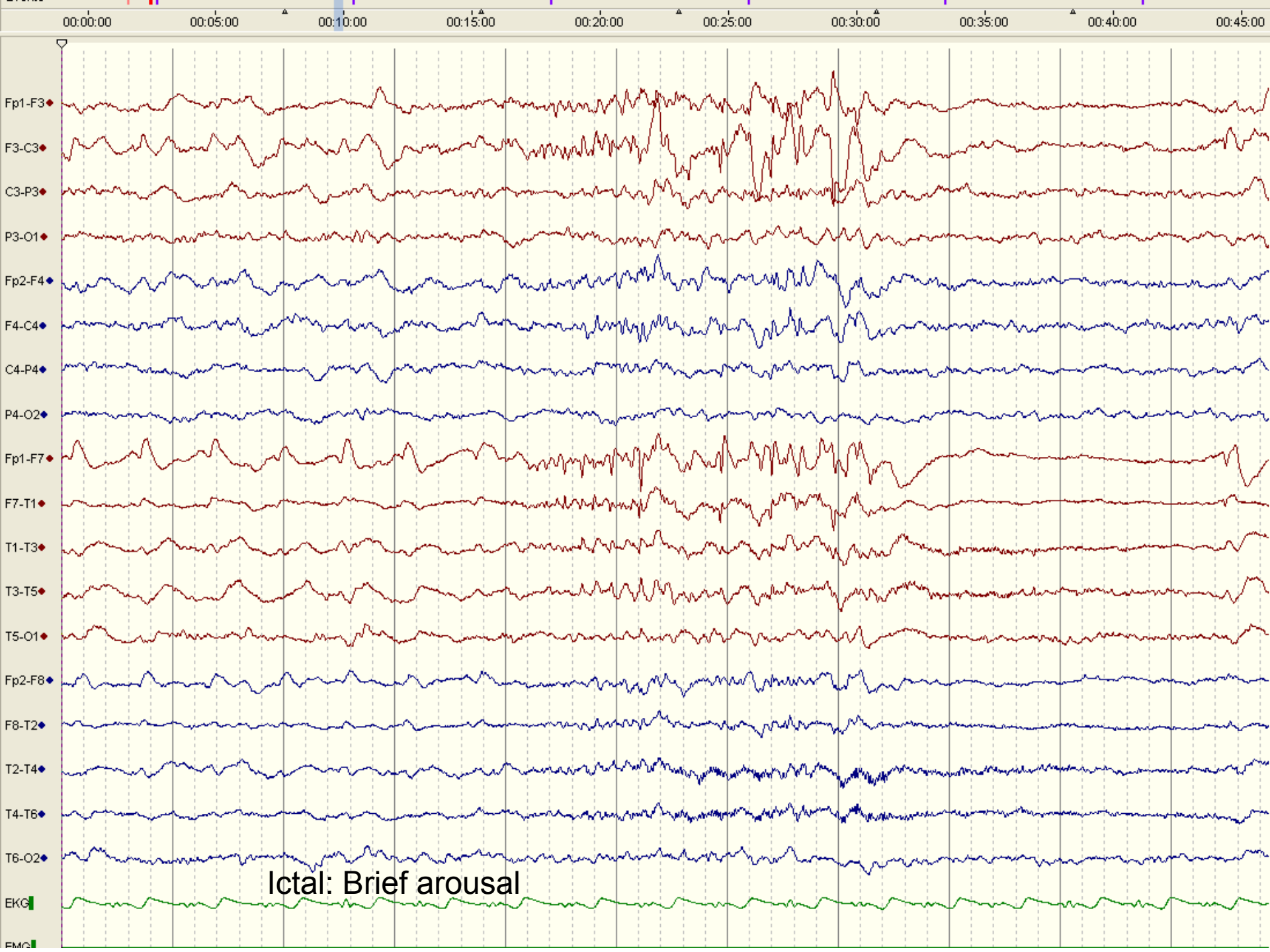
Patient 1

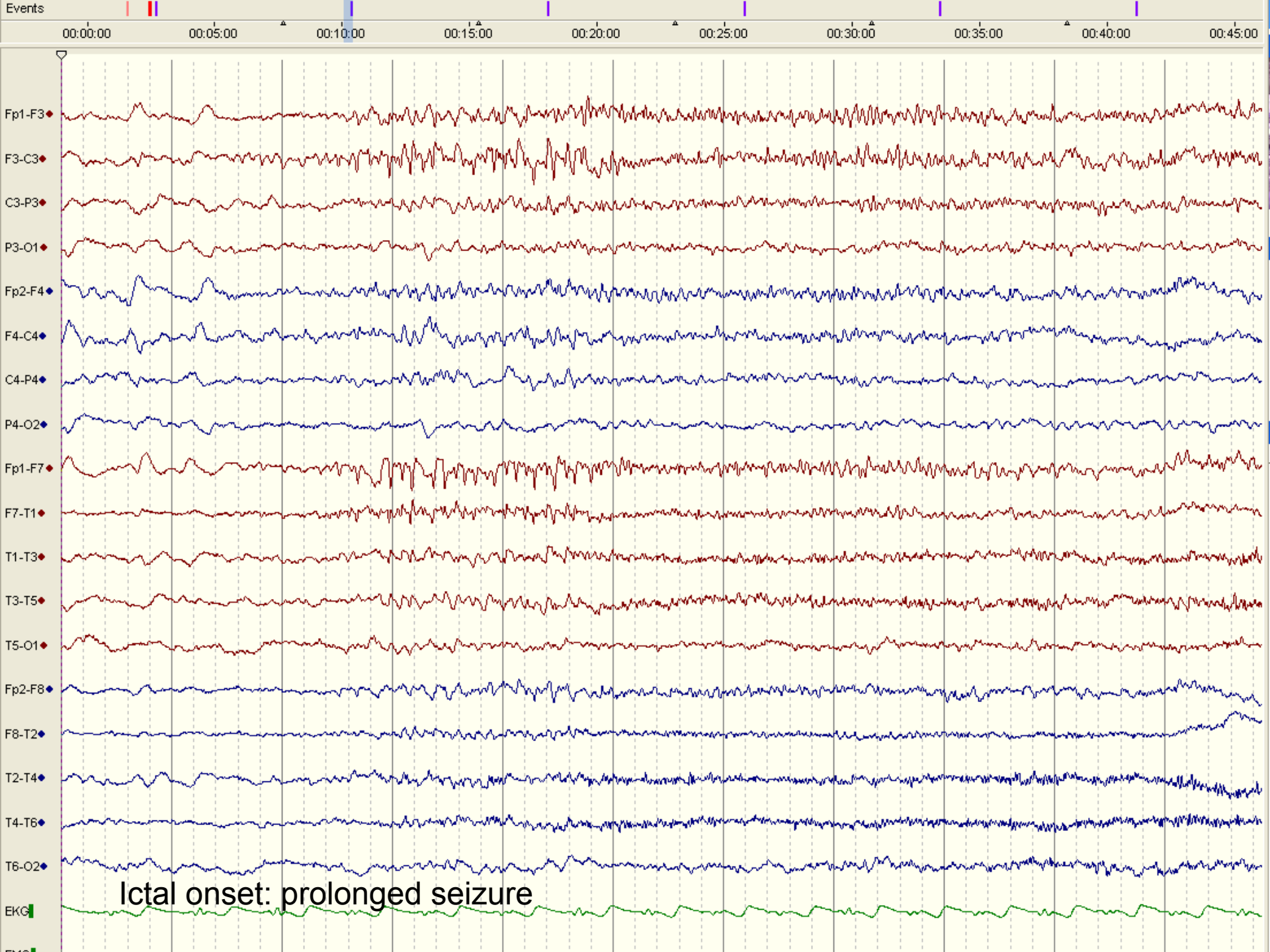
- 5-year old girl
- Frequent awakenings from sleep
- Disturbed night sleep
- Daytime sleepiness and poor school performance
- Normal development
- Normal MRI







