Patient education : The Effects of Epilepsy on Memory Function

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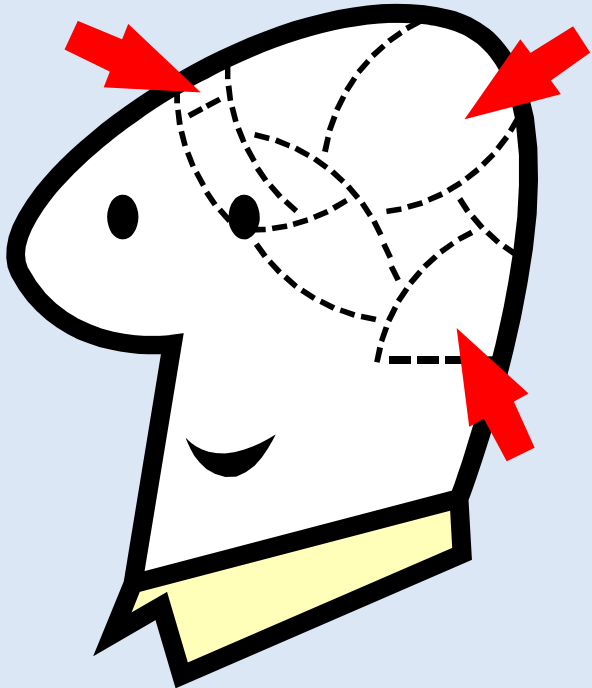
Objectives

1. Define Epilepsy
2. Identify the impact of Epilepsy on memory
3. Describe types of memory loss
4. Discuss epileptic phases in which memory loss occurs
5. Explain the effects of Epilepsy treatment on memory
6. Identify interventions which may enhance recall and memory preservation

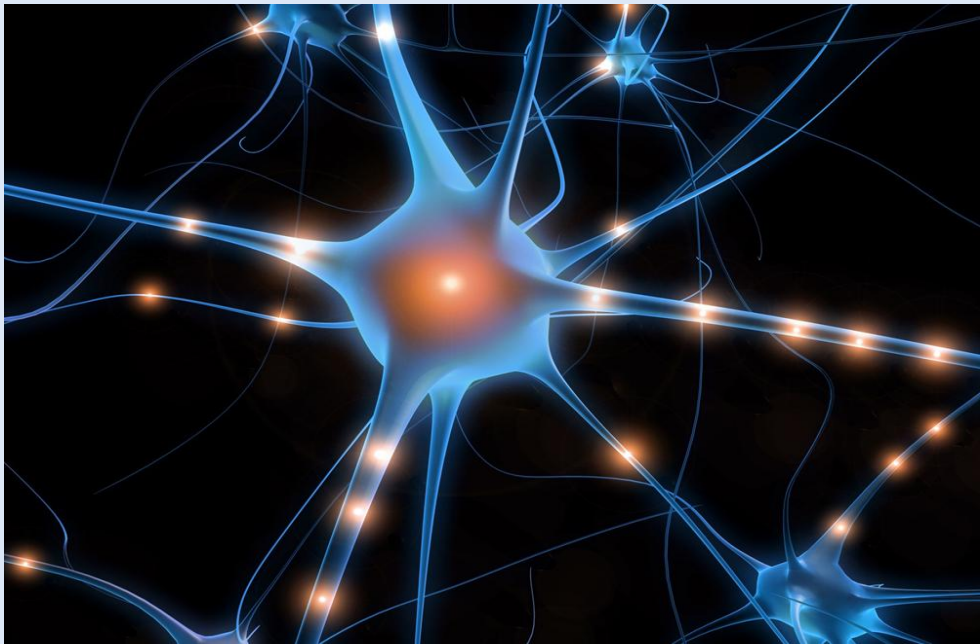
Defining Epilepsy

Epilepsy is defined as the tendency to have recurrent spontaneous seizures . These seizures stem from a deregulation of brain signaling. And the data shows that about two and a half million people in the U.S. are currently diagnosed with Epilepsy and are experiencing these symptoms



Epilepsy and Memory Loss (cont’)

These symptoms or seizures develop when nerve cells lose their ability to turn off electrical impulses, thus, leading to the over-stimulation of certain areas of the brain. Epilepsy can affect multiple centers of the brain and cause a range of symptoms.



Epilepsy and Memory Loss (cont’)

- Epileptic seizures can affect memory functioning because, the activity before and during a seizure is a distraction for the brain’s continuous self-monitoring system.
- During a seizure our memory may also be affected, because the loss of consciousness can interfere with normal brain processes,
- Some people with epilepsy can experience unusual electrical activity within the brain between seizures and this can also affect memory functions.

The Impact of Memory Loss

- Memory loss in and of itself can be mind boggling; However, couple that with epilepsy and we have some pretty serious concerns.

