SEIZURE DISORDER

Definition

- **Seizure**

A seizure is a surge of abnormal electrical activity in your brain. The most recognizable symptoms of a seizure are a temporary loss of consciousness and uncontrollable movements (convulsions). During a seizure, many neurons send signals at the same time, much faster than normal. This surge of excessive electrical activity may cause involuntary movements, sensations, emotions, and/or behaviors. The disturbance of normal nerve cell activity may cause a loss of awareness. Some people recover immediately after a seizure, while others may take minutes to hours to feel like themselves again. During this time, they may feel tired, sleepy, weak, or confused. (Seizure, 2024)

- **Epilepsy**

"Epilepsy is a disorder of the brain characterized by repeated seizures. The brain's electrical rhythms have a tendency to become imbalanced, resulting in recurrent seizures. Epilepsy is usually diagnosed after a person has had at least two seizures that were not caused by some known medical condition, such as alcohol withdrawal or extremely low blood sugar." (American Association of Neurological Surgeons, 2024)

Etiology

I. Neurological Basis

A. Neurons in the brain create, send, and receive electrical impulses for communication
B. Disruption in communication pathways can lead to seizures
C. Seizures occur when affected brain cells fire signals uncontrollably, overloading certain areas

II. Occurrences:

A. Provoked (nonepileptic): Caused by specific triggers or temporary conditions
B. Unprovoked (epileptic): Occur spontaneously, often associated with epilepsy
C. Idiopathic: Seizures without a known cause

Etiology

III. Common Causes

Vascular Issues	• **Aneurysms**: Aneurysms are abnormal bulges in the wall of a blood vessel that can rupture, leading to hemorrhagic stroke and brain damage due to bleeding in or around the brain. (Kraft, 2023) • **Cerebrovascular Disease:** This term encompasses conditions that affect blood flow to the brain, including strokes and aneurysms, leading to potential brain damage from ischemia (lack of blood flow) or hemorrhage (bleeding). (Cerebrovascular Disease, 2024) • **Stroke:** A stroke occurs when blood flow to a part of the brain is interrupted, either by a blockage (ischemic stroke) or a rupture of a blood vessel (hemorrhagic stroke), resulting in brain cell death and neurological deficits. (Kraft, 2023)
Brain Abnormalities	• **Brain Tumors:** Abnormal growths of cells in the brain can exert pressure on surrounding tissues, disrupt normal brain function, and lead to seizures or other neurological symptoms. (Lights, 2022)

	• **Congenital Brain Abnormalities**: These are structural defects in the brain present at birth, which can interfere with normal brain development and function, potentially leading to neurological issues. (National Institute of Neurological Disorders and Stroke. n.d.) • **Severe Concussion and Traumatic Brain Injury:** These injuries result from external forces causing damage to the brain, which can lead to cognitive impairments, seizures, and other neurological symptoms. (Centers for Disease Control and Prevention. 2023)
Metabolic and Systemic Conditions	• **Cerebral Hypoxia:** This condition occurs when there is insufficient oxygen supply to the brain, which can lead to cell death and neurological deficits if prolonged. (MedlinePlus. 2022) • **Diabetes:** Chronic high blood sugar levels can cause damage to blood vessels, increasing the risk of cerebrovascular disease and subsequent neurological complications. (MedlinePlus. 2022) • **Eclampsia:** A severe complication of pregnancy characterized by seizures due to high blood pressure; it can lead to significant neurological damage if not managed promptly. (American Pregnancy Association. n.d.). • **Electrolyte Imbalances:** Imbalances in key electrolytes like sodium, calcium, or magnesium can disrupt normal neuronal function and lead to seizures or other neurological symptoms. (Cleveland Clinic. 2022)
Neurological Disorders	• **Epilepsy:** A chronic disorder characterized by recurrent seizures due to abnormal electrical activity in the brain; it can be caused by various factors including genetic predispositions and structural abnormalities. • **Degenerative Brain Diseases:** Conditions such as Alzheimer's disease or dementia involve progressive loss of neurons and cognitive function, often leading to significant memory and functional impairments. (National Institute on Aging, 2021)
Infections and Inflammation	• **Brain Infections (Meningitis, Encephalitis):** These infections cause inflammation of the protective membranes covering the brain and spinal cord (meningitis) or the brain itself (encephalitis), leading to serious neurological consequences. (Sawires et al., 2022) • **Severe General Illness (Including Severe COVID-19):** Serious infections can lead to systemic inflammation that may affect the brain, potentially resulting in neurological complications such as delirium or cognitive impairment. (Assenza et al., 2020) • **Autoimmune Conditions:** Disorders where the immune system mistakenly attacks healthy brain tissue can lead to inflammation and damage, causing various neurological symptoms. (National Institute of Neurological Disorders and Stroke. n.d.)
Genetic Factors	• **Inherited Epilepsy Syndromes:** Genetic conditions that predispose individuals to epilepsy due to inherited mutations affecting neuronal function and stability. (Epilepsy Foundation. n.d.) • **Other Genetic Conditions Affecting Neurological Function:** Various genetic disorders can impact brain development and function, leading to a range of neurological symptoms including seizures and cognitive impairments. (Kearney, J. A., & Plummer, N. W. 2014)
Environmental and External Factors	• Toxins and poisons (e.g., carbon monoxide, heavy metals) • Venomous bites or stings • Visual stimulation such as flashing lights or moving patterns