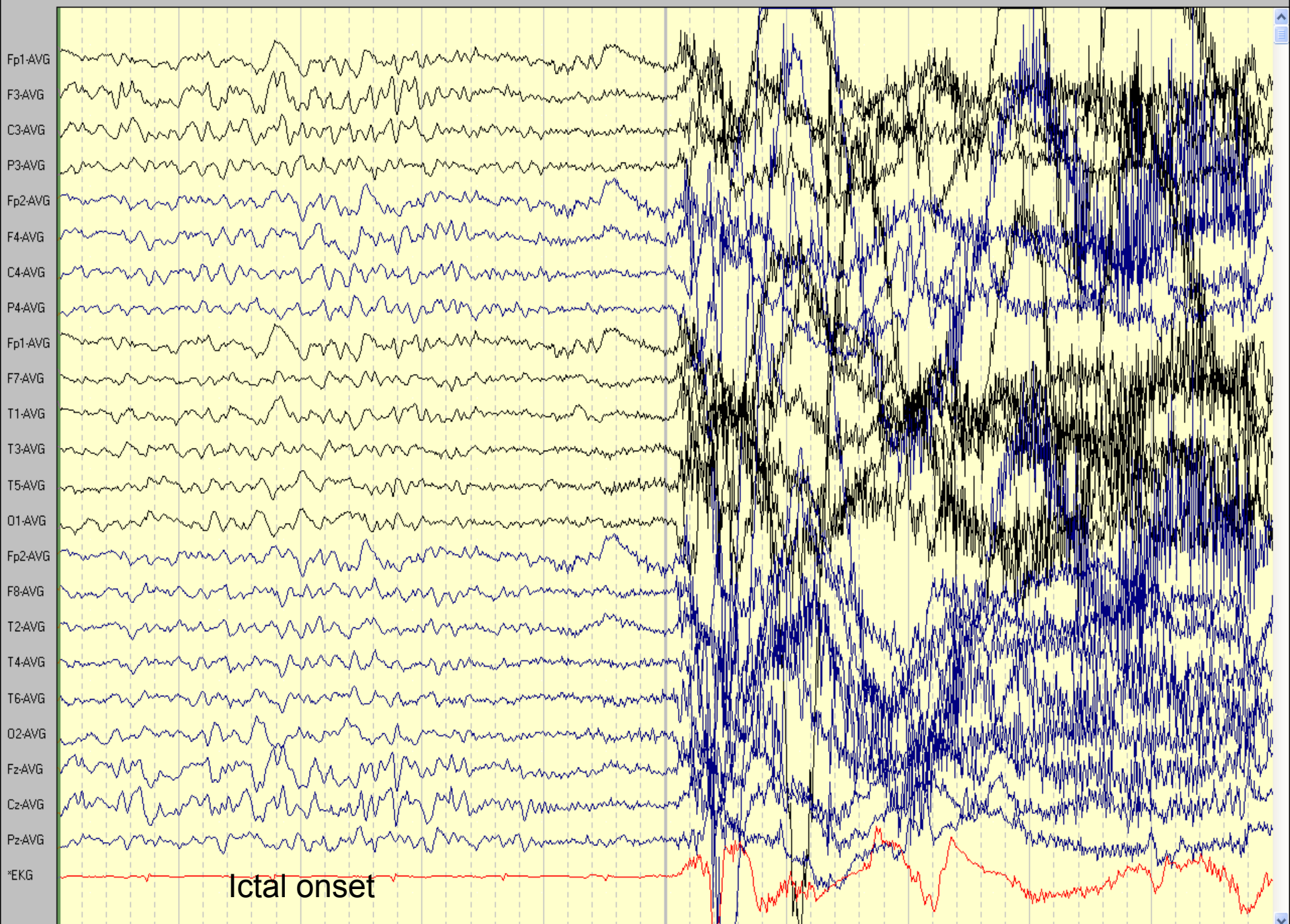


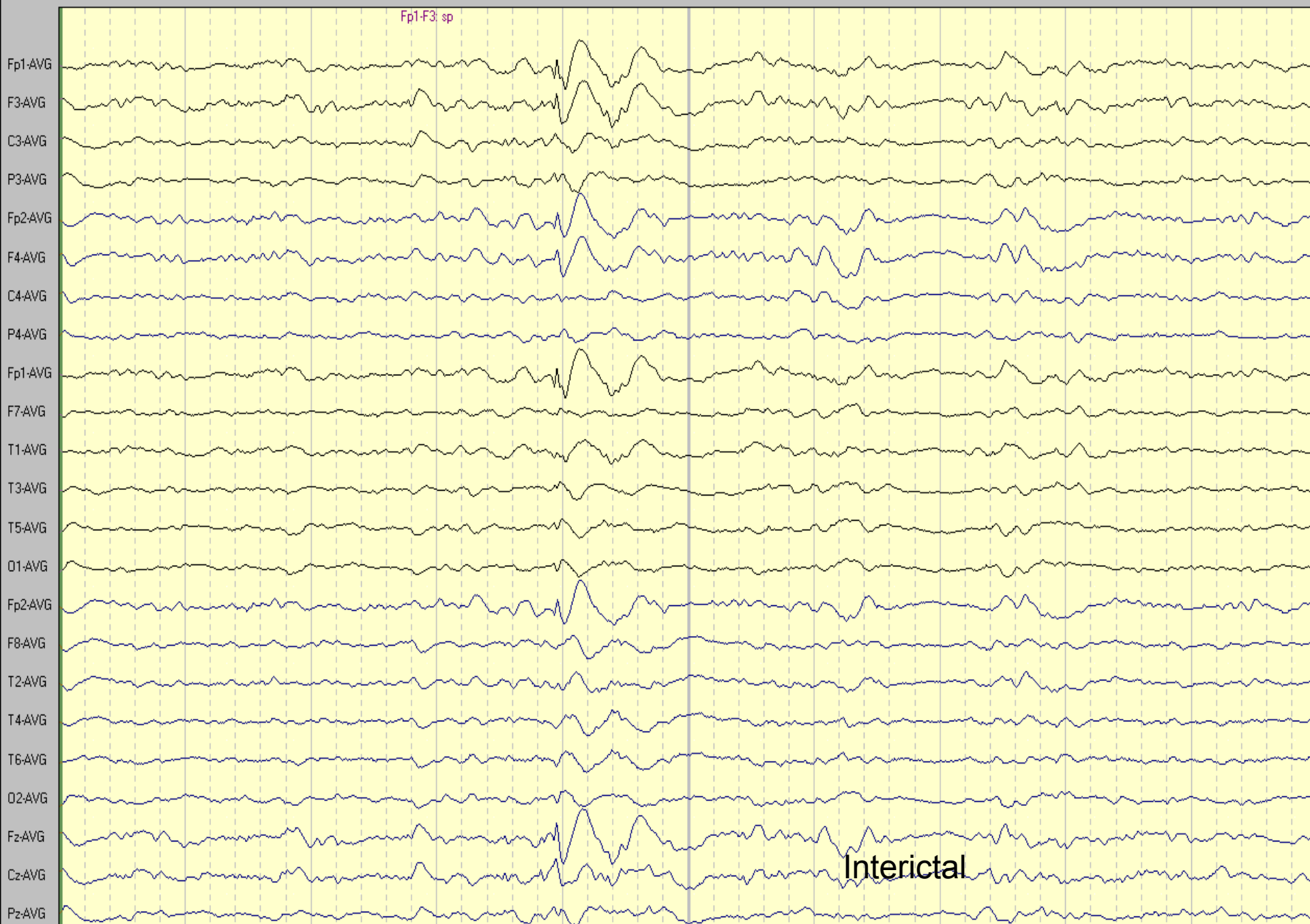


Patient 2

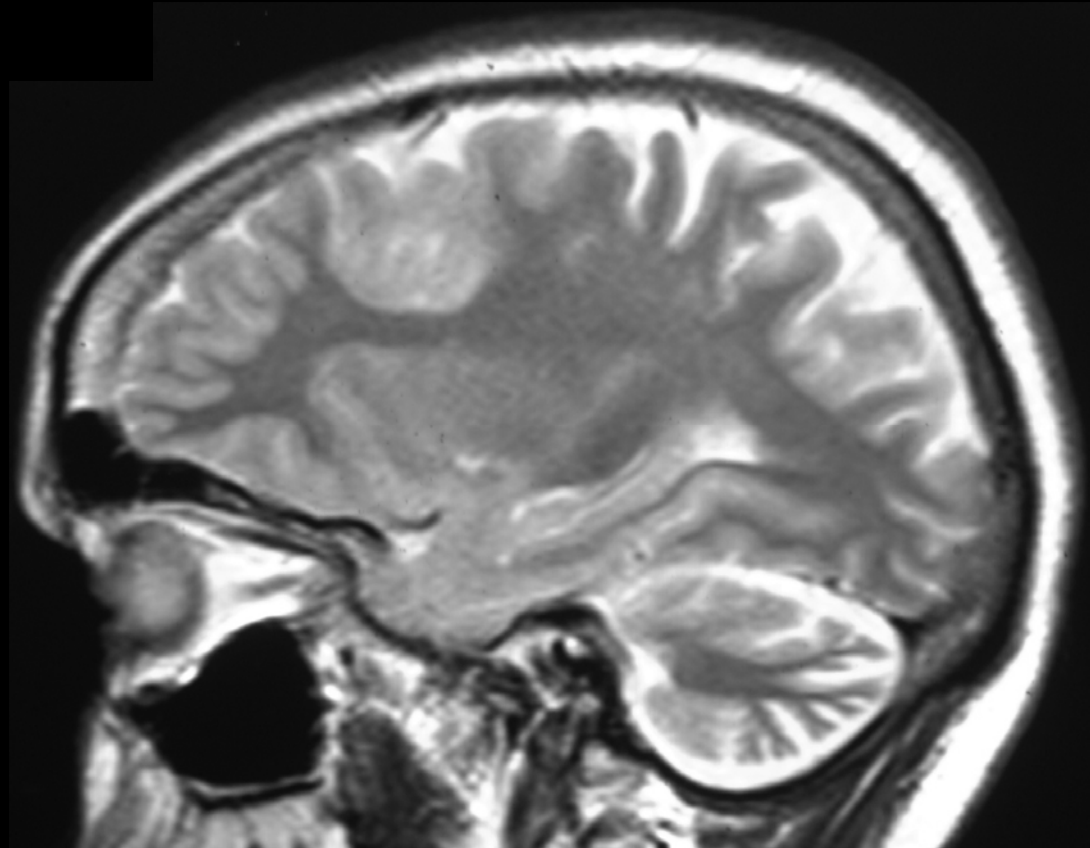
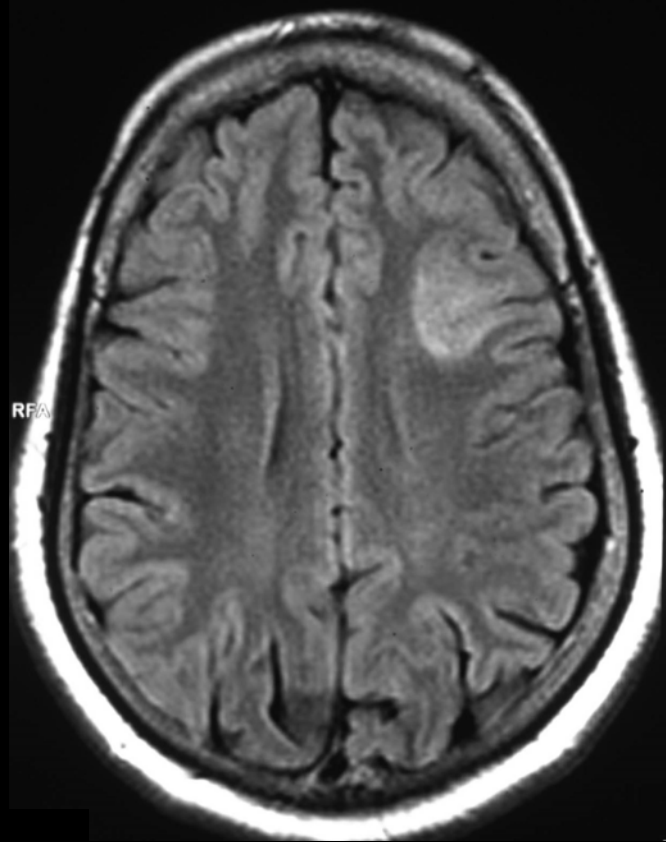
- 35-year old lady.
- Daily nocturnal stereotyped events since age 10 yr.
- Vocalization along with posturing of one upper limb and occasional incontinence.
