Frontal Lobe Epilepsy (FLE)

M. Mazen Al-Hakim, M.D.

Frontal Lobe Epilepsy

- Second most common after Temporal Lobe Epilepsy
- 20% of surgical cases

- FLE often misdiagnosed as PNES

1. Bizarre presentations

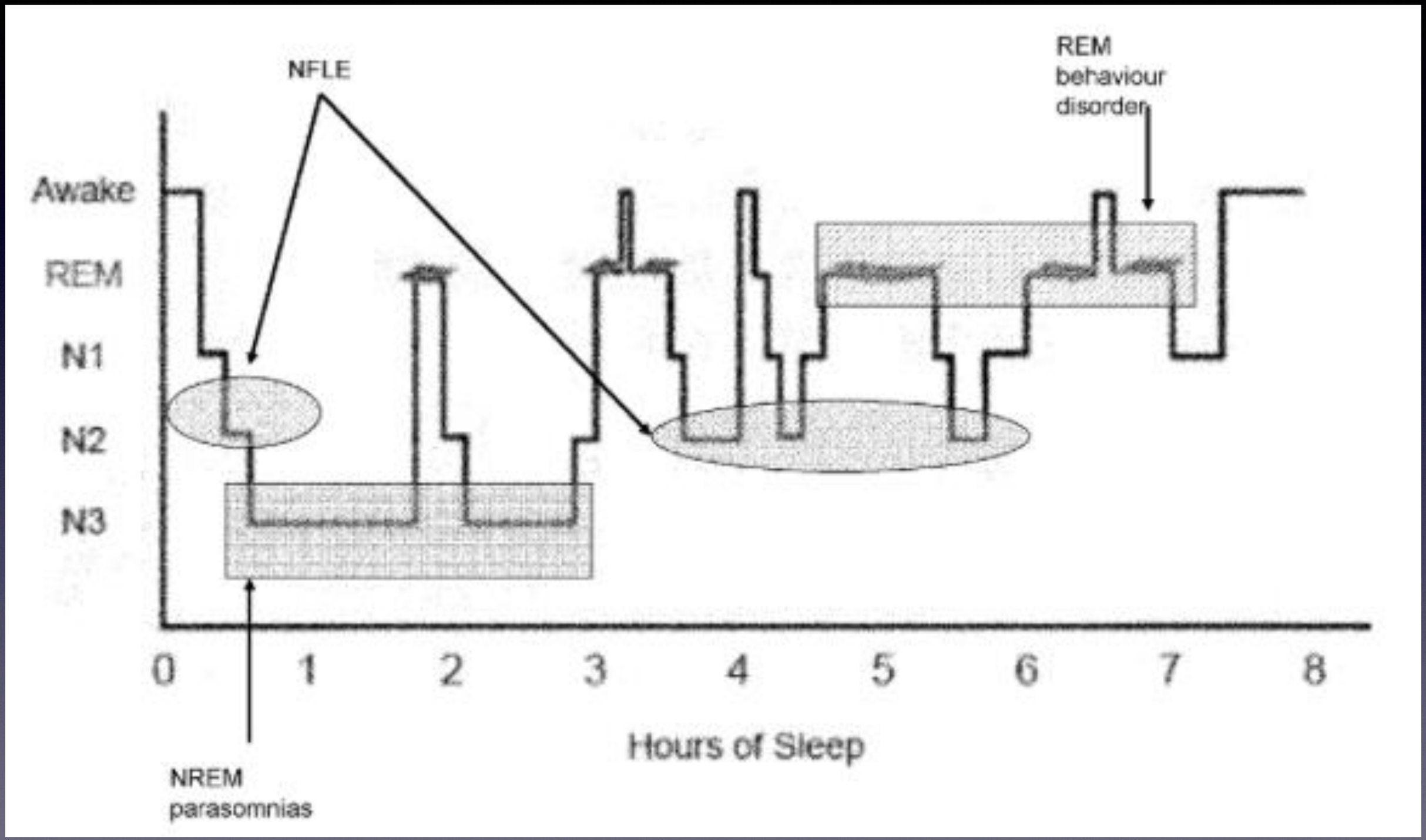
2. Surface EEG is often normal

Surface EEG

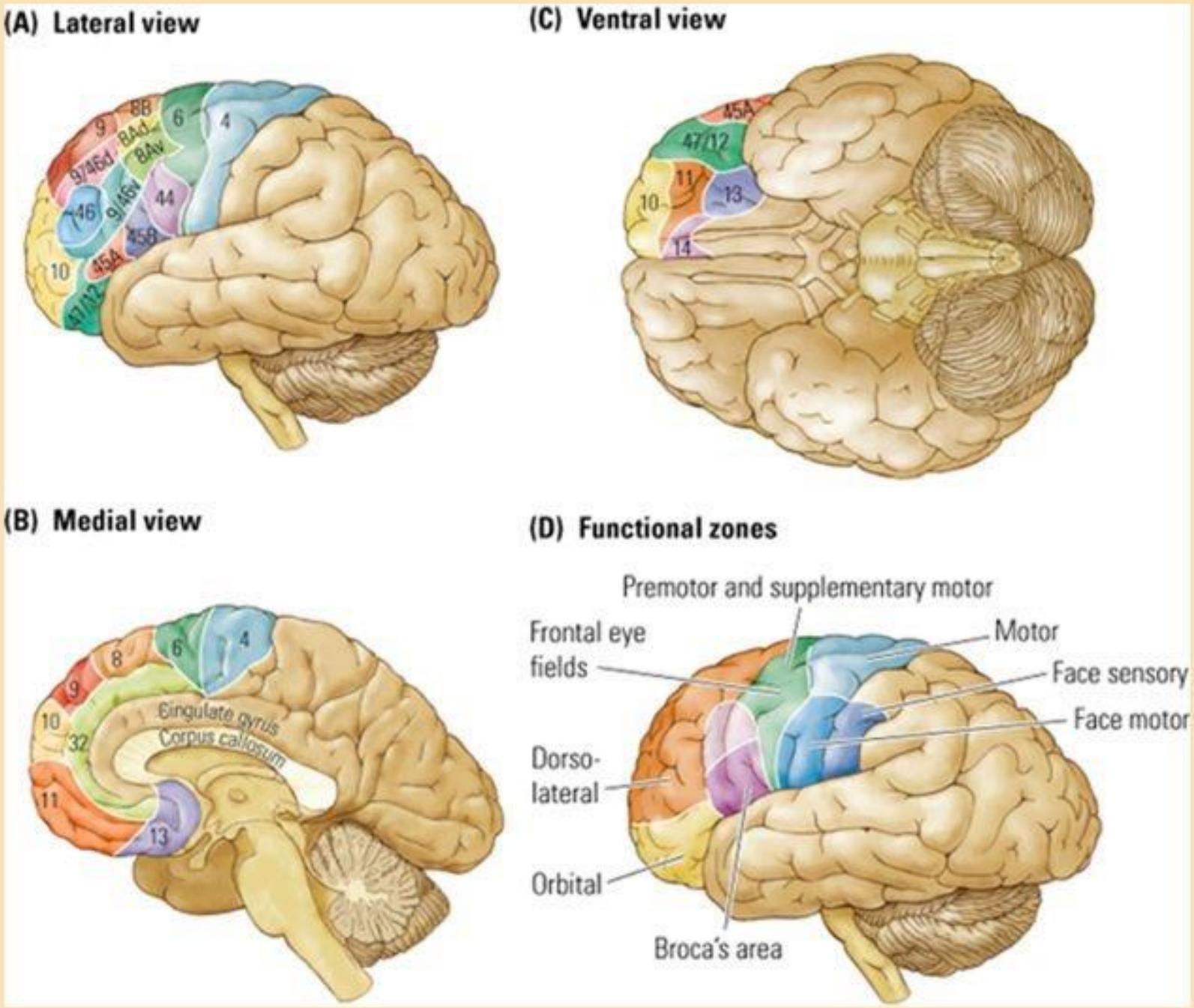
1. Epileptic Focus is distant
2. Rapid spread of epileptic activity
3. Small area (at least 6 cm^2)
4. Muscle artifact

