



# Seizure Semiology

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# Seizure Semiology

- Differentiate between epileptic and nonepileptic seizures
- Classification of epileptic syndrome
- Presurgical evaluation: initial seizure symptoms provide useful information on the location of seizure-onset zone

# Symptomatogenic Zone

I IRRITATIVE ZONE (1)

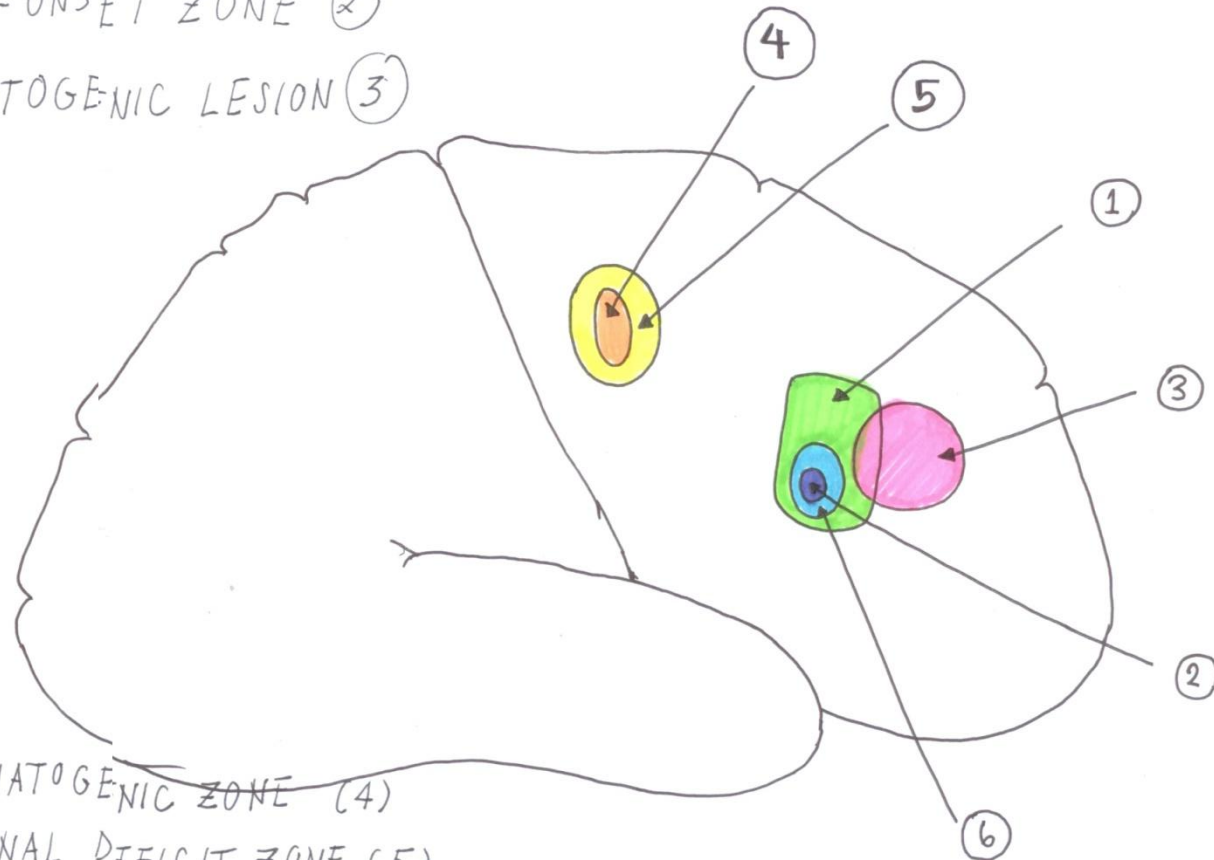
II ICTAL-ONSET ZONE (2)

III EPILEPTOGENIC LESION (3)