Other Factors	• Hormone-related changes • Mental health issues (psychogenic seizures) • Sleep deprivation • High fever (especially in children)

IV. **Triggers and Risk Factors**

Physiological Factors	**EFFECTS**
High fever (Febrile seizures)	High fever, particularly in children, can lead to febrile seizures, which are the most common type of seizure in this age group. The risk increases with the severity of the fever and is often associated with viral infections like influenza or COVID-19. (Renda et al., 2017) (Sawires et al., 2022)
Brain infections (meningitis, encephalitis)	Infections such as meningitis and encephalitis can directly irritate the brain, leading to seizures. These conditions cause inflammation and may disrupt normal electrical activity in the brain, increasing seizure susceptibility. (Sawires et al., 2022)
Severe general illness (including severe COVID-19)	Severe illnesses, including complications from COVID-19, can act as triggers for seizures. The stress on the body from systemic infections or significant health crises can lead to metabolic imbalances that provoke seizures, particularly in individuals with pre-existing conditions (Assenza et al., 2020)
Lack of sleep	Sleep deprivation is a well-documented trigger for seizures. Insufficient sleep can lower the seizure threshold, making it easier for seizures to occur. This is particularly relevant in individuals with epilepsy or those predisposed to seizure disorders (Assenza et al., 2020)
Low blood sodium (e.g., due to certain medications)	Excessive water intake can dilute sodium levels in the body, leading to hyponatremia. This causes water to move into brain cells, making them swell and potentially triggering seizures or even coma if severe. Maintaining proper electrolyte balance, especially sodium levels, is crucial for normal brain function and seizure prevention. (Hyponatremia, 2022)
Stroke or Brain Injury	Acute brain injuries, including strokes, can disrupt normal brain activity and lead to seizures. The risk is particularly high shortly after the injury occurs due to changes in brain excitability. (Myint et al., 2006) (Pourmand R. 1996).
Food Intake	• A rare condition called "eating epilepsy" exists where food intake can trigger seizures • Certain foods (e.g., rice-based meals, spicy foods) may be more likely to trigger seizures • Seizures can occur at various stages of a meal

PREVALENCE AND INCIDENCE

LOCAL	**INTERNATIONAL**
• The estimated prevalence of epilepsy in the Philippines is 0.9%, with approximately	• Approximately 50 million people worldwide have epilepsy (WHO, 2024). • Approximately 0.5-1% of the global population

900,000 people with epilepsy living in the country; among these 900,000 patients with epilepsy, around 25% have intractable seizures that require multiple ASMs for control (Paragua-Zuellig, 2017.) • Approximately 75% of people living with epilepsy in low-income countries, including the Philippines, do not receive the necessary treatment (Liu et al., 2023.)	experiences epilepsy, a chronic seizure disorder (Bastos & Cross, 2020.) • About 3.4 million people in the United States have active epilepsy (Zack & Kubao, 2017.) • About 456,000 U.S. children 17 and younger have active epilepsy (CDC, 2024.) • Approximately 80% of individuals with epilepsy reside in low- and middle-income countries (WHO, 2024.)