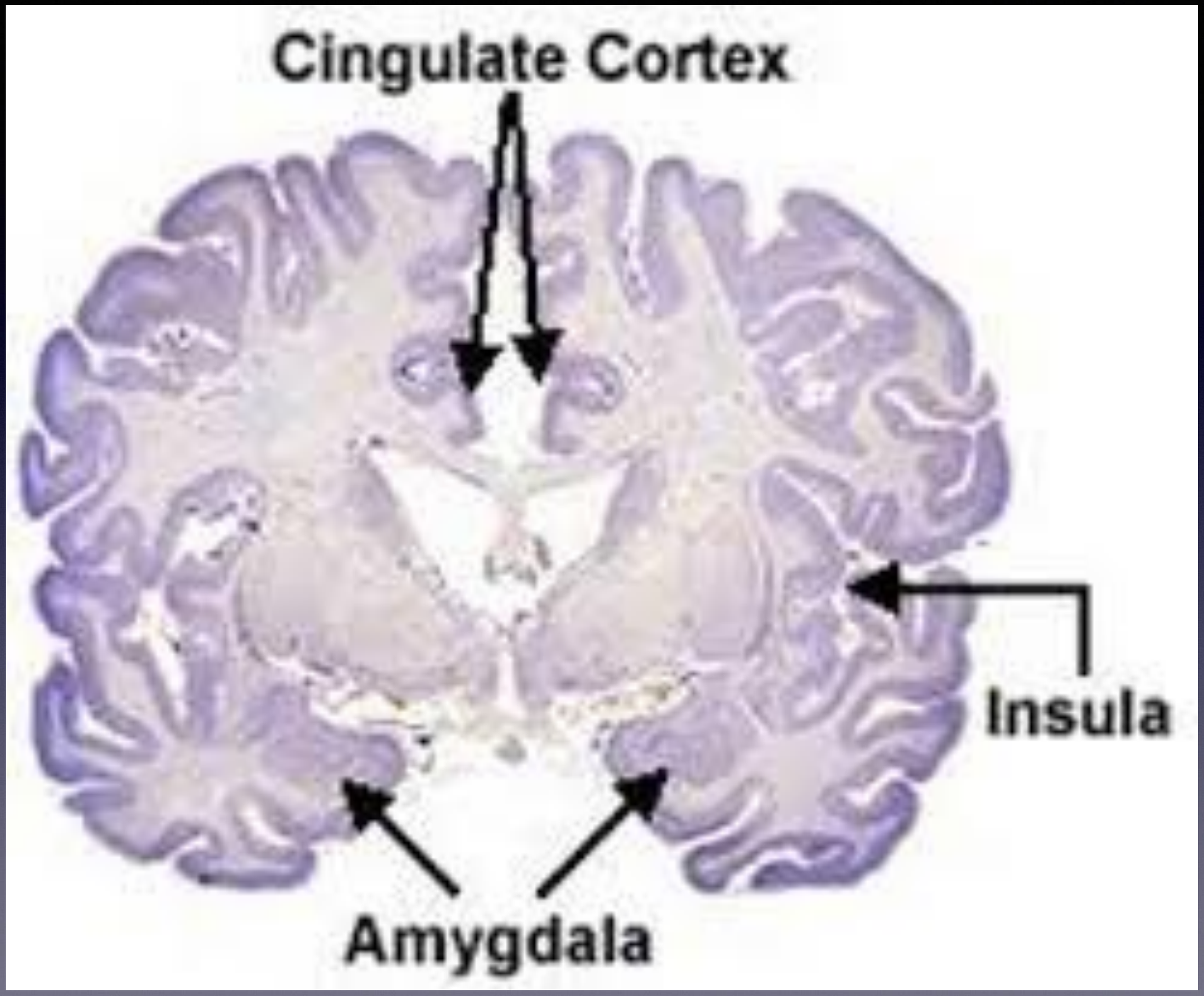
Features of FLE

1. Aura (up to 70%): Sensory or Autonomic
2. Vocalizations (at least 50%)
3. Motor activity (about 90%), hence a lot of muscle artifact
4. Brief duration (less than 1 min) often with brief or no post-ictal confusion
5. Clustering
6. Occurrence from sleep (up to 60%), mostly N2 sleep stage
7. Stereotypic


NFLE
REM
behaviour
disorder
Awake
REM
N1
N2
N3
0
1
2
3
4
5
6
7
8
Hours of Sleep
NREM
parasomnias

