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Health, Bureau of Health
Promotions, to ensure no
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activity

Seizures in the School Setting

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Seizures by the #'s

- 1 in 10 people will have at least 1 seizure in their life
- 1 in 25 children will have a generalized seizure before 5 years of age
- 1 in 100 people will have epilepsy

Objectives

- Review definitions
- Identify various seizure types & categories
- Understand potential causes for seizure
- List aspects of the initial workup after a 1st time seizure
- List common anti-epileptic medication side effects
- Know how to keep a child safe during a seizure

Definition

- Seizure (ictus):
 - abnormal excessive or synchronous neuronal activity in the brain
 - when brain cells send messages again and again in an uncontrolled manner
 - can cause sudden change in level of consciousness, behavior, actions or sensation
- Epilepsy
 - syndrome of recurrent unprovoked seizures
- Status (Epilepticus)
 - Prolonged/persistent seizure

Seizure Characterization

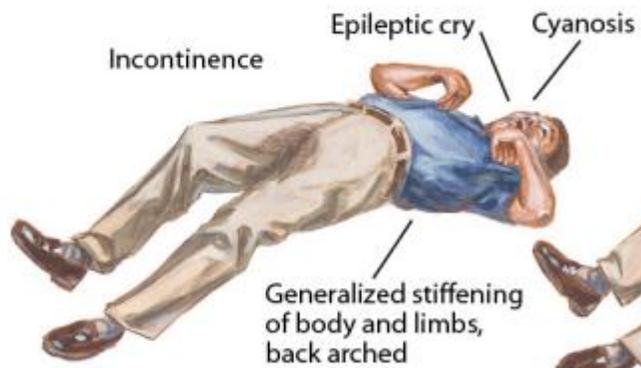
- Age
- Semiology = what it looks like (LOC, head/eyes limbs)
- Onset
- Duration
- Behavior before & after (pre & post-ictal)
- Etiology
 - provoked (e.g. febrile, abscess, structural) vs unprovoked
 - symptomatic vs idiopathic

2 Main Categories

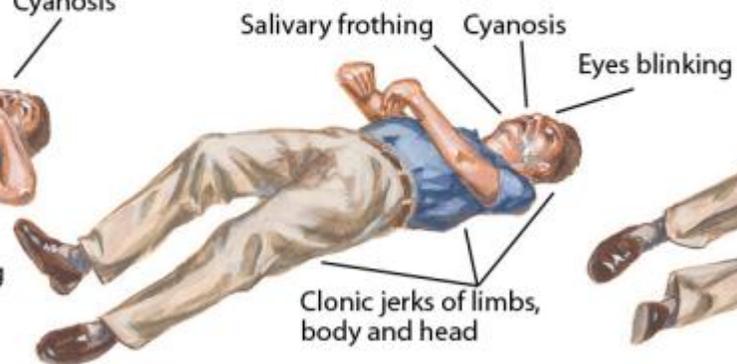
- Generalized
 - Tonic-clonic (convulsive, grand mal)
 - Absence (staring, petit mal)
 - Onset 3-6y, <15 seconds
 - ADHD overlap
 - Abrupt onset, + LOC
 - No postictal period
 - Child often unaware
 - May including blinking, chewing or hand movements
 - Atonic (drop)
 - Myoclonic (single jerk)
- Focal/Partial
 - Simple
 - Affects only one part of the body
 - Consciousness is not affected
 - Complex
 - Includes change in consciousness & automatisms followed by confusion
 - Often have aura
 - Secondary generalization