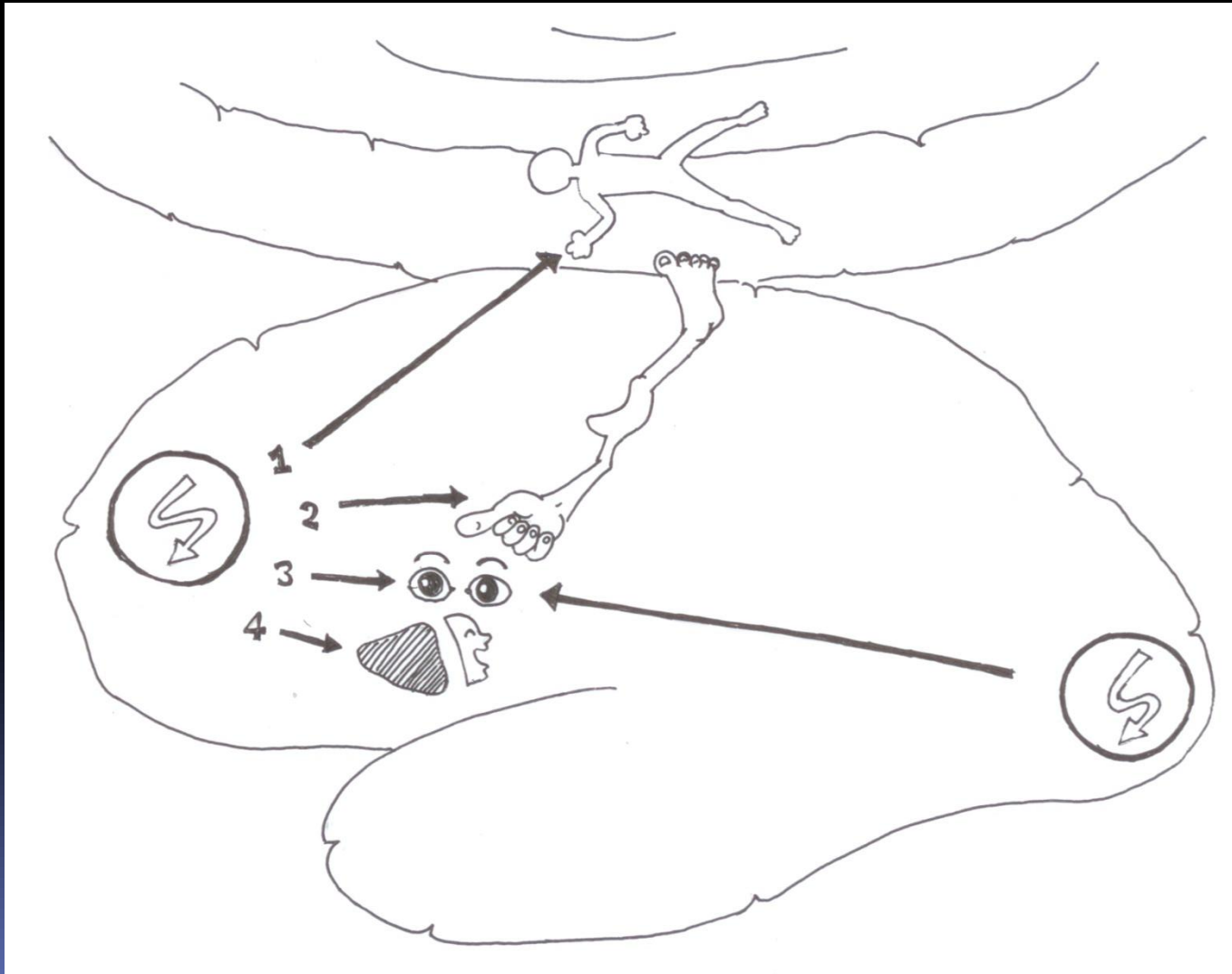
IV SYMPTOMATOGENIC ZONE (4)

V FUNCTIONAL DEFICIT ZONE (5)