- No day time events, but often somnolent.
- No response to multiple AEDs.
- Suspected to have nonepileptic events.







Symptomatic localization-related epilepsy: Left frontal focal cortical dysplasia



Patient 3

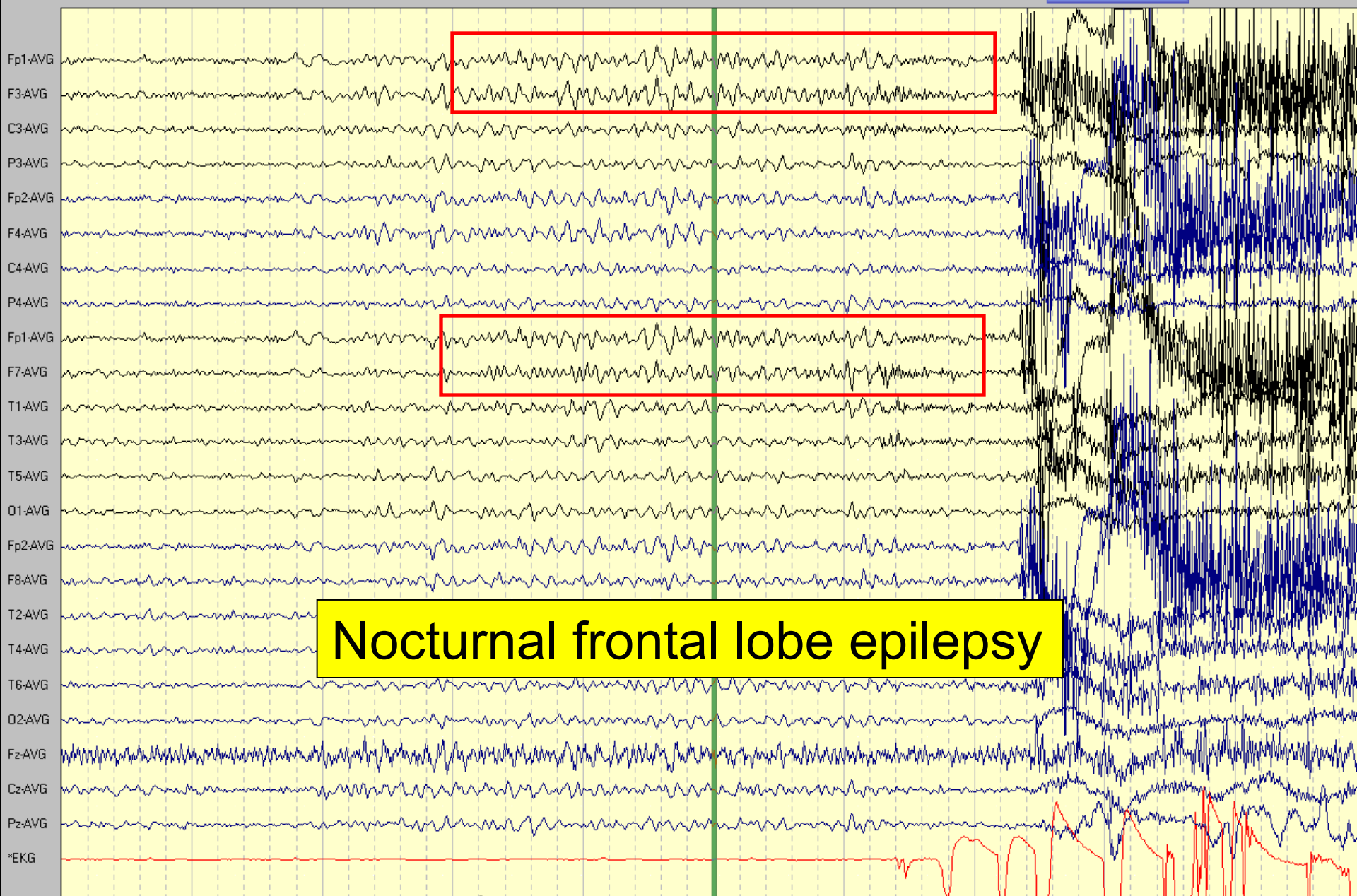
- 49-year old male
- H/O multiple episodes of febrile seizures
- Recurrent nocturnal events from 35 years of age
- Semiology: loud vocalization, restlessness, may hit other persons
- Frequency: 3-4 per night
- No response to AEDs
- Normal MRI
- DD: Parasomnia vs. Nocturnal frontal lobe epilepsy