Tonic-clonic seizure

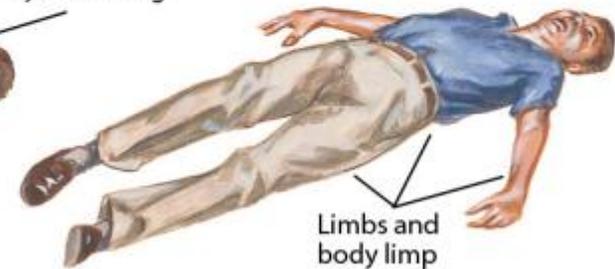
A. Tonic phase



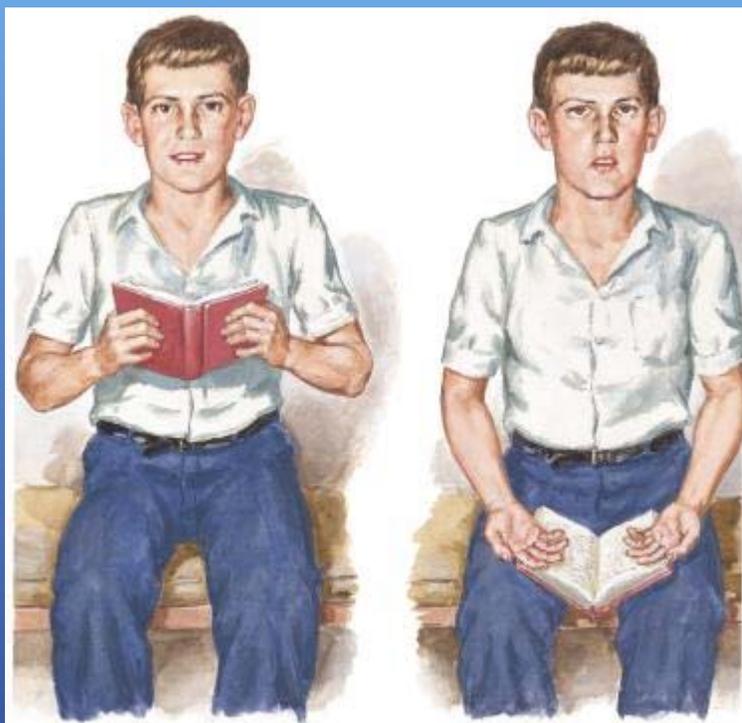
B. Clonic phase



**C. Post-ictal
confusional fatigue**



Absence Seizure



Focal Seizures

Central sulcus **Postcentral gyrus** **Precentral gyrus**

Leg **Trunk** **Arm** **Face**

Somatosensory. Tingling of contralateral limb, face, or side of body

Focal motor. Tonic-clonic movements of upper (or lower) limb

Grimacing

Contraversive: head and eyes turned to opposite side

Autonomic. Sweating, flushing or pallor, and/or epigastric sensations

Visual. Sees flashes of light, scotomas, unilateral or bilateral blurring

Auditory. Hears ringing or hissing noises

EEG: Focal motor seizure, left arm and hand

Fp1-F3
F3-C3
C3-P3
P3-O1
Fp2-F4
F4-C4
C4-P4
P4-O2

Repetitive sharp waves over right central region

Common Pediatric Epilepsy Syndromes

- Febrile Seizure
 - 6m-6y; good prognosis
 - simple vs complex
 - 2-5% of all children
 - antipyretics don't prevent
 - recurrence:
 - 50% for <12
 - 30% for >12m
 - 2nd feb sz →50% risk of 3rd
- Childhood Absence Epilepsy
 - 4-14y; good prognosis
- Benign Rolandic Epilepsy
- GTCS on awakening
- Juvenile Myoclonic Epilepsy (JME)
 - mixed disorder
 - lifetime risk

Rare Pediatric Epilepsy Syndromes

- Lennox-Gastaut
- Landau-Kleffner
- Dravet syndrome
- Doose syndrome

First unprovoked seizure

- Untreated: 40% at 2y
- Treated: 32% at 2 years
- 80-90% of 2nd seizures occur within 2 years
 - Highest risk within 1st 6 months