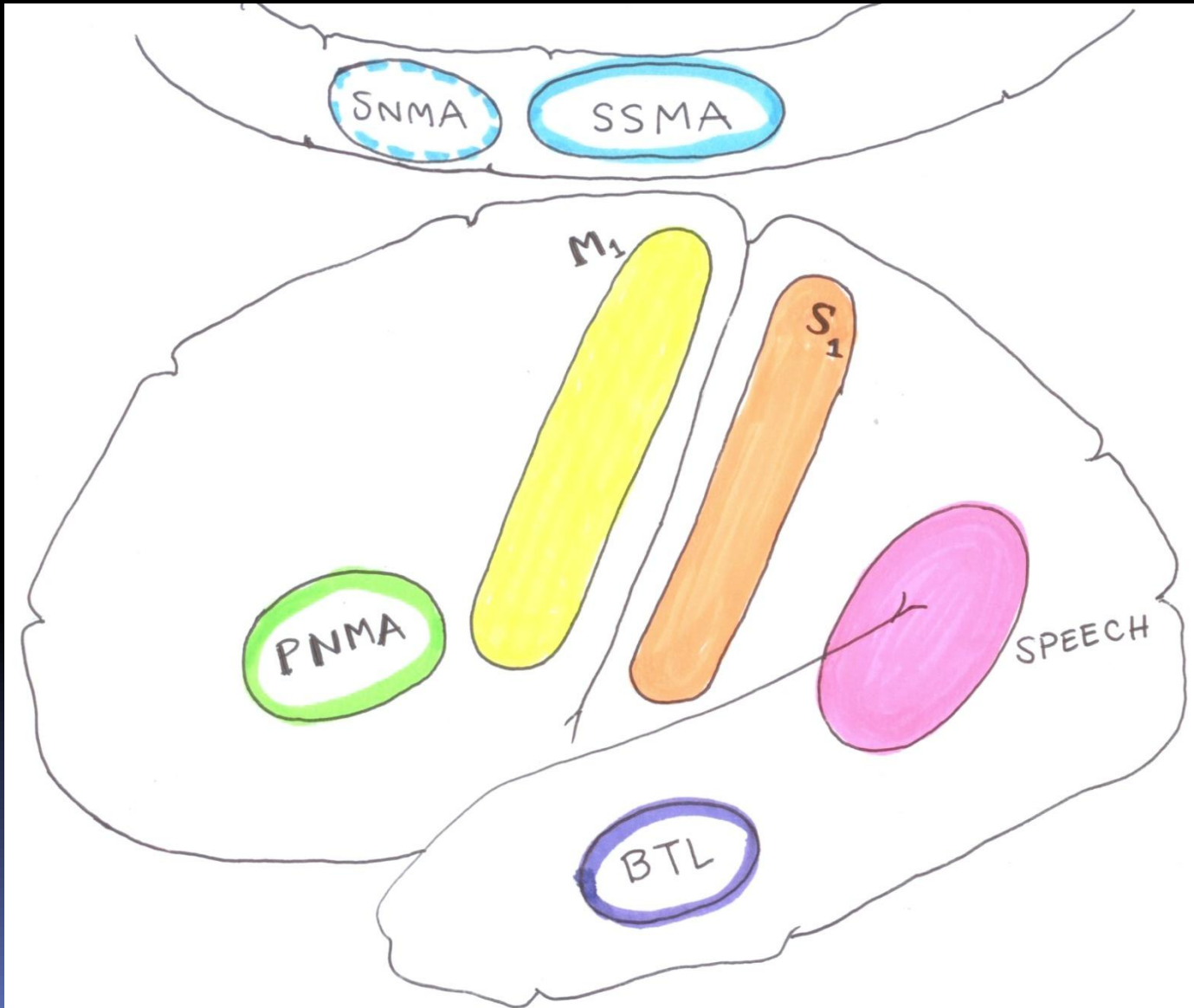
VI EPILEPTOGENIC ZONE (6)



# Symptomatogenic Zone



# Symptomatogenic Zone



# Symptomatogenic Zone

- Clonic: primary motor area
- Tonic: SSMA
- Unilateral distal paresthesia: primary sensory area
- Unilateral/ bilateral paresthesia in addition to tonic contraction: SSMA
- Visual simple hallucination: PVA
- Complex visual hallucination: occipito-temporal association cortex