Interictal



Ictal onset: Seizure 3

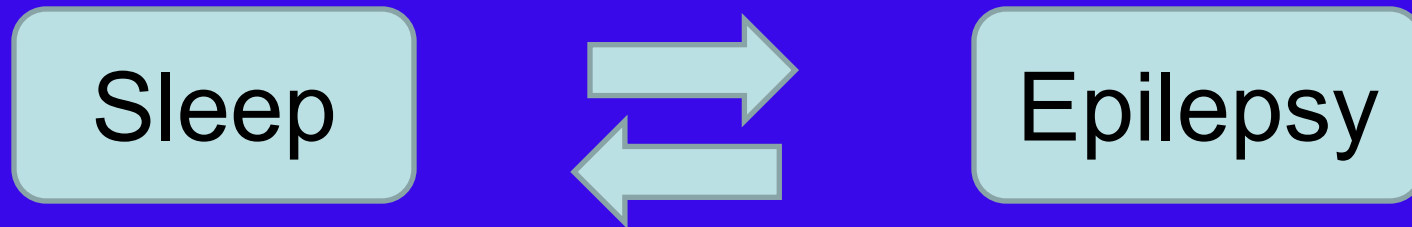
History: Sleep and Epilepsy

- Known since antiquity.

Aristotle and Hippocrates: occurrence of epileptic seizures during sleep.

- Late 19th century: Gowers commented the relationship of seizures to sleep-wake cycle
 - Berger's discovery of EEG in 1920s.
 - Gibbs and Gibbs (1947): IEDs activation during sleep.
 - Janz (1962): differentiated awakening, nocturnal and diurnal epilepsies.
-

Sleep and Epilepsy



Sleep and epilepsy

- Effects of sleep on epilepsy

 - Sleep

 - Interictal epileptiform abnormalities in the EEG

 - Epileptic seizures

 - Sleep deprivation

 - Interictal epileptiform abnormalities in the EEG

 - Epileptic seizures

- Effects of epilepsy on sleep

 - Interictal epileptiform abnormalities in the EEG

 - Epileptic seizures

- Effect of sleep disorders on epilepsy

- Effects of antiepileptic therapy on sleep

- Diagnosis between nocturnal seizures and parasomnias

Effect of sleep stage on epileptogenesis

NREM sleep

Synchronization of EEG

More frequent IEDs

Wider spread of IEDs

Increased likelihood of seizures

Greatest potential for epileptogenesis

REM sleep

Desynchronization of EEG

Less frequent IEDs

More localized IEDs

Infrequent seizures

Least potential for epileptogenesis

Effects of sleep on epilepsy

Interictal epileptiform abnormalities in the EEG

- IEDs gets activated in focal and generalized epilepsies

>30%

- Epilepsy syndromes associated with marked activation

Benign epilepsy with centrotemporal spikes

Landau-Kleffner syndrome

Epilepsy with continuous spike-wave during slow-wave sleep

West and Lennox-Gastaut syndromes

- Temporal lobe epilepsy

IEDs maximum during NREM stages 3&4 (N3)

Becomes bilateral during NREM

IEDs least during REM

Effects of sleep on epilepsy

Epileptic seizures

- Nearly exclusively during sleep

Autosomal dominant nocturnal frontal lobe epilepsy

$\alpha 4$ and $\beta 2$ subunits of ACh nicotinic receptor, chromosome 20

Benign childhood epilepsy with centrotemporal spikes

Effects of epilepsy on sleep

Epileptic seizures

- **Nocturnal GTCS**

 - Disrupted sleep and awakening

 - Primary GTCS – after seizure

 - Secondary GTCS – both before and after

 - Decrease in REM, compensatory increase in NREM stage 2

- **Nocturnal focal seizures**

 - Similar

- **Epilepsy without nocturnal seizures**

 - Sleep fragmentation, increased awakening compared to controls

Sleep complaints in persons with seizure disorder

- Excessive daytime sleepiness
 - Insomnia
 - Nocturnal spells
-

Excessive daytime sleepiness in persons with epilepsy

- Nearly one-third have elevated scores on ESS
 - Multifactorial
 - AEDs
 - Nocturnal IEDs and seizures
 - Associated primary sleep disorders
 - SDB and RLS
 - Correction of sleep disorders can improve seizure control
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Sleep disorders and epilepsy