Manifestations of the Disease that the Physician/Allied Health Medical Professional Perceives
According to Mayo Clinic, (n.d.):
• Medical professionals may use Electroencephalogram (EEG); allowing them to monitor brain activity during seizures.
  ○ Other tests such as MRI or CT Scans may also reveal structural anomalies in the brain which could be related.
• Involuntary movements
• Loss of consciousness
 	
Seizure Phases (Epilepsy Foundation, n.d.):
• Prodromal Phase: Before the onset of a seizure, some people may show the following signs hours or even days before the seizure begins.
  ○ Mood changes
  ○ Anxiety
  ○ Lightheadedness
  ○ Difficulty Sleeping
  ○ Difficulty focusing
  ○ Behavioral changes
• Ictal Phase: The time from the first symptom to the end of the seizure activity; during this time that intense electrical activity is occurring in the brain.
  ○ Loss of awareness
  ○ Memory lapse
  ○ Feeling confused
  ○ Difficulty hearing
  ○ Odd smells, sounds or tastes
  ○ Difficulty speaking or saying strange words
  ○ Twitching Loss of muscle control
  ○ Repeated movements (such as lip smacking or chewing)
  ○ Body convulsions
  ○ Racing heart
  ○ Trouble breathing
• Postictal Phase; characterized by disorienting symptoms such as confusion, drowsiness, hypertension, headache, nausea, etc.
	Manifestations the Patient Experiences
	According to Adamolekun (n.d.) and (Seizures - Symptoms and Causes, n.d.):
	• Temporary confusion
	• Staring spells: Can be noted in an individual when they stop whatever they are doing and stare ahead.
	  ○ Their eyelids may flutter and not respond to anyone.
	  ○ They would either stay still or make chewing/smacking noise with their mouth as well.
	• Uncontrollable jerking movements of the arms and legs.
	• Loss of consciousness or awareness.
	• Aura or unusual sensations are felt before seizure starts; usually part of focal aware seizure. Auras are usually felt via:
	  ○ Abnormal smells or tastes
	  ○ Butterflies in the stomach
	  ○ Feeling of Deja Vu or the opposite called Jamais Vu
	  ○ An intense feeling indicative of a seizure
	• Usually it depends on which area of the brain is affected.
	  ○ Cerebrum (Particularly the Insula): If affected, individuals may experience intensely pleasant or unpleasant taste.
	  ○ Occipital Lobe: If affected, individuals may experience visual hallucinations (seeing unformed images).
	  ○ Frontal Lobe: If the particular area that controls speech is affected, the individual affected may be unable to speak.
	  ○ Large Areas on Both Sides of the Brain: May result in convulsion (jerking and spasms of muscles throughout the body).

- A period that begins when a seizure subsides and ends when the patient returns to baseline.
- Typically lasts between 5 and 30 minutes; begins when a seizure subsides.

FOCAL SEIZURES

- **With impaired awareness**:
  - Involves change or loss of awareness. They may appear awake but unresponsive, staring into space and performing repetitive movements like hand rubbing or walking in circles.
- **Without impaired awareness**:
  - Can affect emotions and alter how things are perceived, like sight, smell, taste, or sound, but they don't cause a loss of consciousness.

GENERALIZED SEIZURES

- **Absence seizures**:
  - Typically cause brief staring spells or subtle movements like eye blinking or lip smacking, lasting 5 to 10 seconds.
- **Tonic seizures**:
  - Causes muscle stiffening, often affecting the back, arms, and legs. The person may lose consciousness and collapse.
- **Atonic seizures**:
  - Involves sudden loss of muscle control, causing a person to collapse or drop their head.
- **Clonic seizures**:
  - Involve repeated jerking movements; typically affecting the neck, face, and arms on both sides of the body.
- **Myoclonic seizures**:
  - Appear as sudden brief jerks or twitches of the arms and legs. There is often no loss of consciousness.
- **Tonic-clonic seizures**:
  - Cause sudden loss of consciousness, body stiffening, and shaking. May also lead to bladder control loss or tongue biting.
  - May start as Focal Seizure that then spreads to involve most or all of the brain.

- Other symptoms may include (Seizure, 2024):
  - Sudden emotional changes (confusion, fear, joy, anxiety).
  - Teeth clenching.
  - Drooling.
  - Abnormal eye movements.
  - Loss of bladder or bowel control.
  - Noise making (grunting or snorting).