Anatomy of the Frontal Lobes




Cingulate Cortex
Insula
Amygdala

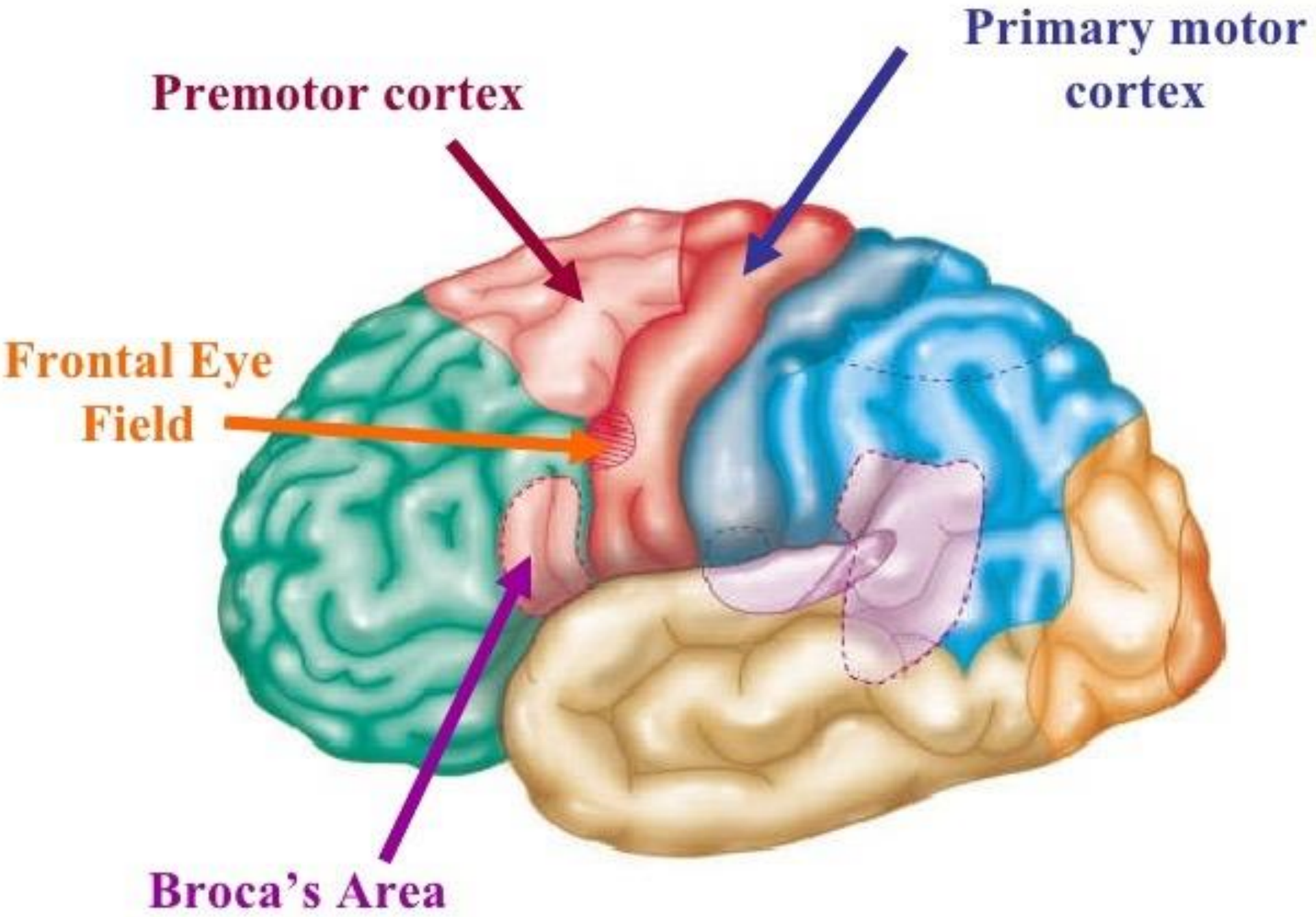

Primary motor cortex
Premotor cortex
Frontal Eye Field
Broca's Area

TABLE 5-1 Clinical Manifestations of Frontal Lobe Syndromes[a]

Location	Ictal Behavior
Perirolandic or primary motor	Focal motor seizures with or without jacksonian march, speech arrest or dysphasia, vocalization
Supplementary sensorimotor	Focal asymmetric tonic posturing, versive movements of head and eyes, speech arrest, vocalization
Dorsolateral	Focal tonic or clonic activity, versive movements of head and eyes, speech arrest or dysphasia
Orbitofrontal	Complex motor automatisms, olfactory hallucinations and illusions, autonomic features
Anterior frontopolar	Versive movements of head and eyes, forced thinking, initial loss of contact or "absencelike," speech or motor arrest
Opercular	Mastication, salivation, swallowing, laryngeal symptoms; speech arrest or dysphasia; epigastric aura, fear; autonomic features; facial clonic activity; gustatory hallucinations
Cingulate	Fear, vocalization, emotional or mood changes, complex motor automatisms, autonomic features

[a] Reprinted with permission from Bagla R, Skidmore CT, Neurologist.[14] *journals.lww.com/theneurologist/Abstract/2011/05000/Frontal_Lobe_Seizures.1.aspx*.

More Practical

1. Focal motor
2. SMA
3. FLCPS

Focal Motor

- Tonic
- Clonic
- Jacksonian March
- No LOC

SMA

- Bilateral asymmetrical tonic (fencing seizures)
- Head, eyes, and body turn
- Aphasic seizures
- Negative seizures

FLCPS

- Bizarre
- Vigorous proximal muscle movement such as bicycle, wind mill movement, kicking, hand clapping, or rocking.
- Sexual automatism
- Ambulation
- Vocalization
- With or without LOC

Surface EEG

1. More than 50% is normal, even during the seizure.
2. The highest yield is in dorsolateral and frontopolar.

- Epileptic discharges
- Background suppression
- Paroxysmal fast activity
- Bilateral hyper-synchrony
- Midline rhythmic theta (MRT)