The Impact of Memory Loss

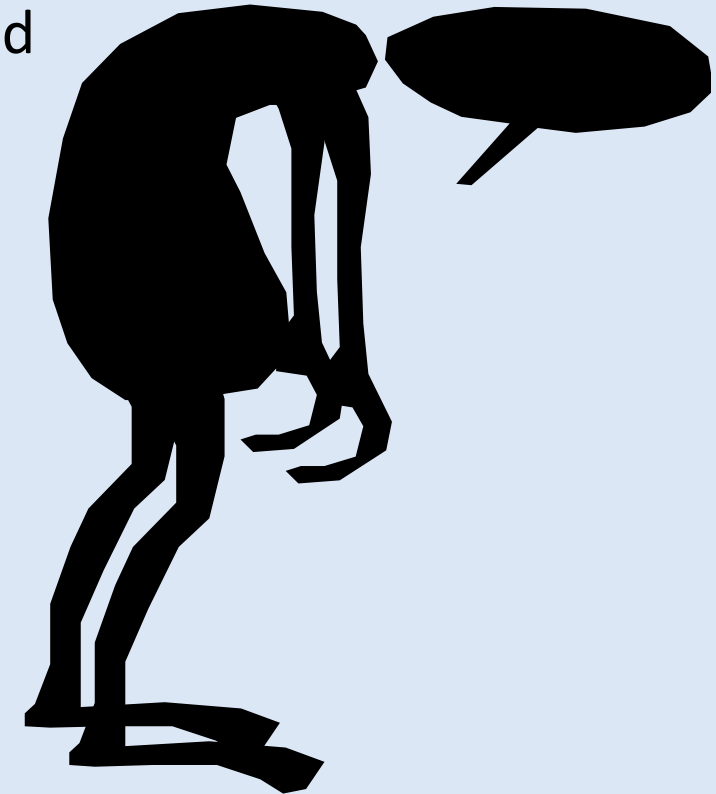
- Memory deficits can be devastating.
- The presentation and effect of memory loss may vary with each individual.

The impact of Memory Loss (cont.)

- Memory problems in individuals with epilepsy may be very specific and may affect only one aspect of memory function, such as remembering what people tell you or remembering how to get to a once familiar location.

The impact of Memory Loss (cont.)

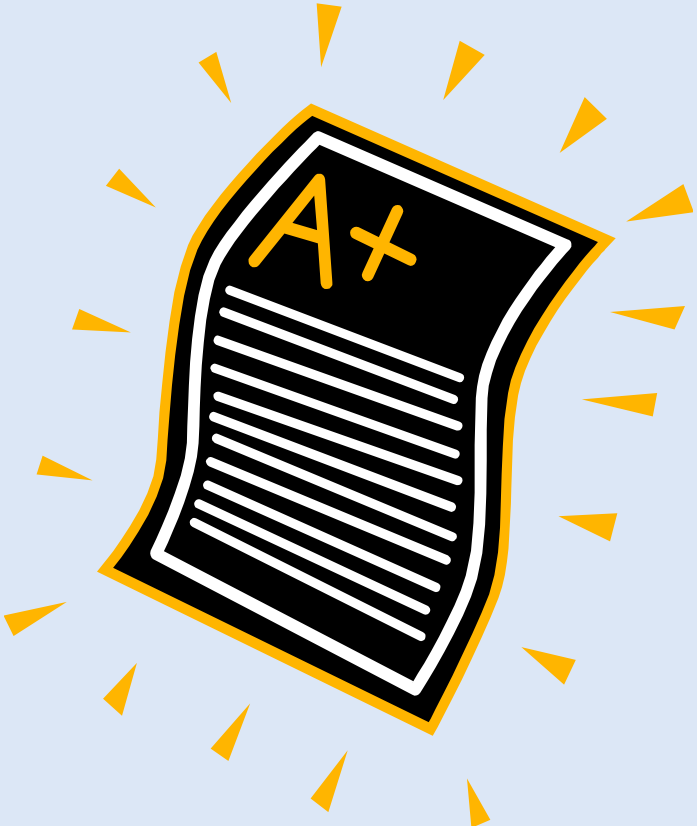
- Creating difficulty for the individual to cope with everyday living and relationships.
- Creating a great deal of emotional distress fear and confusion for the person affected