Structural and Anatomical Changes Related to the Condition

(Chauhan, et al. 2022)

- Brain regions specialized for learning and memory, particularly the ***neocortical regions*** and the ***hippocampus***, are comparatively more prone to seizures.
- Epilepsy is associated with anatomical changes in the following areas, often presenting tissue shrinkage and loss of cells due to the condition:
    - ***Hippocampus*** - In the deep, medial part of the thalamus which plays an important role in memory processing, emotions, spatial navigation, and learning.
    - ***Amygdala*** - This area is primarily associated with emotions; lesions in the lateral amygdala leads to deficits in emotional appraisal.
    - ***Frontal cortex*** - Seizures originating in the primary motor area has early motor manifestations and may occur during sleep,
    - ***Olfactory cortex*** - Seizures involving this area present reduced olfactory functioning, confusion in test, and unpleasant areas.
    - ***Temporal cortex*** - This area processes emotions and is important to short-term memory (MayoClinic, 2023.)

Possible SLP Areas Affected and Their Characteristics

Speech	• **Articulation problems:** refers to issues with speech production and articulation that can occur during or after seizures.
Language	Based on research conducted by Papadopoulou et al. (2022) & (Branchini, 2023): • **Apraxia:** Epilepsy can lead to apraxia, particularly in the context of certain genetic syndromes such as DeSanto-Shinawi syndrome. In this syndrome, patients exhibit global developmental impairment, with language skills being severely affected. This impairment can manifest as childhood apraxia of speech. The presence of seizures in these patients, often focal and occurring during sleep, can exacerbate the challenges in motor planning and execution related to speech, thereby contributing to apraxia. (Alawadhi et al., 2020) • **Aphasia:** refers to cases of epileptic aphasia, which involves difficulties with language production or comprehension. This can be a much more severe problem if your epilepsy was caused by a stroke, brain tumor, or other brain lesion that primarily affected the language areas in your brain. • **Word-finding difficulties:** where patients experienced trouble finding words, which can be associated with certain types of seizures. • **Language impairments:** Broader language difficulties are noted as being associated with epilepsy in some cases.
Fluency	Based on research conducted by Papadopoulou et al. (2022): • **Stuttering:** stuttering can be both a symptom and a potential trigger for epileptic seizures. Some patients experience stuttering during seizures or as a side effect of antiepileptic medications. • **Disfluency:** Beyond stuttering, general speech fluency issues are noted as potential problems associated with seizures.
Cognition	• A seizure can disrupt the area of the brain in charge of a particular function. (Sirven & Shafer, 2014.) ◦ **Executive Function:** Seizures that occur in the frontal lobe can cause the weakening of one's planning ability; attention may also suffer; behavioral differences may also be noted after years of experiencing seizures.

	○ **Memory:** Seizures that occur in the temporal lobe which affects the hippocampus particularly harder thereby impacting memory. Information may be stored but it is disorganized. ● Individuals that primarily experience generalized seizures are much less likely to have problems with "thinking" or executive function than those who primarily experience partial-onset seizures (Sirven & Shafer, 2014.) ● In conclusion, there is a mild, but measurable decline in cognition with memory being the most vulnerable cognitive function (Vingerhoets, 2006.)
Feeding & Swallowing	Based on a research conducted by Girges et al., (2020). **Eating-triggered seizures:** ● A rare condition called "eating epilepsy" exists where food intake can trigger seizures ● More common in males and typically starts in adolescence ● Often focal-onset seizures, particularly focal impaired awareness seizures **Impact on eating habits:** ● Patients may develop anxiety around eating ● Some may avoid specific foods or change eating patterns to prevent seizures ● Meal times might become stressful or challenging Swallowing is moderated by a widely distributed neural network that involves multiple cortical and subcortical brain regions in both hemispheres, making dysphagia a potential seizure manifestation or postictal symptom. (Lapa et al., 2024) **Postictal Dysphagia:** ● Postictal dysphagia is a condition characterized by difficulty swallowing that occurs following a seizure. It is part of the postictal state, which is the period of recovery after a seizure. This dysphagia can result from transient neurological deficits that affect the muscles involved in swallowing, leading to an increased risk of aspiration and other complications. The severity and duration of postictal dysphagia can vary among individuals, and it may require clinical management to ensure safe swallowing and prevent aspiration pneumonia. (Lapa et al., 2024)
Others	Based on research conducted by Papadopoulou et al. (2022), several possible speech-language problems can be associated with seizure disorders: ● **Reading difficulties:** The paper discusses cases of "reading epilepsy" where the act of reading can trigger seizures, potentially leading to associated language problems. ● **Writing impairments:** "Graphogenic epilepsy" is mentioned, where writing can trigger seizures and potentially cause associated language issues. ● **Facial myoclonus affecting speech:** Some patients experience involuntary facial muscle movements during seizures that can impact speech production.