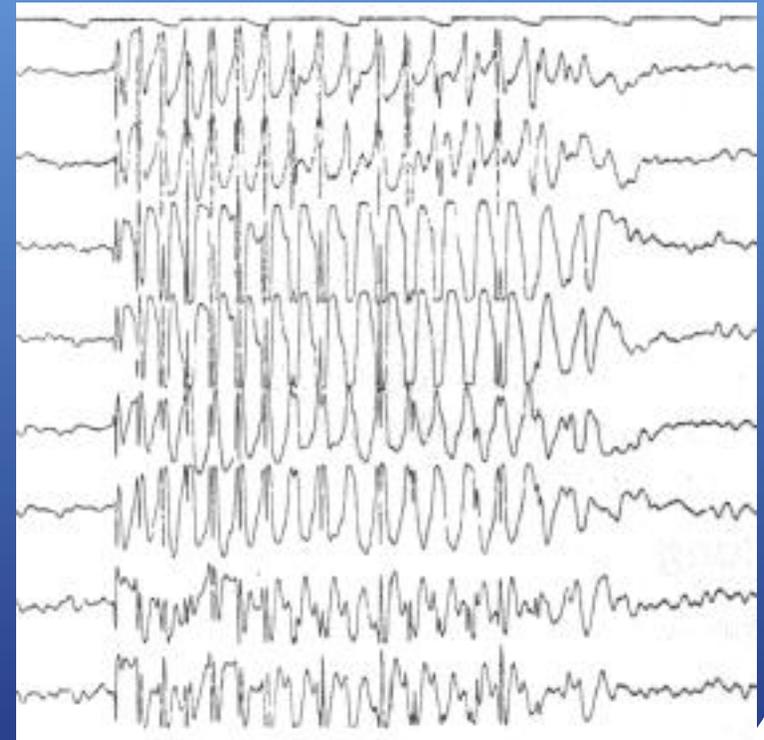
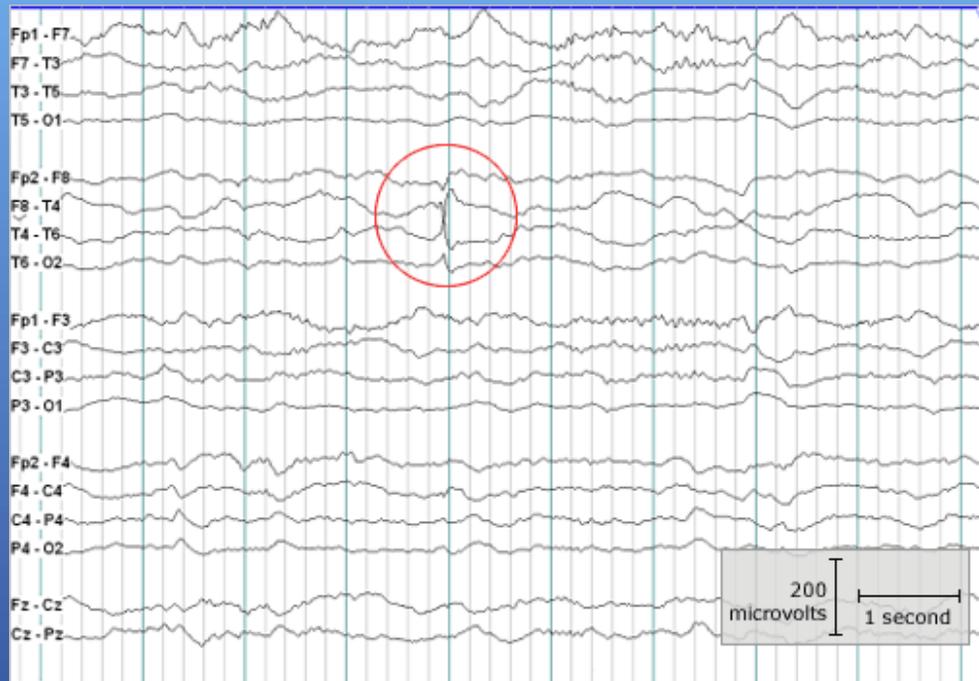
Causes for seizure

- CNS infection - meningitis, encephalitis, abscess
- Trauma - acute, scarring
- Vascular - stroke, hemorrhage, vessel malformation, clot
- Hypoxia - hypoxic ischemic encephalopathy
- Metabolic/Electrolyte Imbalance - hypoglycemia, hypercalcemia, inborn errors of metabolism
- Drugs/Toxins/Withdrawal
- Structural - Mass, tumor, cortical malformations/dysplasia
- Idiopathic - genetic

First-time Seizure Workup

- Depends on context
 - E.g. age, fever, trauma, infection, duration
- Should include:
 - Thorough history (including birth, development & family history)
 - Physical exam (head size, skin findings)
- May include:
 - Head CT (if concerned for head trauma)
 - EEG
 - Brain MRI
 - ECG
 - Labs
 - Lumbar puncture