# Symptomatogenic Zone

- Autonomic symptoms: superior bank of sylvian fissure
- Psychic symptoms: basal temporal region
- Akinetic/ atonic: negative motor area
- Aphasic: Broca, Wernicke, basal temporal area
- Automatism: cingulate gyrus

# Symptomatogenic Zone

- Simple auditory hallucination: Heschl's gyrus
- Complex auditory hallucination: temporal association cortex
- Olfactory: amygdala



# Seizure Semiology

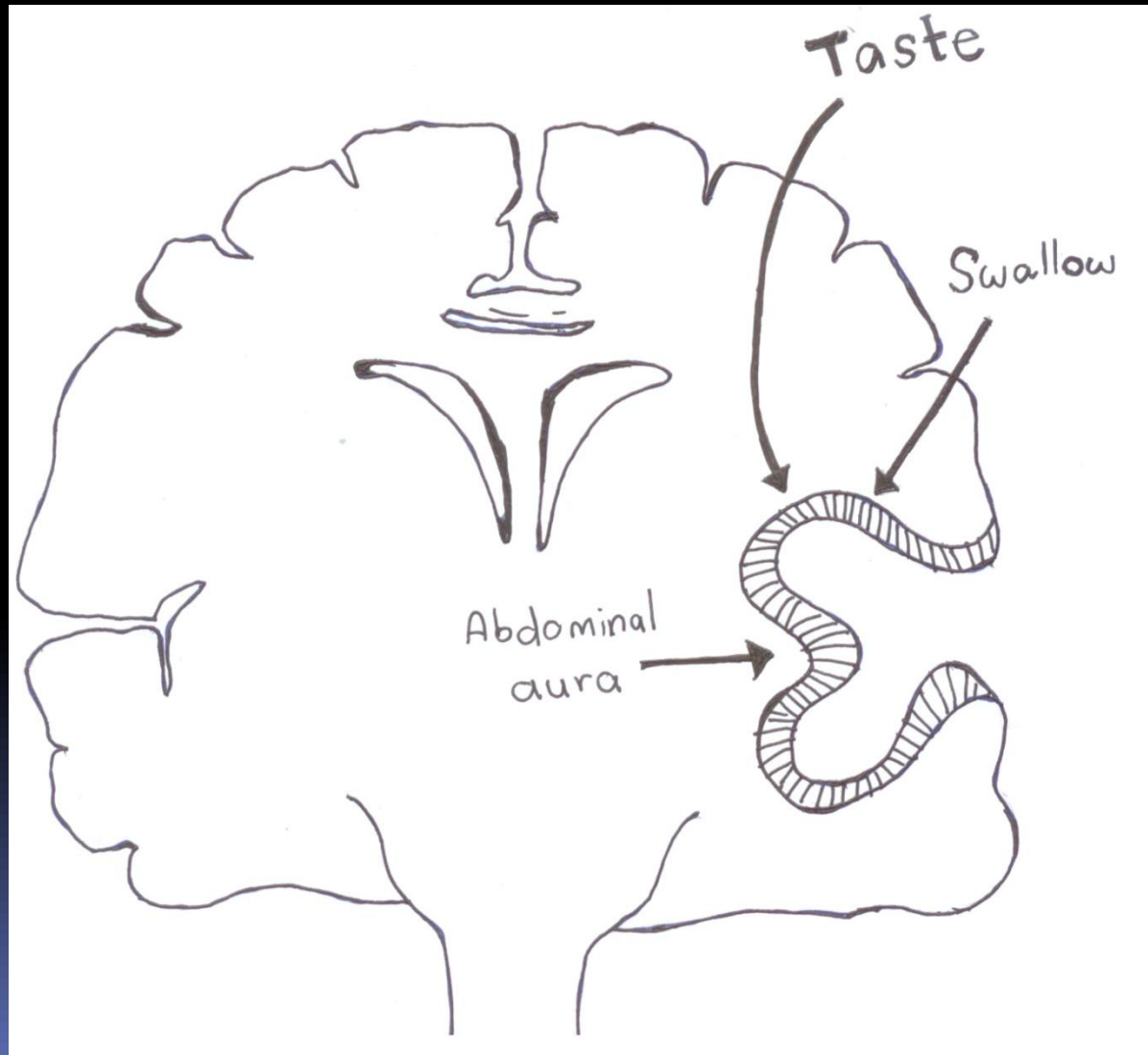
- Sensory
- Autonomic
- Consciousness
- Motor