<u>Types of Seizure Disorders</u>

(Seizure, 2024) (Seizures - Symptoms and Causes, n.d.), and (Epilepsy Foundation, n.d.)

GENERALIZED SEIZURES	Seizures that involve the entire brain from the onset, causing various symptoms depending on the specific type.
Absence seizures (Petit Mal)	• Brief, sudden cessation of movement with staring. • Blank stare, "daydreaming" appearance, fluttering eyes, slight jerking movements. • Characterized by brief loss of awareness. • Duration: Usually up to 15 seconds, may occur multiple times a day. • Memory: No recollection of the seizure.
Myoclonic Seizures	• Quick, shock-like jerks in muscles. • Abrupt twitching or jerking motions of the body. • Commonly happens when waking up. • Frequently affects both sides of the body at the same time. • Lasts for a fraction of a second, and can happen repeatedly. • Consciousness usually remains intact.

Tonic-Clonic Seizures (Grand-mal)	• Start with stiffening (tonic phase) followed by convulsions (clonic phase).
	  ○ Tonic Stage – Loss of consciousness, body stiffness, may fall to the floor.
	  ○ Clonic Stage – Limbs jerk, loss of bladder or bowel control, potential tongue or cheek biting, breathing difficulties.
	• Involve loss of consciousness and can cause injuries.
	• Duration: Typically stops after a few minutes, but may last longer.
	• Aftermath: Headache, memory difficulty, fatigue, confusion.

Atonic Seizures	• Characterized by sudden loss of muscle tone, leading to collapse and falling to the ground. • Also known as "drop attacks" due to the abrupt onset and brief duration. • Typically followed by rapid recovery and ability to resume previous activities.
Status Epilepticus	• Medical emergency characterized by prolonged seizure activity or repeated seizures without regaining consciousness in between. • Can lead to significant neurological damage, systemic complications, and mortality if not promptly treated.
Progressive Myoclonic Epilepsy	• Rare, often due to hereditary metabolic disorders. • Symptoms include seizures, unsteadiness, muscle rigidity, and intellectual disability
Reflex Epilepsy	• Seizures triggered by specific stimuli like flashing lights or sounds. • Can also be triggered by activities such as reading or thinking about a subject.
FOCAL SEIZURES	Begins with abnormal electrical discharge in **one specific lobe** of the brain. Characteristics include how it can spread and cause loss of consciousness (tonic-clonic seizures) and it can affect consciousness, responsiveness, and memory vary.
Temporal Lobe Seizures	• Most common type of focal seizure. • Affect memory, emotions, sound interpretation, and language

	understanding. • Symptoms vary from mild sensations to intense emotions or feelings of déjà vu. • Automatisms (repetitive movements) like lip smacking may occur.
Frontal Lobe Seizures	• Involve movement, decision making, problem-solving, and emotions. • Symptoms may include night waking, thrashing, and cycling movements during sleep.
Occipital Lobe Seizures	• Affect the visual system. • Symptoms may include visual hallucinations of lights or patterns. • Can be mistaken for migraine headaches due to similar symptoms.
Parietal Lobe Seizures	• Involve processing touch, pain, and spatial information. • Less common, but can cause diverse sensory symptoms.

Progression of the Condition

- The prognosis for epilepsy depends on factors like the cause of the initial seizure and treatment effectiveness. Around 70% of people achieve seizure control with antiepileptic drugs, while about 30% continue to have seizures despite medication. For those with drug-resistant epilepsy, surgical options or neurostimulation might be viable alternatives. Between 60% and 80% of patients can experience long periods without seizures, with or without medication. Some childhood epilepsies may resolve by adolescence, indicating a positive outlook for some.

- It's important to address both acute and chronic complications of epilepsy. Acute issues, like status epilepticus, require immediate medical attention due to their potentially life-threatening nature. Long-term seizures can lead to neurological and cognitive impairments. Epilepsy also slightly increases mortality risk due to factors such as sudden unexpected death in epilepsy (SUDEP), accidents during seizures, or status epilepticus.