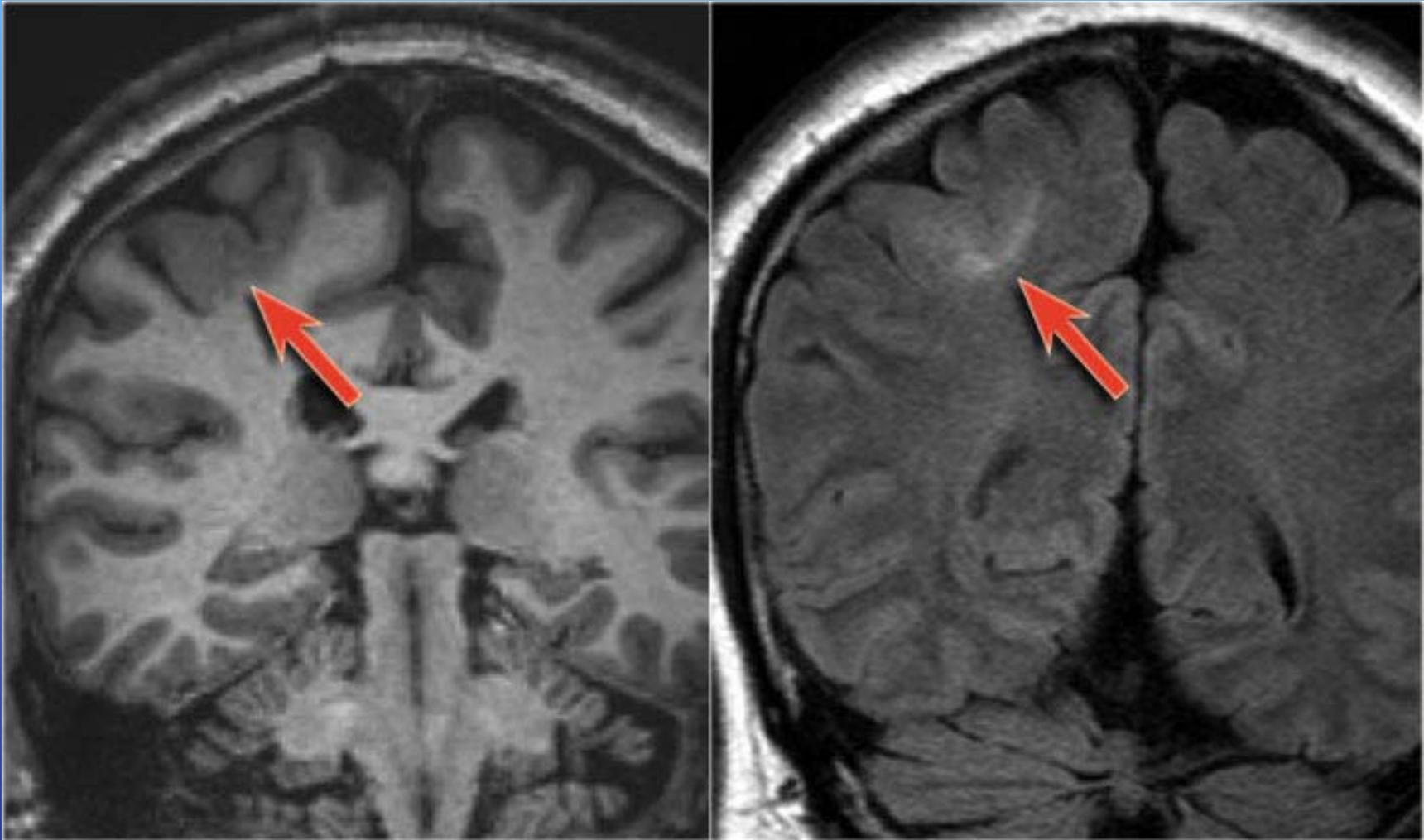
EEG



Brain MRI



MRI - cortical dysplasia



Conditions that Mimic Seizures

- Tics
- Shivering
- Syncope
- Breath Holding Spells
- Reflux
- Excessive startle
- Psychogenic/Pseudoseizures
- Behavioral Variants - self-stimulation

When to Treat

- Rarely after first event

Safety

- Water
- Heights
- Medications
- Helmets

Medications

- Preventive

- Rescue

Common Preventive Medications

- Levetiracetam (Keppra)
- Ethosuximide (Zarontin)
- Oxcarbazepine (Trileptal)
- Valproic acid (Depakote)
- Lamotrigine (Lamictal)
- Topiramate (Topamax)
- Zonisamide (Zonegran)
- Lacosamide (Vimpat)
- Phenobarbital
- Fosphenytoin (Dilantin)

Side Effects

Medication

- Levetiracetam (Keppra)
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Side effect

- Irritability, fatigue
- Fatigue
- Nausea, hyponatremia
- Tremor, nausea, wt gain, hair loss
- Rash
- Fatigue, cognitive slowing
- Rash
- Fatigue
- Sedation, lower IQ
- Rash, gum overgrowth, bone loss

Common Rescue Medications

- Diazepam (Diastat) - rectal
- Lorazepam (Ativen) - oral
- Midazolam (Versed) - nasal

Other Therapies

- Vagal Nerve Stimulator
- Ketogenic Diet
- Epilepsy Surgery

What to Do

- Remain calm
- Lay child down on his/her side & turn head to side if possible
- Keep objects away from face to help breathing & prevent injury
- Do not put anything in mouth or between teeth
- Protect head and body from banging, sharp or hard objects
- Do not restrain limbs
- >5 minutes or > 2 seizures without recovery →call EMS

After a Seizure

- Allow child to lie quietly
- Reorient to surroundings & recent events
- Reassure recovering child that he/she is safe
- Do not give food/drink until fully alert
- If not breathing or having difficulty, call 911 & start CPR
- Record an accurate description of seizure
 - Length, context, semiology
- Call family
- Discuss event with class as soon as possible

Accommodations

- IEP or 504
- Rescue medication
- Time to recover after an event

Promote Epilepsy Awareness

- Teaches acceptance of others
- De-stigmatizes epilepsy and other health conditions
- Advances learning of brain function
- Enriches health and science lessons

For more information

- www.epilepsyfoundation.org
- www.utahparentcenter.org
- www.medicalhomeportal.org
- www.epilepsy.com
- www.epilepsyclassroom.com
- www.epilepsyadvocate.com

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