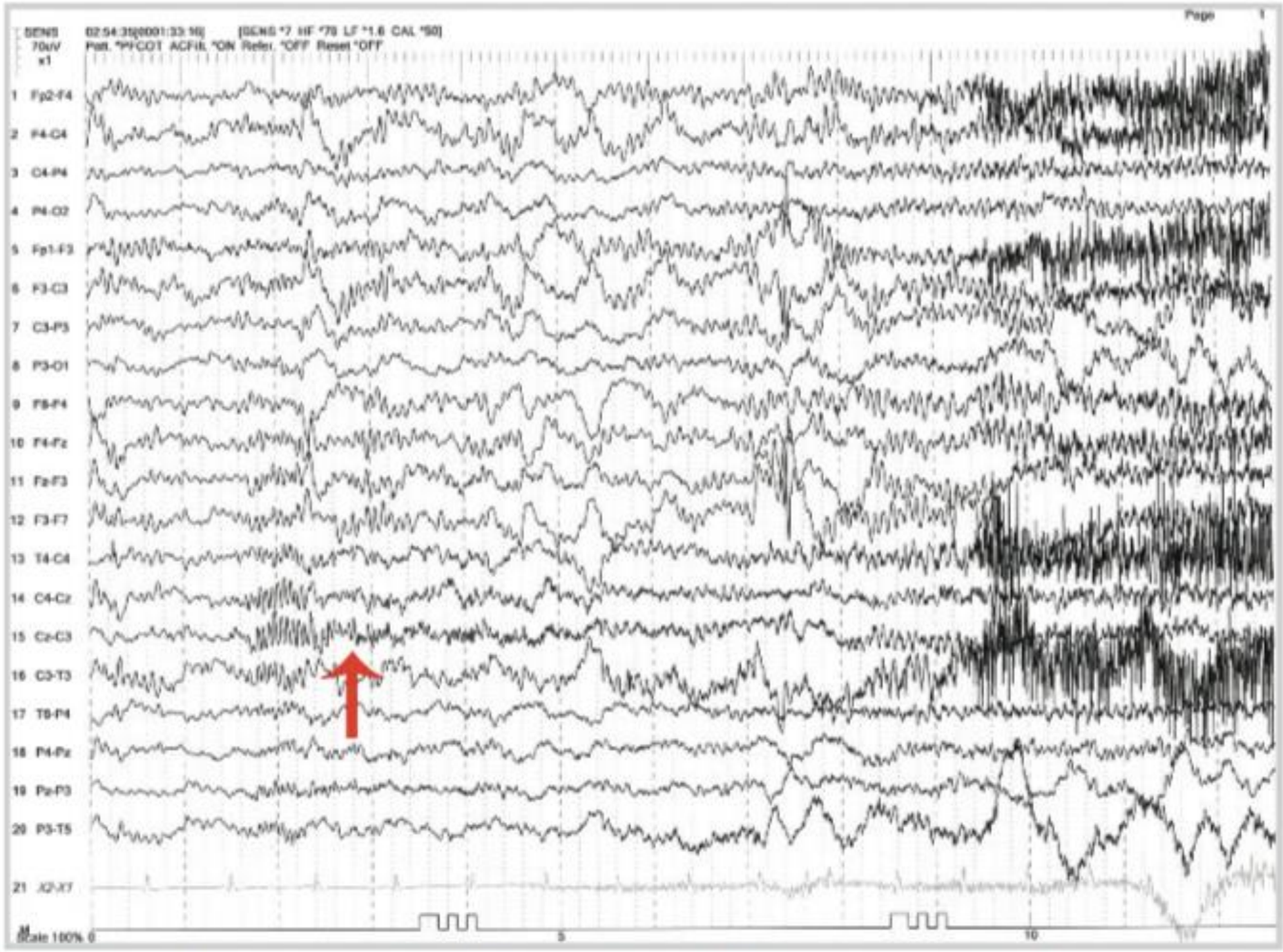


FIGURE 5-11 EEG of the patient in **Case 5-3** demonstrating mesial frontal seizure. During the third second of the EEG, a paroxysmal fast discharge develops at electrode Cz (*arrow*). This finding was reproducible with all seizures and always preceded clinical onset.

To Improve Seizure Detection

1. Add midline leads
2. High density scalp EEG (10-10 system)
3. Sleep deprived EEG

- SPECT
- PET
- Invasive recording, including:
  - Dural
  - Stereo EEG

References

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