- Psychiatric issues like anxiety and depression are common in epilepsy and need thorough management to enhance quality of life. Antiepileptic drugs can also lead to complications such as sexual dysfunction, metabolic issues, bone health problems, and cardiovascular concerns. Thus, a comprehensive approach that includes seizure control and complication management is essential for improving long-term outcomes

Outcome if Left Treated and/or Untreated

If treated
- Controlled Seizures
- With appropriate treatment, including medication, surgery, or other interventions, many individuals with epilepsy can achieve good seizure control.
- Controlled seizures allow individuals to lead relatively normal lives, with reduced risk of injury and improved quality of life.
- Improved Quality of Life
- Effective seizure management can alleviate symptoms, reduce seizure-related complications, and improve overall well-being.
- Treatment may also help address associated comorbidities, such as mood disorder or cognitive impairments.
- Long-Term Prognosis
- With ongoing treatment and regular medical follow-up, individuals with epilepsy can often maintain stable seizure control and lead productive lives.
- Periodic reevaluation may be necessary to adjust treatment based on changing needs and response to therapy.

If left untreated
- Continued Seizures
  - Without proper treatment, seizures are likely to persist or worsen over time, leading to ongoing physical and psychological challenges.
  - Uncontrolled seizures may increase the risk of injury, accidents, and other adverse outcomes.

and quality of life.	○ Decline in Quality of Life ■ Uncontrolled epilepsy can significantly impact daily functioning, employment, education, relationships, and overall quality of life. ■ Persistent seizures may contribute to social stigma, isolation, and emotional distress for affected individuals and their families. ○ Increased Risks ■ Untreated epilepsy carries risks of various complications, including status epilepticus, injuries from falls or accidents during seizures, and cognitive decline. ■ Long-term consequences may include cognitive impairment, mood disorders, and decreased life expectancy ○ Sudden Unexpected Death in Epilepsy (SUDEP) ■ Individuals with untreated or poorly controlled epilepsy face a higher risk of SUDEP, a rare but serious complication characterized by sudden death in individuals with epilepsy, often during sleep. ■ Effective seizure management and adherence to treatment can help reduce the risk of SUDEP and improve overall outcomes.

Medical/Surgical Management

MEDICATION/ MEDICINES	Antiepileptic drugs (AED) are prescribed to the patient by the attending physician to keep seizures under control. When taking medications, one must follow the doctor's instructions and keep contact with the doctor in case adverse effects from the prescribed drugs are noticed (NHS, n.d.). - Numerous medicine options are available; doctors shall keep guiding until a best suited medicine is found. - Most common treatment for epilepsy; controlling seizures in 7 out of 10 people. - Sodium valproate - Carbamazepine - Lamotrigine - Levetiracetam - Topiramate Many drugs have indirect effects on the seizure threshold as it contributes to the shift in excitatory or inhibitory balance	
	ADVERSE EFFECTS (Mutanana et al., 2020)	**MECHANISM OF ACTION OF AEDs** (Epilepsy Foundation, n.d.; Hitchings, n.d.)

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<td><u>General:</u> Happens typically within the first week of taking the AEDs.
- Feelings of tiredness
- Upset stomach
- Dizziness or blurred vision
<u>Psychological:</u>
- May suffer cognitive problems that are associated with thinking, remembering, attention, and word-finding.</td>
<td>Seizures occur when neurons become overly active and collectively overfire due to an imbalance between neuronal excitation and inhibition in the brain.

AEDs work to enhance inhibition and reduce excitation by influencing several chemical processes that nerve cells utilize to communicate:
- SODIUM CURRENTS: AEDs attach to the cell membrane pores to keep the pores from reopening quickly, thereby reducing the overwhelming sodium entry that initiates overexcitation of the brain’s electrical current.
- CALCIUM CHANNELS: Blocks the calcium channels and slows things down.
- GLUTAMATE AND GABA: Glutamate is the main excitatory neurotransmitter in the central nervous system (CNS), meaning it increases brain activity, which can lead to anxiety, restlessness, and similar effects. On the other hand, GABA is the key inhibitory neurotransmitter in the CNS, helping to slow down the brain, which may cause drowsiness, and etc. GABA works by allowing chloride ions to enter nerve cells, causing hyperpolarization (making the cells less likely to fire). It also impacts sodium and calcium channels, enhancing its calming effects, which in turn reduces the excitatory action of glutamate.</td>
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<td><u>SURGICAL</u></td>
<td colspan="2">In the case wherein symptoms are not managed well with medication alone, surgery becomes a very effective treatment option instead.