Sleep disordered breathing

Valproate related obesity

Sedation by BDZ and PB

Vagus nerve stimulation (VNS)

Restless leg syndrome

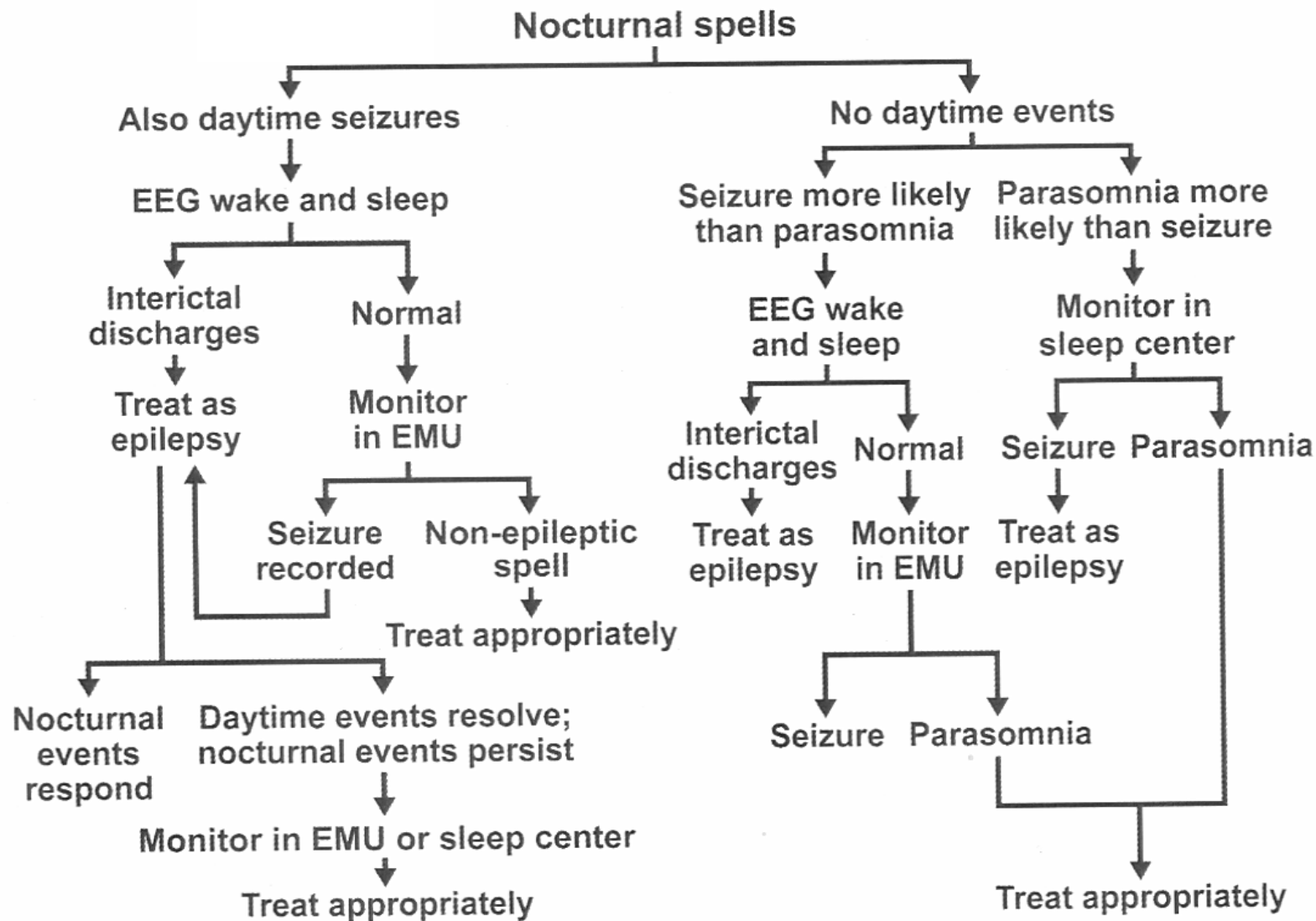
Worsen with DPH, Zonisamide

Benefit with GBP, VPA, CBZ, LTG

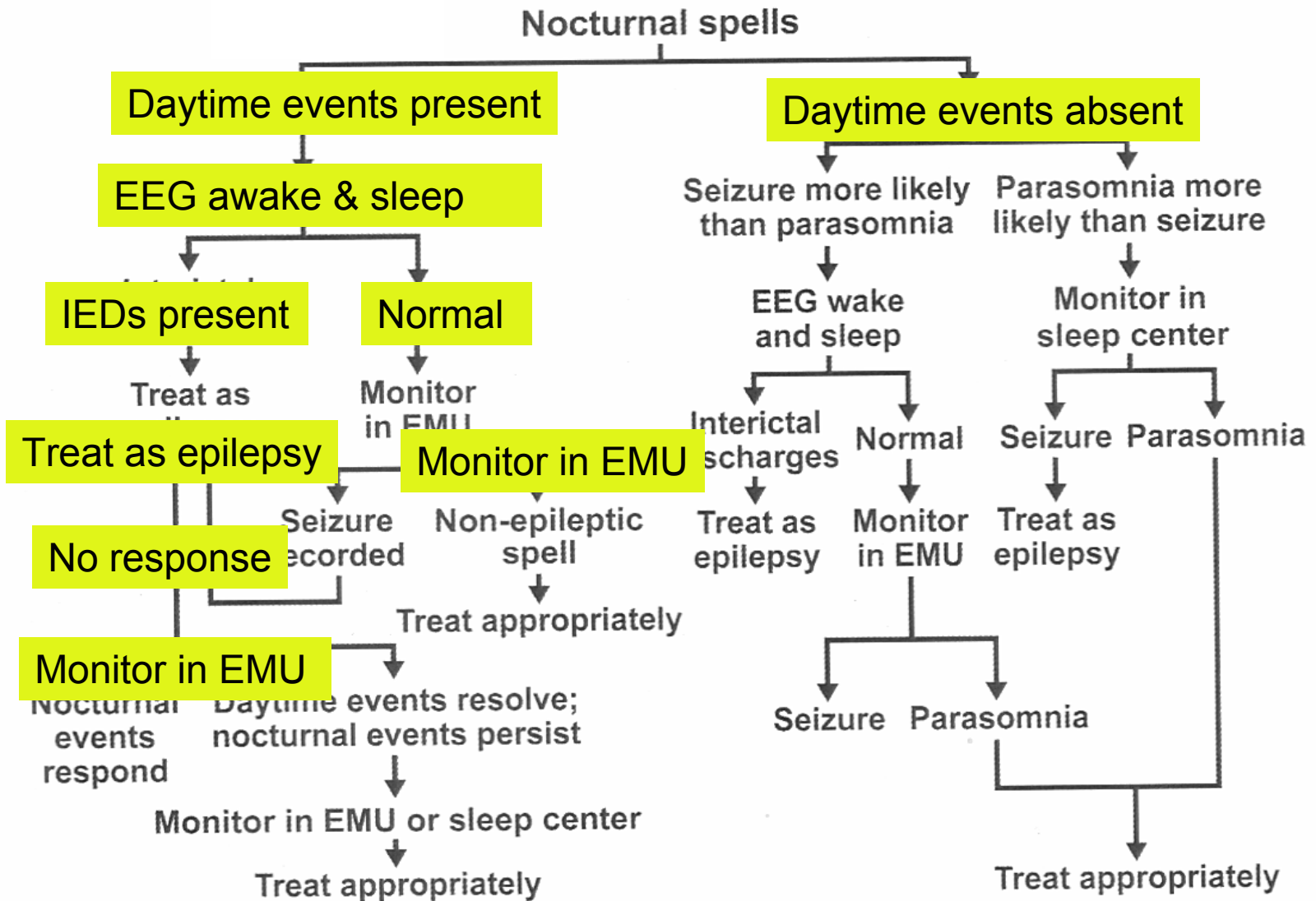
AEDs and sleep

- In general beneficial