Noachtar, 2001

# Aura

- Epileptic seizure with exclusively subjective symptoms
- Extremely useful localizing information about seizure-onset zone
- Sensory, auditory, olfactory, gustatory, psychic, abdominal and autonomic auras

# Aura



# Motor Seizure

- Simple
- Myoclonic
- Tonic
- Spasm
- Clonic
- Tonic-clonic
- Versive
- Complex
- Hypermotor
- Automotor
- Gelastic

# Special Seizures

- Astatic
- Atonic
- Akinetic
- Negative myoclonus
- Aphasic
- Hypomotor

# Myoclonic Seizures

- Frequently associated with generalized spikes with frontal maximum
- Unilateral/ bilateral
- Primary motor cortex/ premotor cortex
- LGS, JME

# Versive Seizures

Wyllie E, et al: Neurology, 36:606-611, 1986

- Sustained, forceful, unnatural turning of the eyes and head to one side
- Activation of frontal eye field
- Highly suggestive of contralateral ictal foci
- Initial version: 91% frontal ictal foci
- Follow automatism 100% TLE

# Versive Seizure

- High lateralizing value when occur immediately before a generalized tonic-clonic seizure ( Bleasel et al, 1997)



# Automotor Seizures

- Occur most frequently in patients with temporal lobe epilepsies but also occur in patients with frontal lobe epilepsies, especially orbito-frontal origin
- Activation of cingulate gyrus

# Dystonic Posturing in Complex Partial Seizure of Temporal Lobe Onset:

Kotagal P, et al; Neurology 89: 196-201, 1989

- All contralateral ictal foci
- Secondary activation of ipsilateral basal ganglion

# Clonic Seizure

- Mostly affect distal segments
- Primary motor/ premotor cortex

# Asymmetrical Tonic Seizures

- Preferentially affect proximal muscle on both sides, but more prominent over the contralateral side
- Conscious is intact in most patients at least at the seizure onset
- Unilateral tonic seizures have a high lateralized value with contralateral foci
- Primary motor, SSMA

# Symmetrical Tonic Seizures

- Consciousness is impaired from seizure onset
- LGS



# Tonic-Clonic Seizures

- May occur in generalized and focal epilepsy

# Hypermotor Seizures

- Complex sequences of movement which primarily affect the proximal body segments and result in large, violent movement
- Preservation of consciousness is common
- Mesial frontal or SSMA
- Interictal/ ictal EEG may be normal



# Gelastic Seizures

- Ictal laughing
- Hypothalamic hamartomas



# Atonic Seizures

- Usually generalized and primarily affects the axial muscles
- Epileptic activation of inhibitory centers in the brainstem
- Lennox-Gastaut syndrome

# Akinetic Seizures

- Inability to perform voluntary movements
- Consciousness is not disturbed
- Focal or generalized
- Negative motor areas

# Unilateral Blinking

Benbadis SR, Kotagal P, and Klen GH 1996

- Fourteen patients with unilateral eye blinking
- 0-37 seconds after onset
- Ipsilateral 10/12
- Contralateral 2/12

# Lateralizing Seizure Phenomena

- Versive Contralateral
- Dystonic posturing Contralateral
- Automatism with preserved responsiveness Nondominant
- Ictal speech Nondominant
- Postictal aphasia Dominant
- Ictal vomiting Nondominant
- Ictal spitting Nondominant

# Lateralizing Seizure Phenomena

- Periictal urinary urge                      Nondominant
- Postictal nose rubbing                      Ipsilateral
- Postictal coughing                          Nondominant
- Unilateral clonic                              Contralateral
- Unilateral tonic                                Contralateral
- Unilateral eye blinking                      Ipsilateral



Thank You for Your Attention