Examples of the types of surgery according to NYU Langone Health (n.d.):
- Temporal Lobe Resection: The removal of a small portion of the temporal lobe; most common surgical procedure.
- Resection of Frontal, Parietal, or Occipital Areas of the Brain: Removal of tissue in the frontal, parietal, or occipital area of the brain is performed when a structural abnormality is identified on MRI scan</td>
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	- **Corpus Callosotomy**: The connection between the right and left sides, or hemispheres, of the brain is cut. This slows down the electrical activity between the two halves of the brain that can lead to a seizure. - Surgeons perform this technique in people who have sudden "drop" seizures - **Lesionectomy**: This surgery is performed when a person's recurrent seizures are caused by a specific abnormality in the structure of the brain. - **Hemispherectomy & Hemispherotomy**: Procedure involves combinations of removing and disconnecting one side of the brain from the rest of the brain. This procedure is only considered for people who have severe epilepsy and seizures that arise from only one side of the brain, leading to poor function in that hemisphere. - **Multiple Subpial Transection**: A procedure used to control focal seizures that originate in areas of the brain that can't be removed safely.
OTHER PROCEDURES	In events wherein AEDs are ineffective and brain surgery is not suitable, the following may apply (NHS, n.d.): - **Vagus Nerve Stimulation**: A small electrical device similar to a pacemaker is placed under the skin of your chest. The device is attached to a wire that goes under your skin and connects to the vagus nerve. Bursts of electricity are sent along the wire to the nerve; help control seizures by changing the electrical signals in the brain. - **Deep Brain Stimulation**: Similar to VNS, but the device placed in the chest is connected to wires that run directly into the brain. Bursts of electricity sent along these wires can help prevent seizures by changing the electrical signals in the brain. - **Dietary Therapy:** According to the Epilepsy Society (2022), for some adults with medication-resistant seizures, the ketogenic diet—a high-fat, low-carb plan—may help reduce the frequency and severity of seizures among other benefits. The diet may not be ideal for everyone, thus it is advised to consult a doctor to see if it's a suitable option. - **Alternative Therapy:** Epilepsy Foundation (n.d.) reported that complementary therapies like relaxation methods and herbal supplements can help manage the symptoms and improve well-being. However, they should not replace medical treatment, and patients should consult their healthcare providers before trying them to ensure safety and effectiveness.

SLP Therapy

Areas for Evaluation	Evaluation Materials	Treatment Strategies
• Speech (ASDclinic, n.d.) ○ Fluency - Often slurring, or showcasing dysfluency.	• **Western Aphasia Battery Test** - A diagnostic tool that assesses linguistic skills and main nonlinguistic skills. It also assesses	Jones (2023) reported the following intervention techniques for adults: • **ARTICULATION THERAPY**: Therapy that involves exercises to

• Language (ASDclinic, n.d.; DistrictSpeech, n.d.)
  ○ Pragmatics - Struggle with expressing self in a manner that is deemed socially acceptable.
  ○ Receptive Language
  ○ Expressive Language
  ○ GenPhysio (2023) reported that the most common speech and language difficulties in people with seizure disorder or with epilepsy are **Aphasia, Dysarthria,** and **Apraxia of Speech.**
• Swallowing - Seizures can often cause transient neurological symptoms, one of which is a temporary swallowing change which leads to **Postictal Dysphagia** (Lapa et al., 2024.)
• Cognition - A seizure can disrupt the area of the brain in charge of a particular function.
	fluency, auditory comprehension, repetition, naming, word finding, reading, writing, and drawing (Kertesz, 1982; Barfod, 2013).
	• **Saint Louis University Mental Status Examination** - Used to diagnose aphasia and related disorders; evaluates various perceptual modalities [auditory, visual, gestural], processing functions [comprehension, analysis, problem-solving], and response modalities [writing, articulation, manipulation] (Goodglass, et al., 2001; Barfod & Figueiredo, 2012).
	• **Montreal Cognitive Assessment** - A highly sensitive tool for early detection of mild cognitive impairment; it looks into STM, Visuospatial abilities, executive functions, attention, concentration, working memory, language, and orientation (MoCA Cognition, n.d.)
	• **Assessment of Intelligibility in Dysarthric Speech** - Tool for quantifying single-word intelligibility, sentence intelligibility, and speaking rate of adult and adolescent speakers with dysarthria (Yorkston, et al., n.d.)
		practice specific sounds and sound patterns.
		  ○ *Auditory Training*
		  ○ *Phonetic Placement*
		  ○ *Drill Repetition*
		• **FLUENCY TECHNIQUES**: Techniques like '*easy onset*', '*light articulatory contacts*', or '*controlled fluency*' can help manage stuttering and enhance fluency.
		• **VOICE THERAPY**: Techniques can include vocal hygiene training, resonant voice therapy, and exercises for pitch and volume control.
		• **ORAL-MOTOR EXERCISES**: For conditions like dysarthria, exercises that strengthen oral muscles can be helpful.
		• **MOTOR SPEECH DRILLS**: In cases of apraxia, repetitive practice of speech movements and sequencing can improve motor planning.
		• **SWALLOWING EXERCISES**: In cases where dysphagia (swallowing difficulties) is present, specific swallowing exercises may be included.