 - Decrease sleep latency, increase efficiency
 - Decrease REM, increase NREM stage 2
 - Old AEDs: VPA most beneficial, DPH least
 - Insomnia: Felbomate, Lamotrigine, Zonisamide
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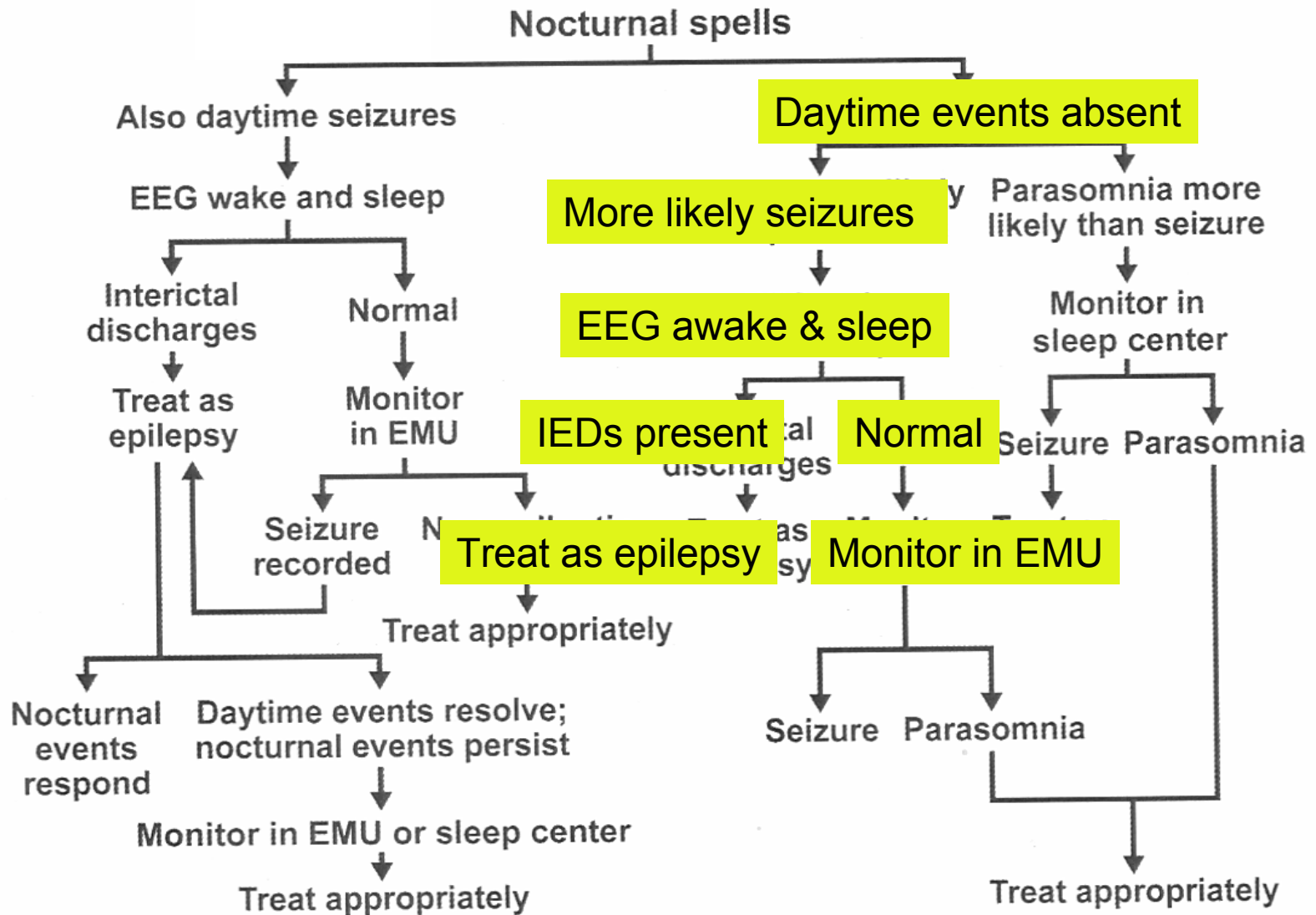
An algorithm for evaluation of nocturnal spells



An algorithm for evaluation of nocturnal spells



An algorithm for evaluation of nocturnal spells

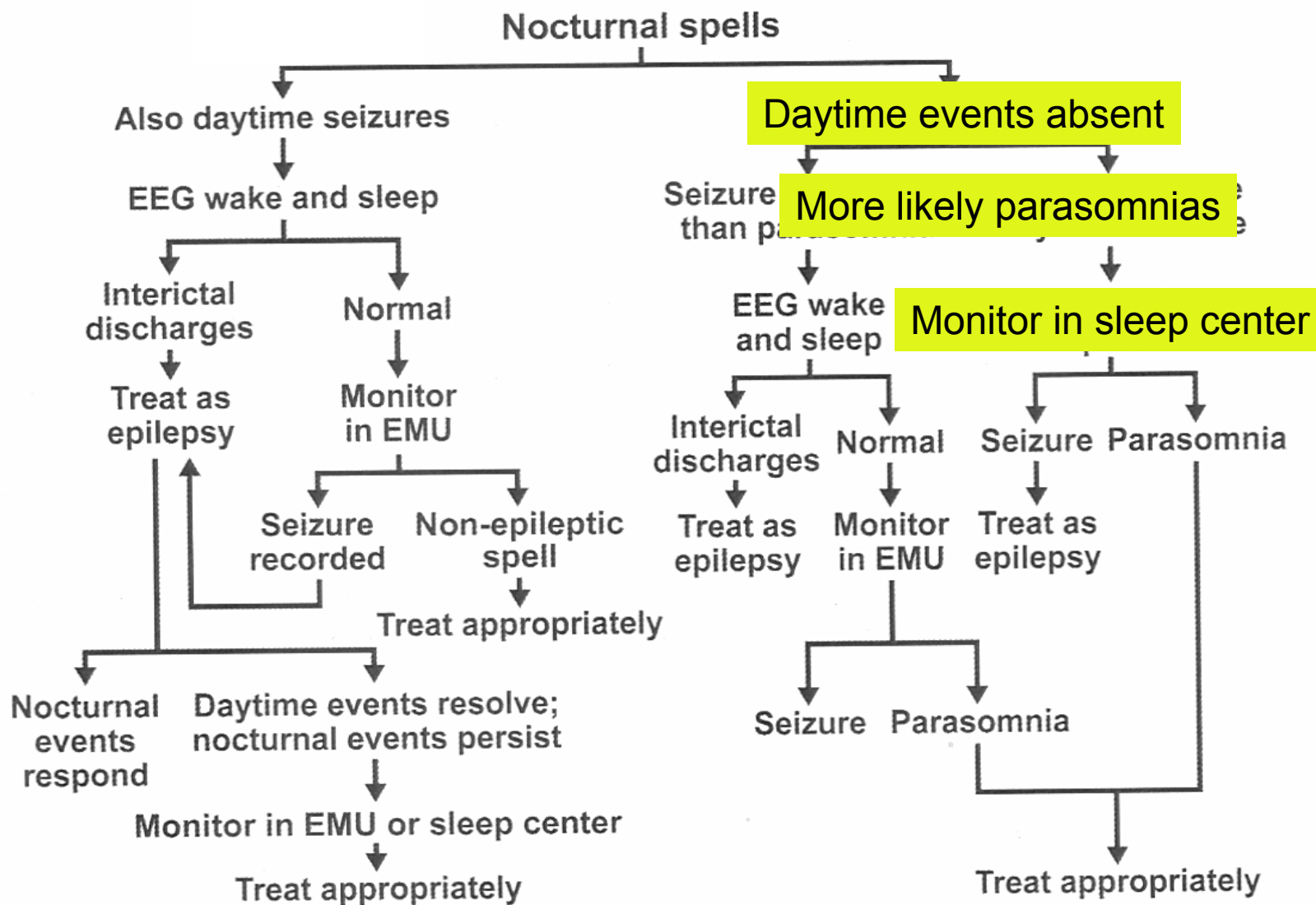


Frontal lobe epilepsy and parasomnia (FLEP) scale

- Age at onset <55 yr
- Duration of events <2 min
- Timing within 30 min of sleep onset
- Prominent dystonic posturing
- Stereotyped events
- Lucid recall

(Derry et al. *Arch Neurol* 2006;63:705-9)

An algorithm for evaluation of nocturnal spells



Conclusions

- ❖ The interaction between sleep and epilepsy is bidirectional and complex
 - ❖ Sleep is an activator of IEDs and seizures
 - ❖ Routine EEG in persons with suspected seizure disorder should include recording during sleep
 - ❖ Sleep disruption can disturb seizure control
-

Conclusions

- ❖ Epileptic discharges alter sleep regulation and provoke sleep disruption
 - ❖ Excessive daytime sleepiness and insomnia in persons with epilepsy often indicate an underlying sleep disorder rather than the effect of epilepsy or AEDs.
-

Conclusions

- ❖ Differential diagnosis between nocturnal seizures and parasomnias often need a close interaction between epileptologist and sleep specialist.
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A vibrant field of petunias in various colors including pink, purple, and white, with green foliage. The text "THANK YOU" is overlaid in the center in a bold, blue, 3D-style font.

THANK YOU