Critical Members of the Management Team
(Sirven et al., 2013)

Epileptologists	Doctors trained in neurology (disorders of the brain) and have additional training in diagnosing and treating people with epilepsy

EEG Technologists	Performs electroencephalogram (EEG) tests and assists patients and doctors
Neurosurgeons	Surgeons specializing in treating brain and spinal cord disorders
Neuroradiologists	Doctors trained in radiology, specializing in creating and interpreting pictures of the brain and spinal cord
Neuropsychologist	Specializes in the relationship between the central nervous system (the brain or spinal cord) and mental functions
Nurses	Assists in all aspects of patient care, and includes nurse-clinicians and nurse practitioners
Pharmacists	Fills prescriptions and provides expert information about medications
Social Workers	Plays a varied role, such as educating patients and families, provides community support and resources, helps in crisis situations and more
Physicians	Evaluates a person's medical history and current symptoms, creates, and manages treatment plans, and more
Psychiatrists and Psychologists	Helps manage mental and emotional health
Occupational Therapist	Empowers individuals to maximize their independence throughout activities of daily living
Physical Therapist	Helps limit the movements within a seizure
Speech-Language Pathologist	Evaluates speech and language skills, identifies problematic areas, and diagnoses associated disorders. They create tailored treatment plans to enhance communication abilities and address speech and language issues.

Medical Precautions Regarding Speech-Language Therapy

Before	During	After
• Obtain extensive and accurate history to be informed of the client's current state and what you should be looking out for. This would include their	• Be wary of possible triggers; filter out anything that may induce an episode in therapy tools. (HealthDirect, n.d.). • Be prepared to respond in the case an episode *does*	• Communicate and debrief caregivers. • Educate them as to what is the next best course of action in the event that a seizure had occurred.

triggers, the medication being taken, changes in seizure activity in order to prepare accordingly and avoid possible triggers (HealthDirect, n.d.).	occur; remain calm and do not try to restrain their movements, turn them to their side so as to keep the airway clear, document and time the seizure, then immediately call the emergency services. (Hoffman, 2023.) ○ DO NOT TRY TO STICK ANYTHING INTO THEIR ORAL CAVITY, contrary to popular beliefs. ○ Emergency services must be called especially if the episode lasts longer than 2 minutes or the client loses consciousness and does not come back after. ● Make the area free of obstruction that may result in injury if ever the client has an episode. (HealthDirect, n.d.). ● Not all seizures are noticeable; this requires the clinician to be on their feet and be on the lookout for any signs; *pupils changing size, acting out of character,* and more. Upon noticing this, try vacating the area of any possible dangerous objects. (HealthDirect, n.d.).	

SUPPORT SYSTEMS FOR PEOPLE WITH SEIZURE DISORDER

LOCAL	
Philippine League Against Epilepsy (PLAE)	Non-governmental organization in Manila. They are committed to Pioneer Lead Advocate Epilepsy care. (Philippine League Against Epilepsy, n.d.)
INTERNATIONAL	
Epilepsy Foundation Philippines & Epilepsy Foundation (USA)	The Epilepsy Foundation, in collaboration with their community and network partners, connects the people, data and resources needed to address challenging health problems associated with seizures and the epilepsies—and promotes education, policy, research and

	systemic change that will foster measurable and sustainable improvement for all people living with epilepsy. (Epilepsy Foundation, n.d.)
International League Against Epilepsy (ILAE)	The ILAE is active on both national and international levels through its commissions, task forces, and chapters. (International League Against Epilepsy, n.d.) Promoting action for: • Equity and Inclusion • Care and Treatment • Research and Education Promoting action by: • People with Epilepsy, Care Partners, and Care Providers • Governments • Health and Education Professionals
International Bureau for Epilepsy (IBE)	The International Bureau for Epilepsy is a non-for-profit started in 1961 which aims to improve the social condition and quality of life of people with epilepsy. The organization addresses social problems such as employment, education, driving license restrictions and public awareness. (Niallflynn, 2022)

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