Types of Memory Affected by Epilepsy

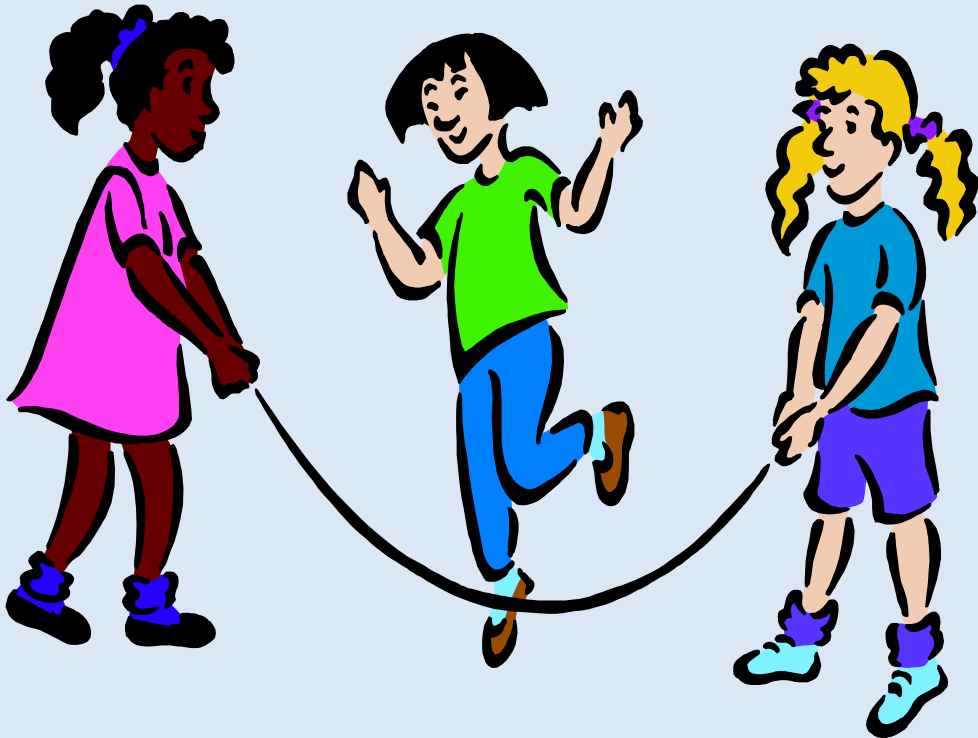
Declarative/Episodic Memories (conscious memories):

This type of memory includes memories of facts and events, that can be consciously recalled.



Types of Memory Affected by Epilepsy (cont.)

Procedural Memory or the how to and unconscious memory) is also referred to as the implicit memory, because previous experiences aid in the performance of a task without explicit and conscious awareness of these previous experiences.



Types of Memory Affected by Epilepsy (cont.)

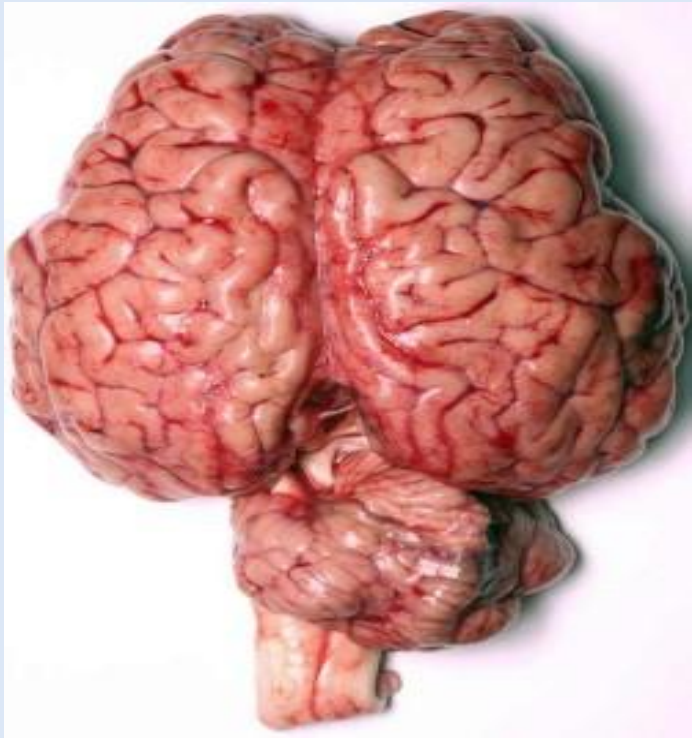
- This memory is composed of automatic sensorimotor behaviors that are so deeply embedded that we are no longer aware of them, and, once learned, these "body memories" allow us to carry out ordinary motor actions automatically.

OOPS!!

Areas of the Brain Affected by Epilepsy & Memory Loss

•Knowing the area of the brain affected by epilepsy is a good predictor of the type of memory loss that will ensue.

•Epilepsy affects the cerebral area of the brain which includes the temporal, occipital and frontal lobes.



Areas of the Brain Affected by Epilepsy & Memory Loss (cont.)

- **The frontal lobe** is involved in conscious thought and higher mental functions such as decision-making, and plays an important part in processing short-term memories , the frontal lobe functions as temporary storage of short-term memory aids in recall
- **The temporal lobe** (among many other functions) plays a role in the formation of long-term memory.
- **The Occipital lobe** help process visual stimulation.
- **The hippocampus** is located deep inside the medial temporal lobe and is essential for memory function, particularly the transference from short- to long-term memory and control of spatial memory (directions ; environment) and behavior

Frontal Lobe

•Frontal lobe epilepsy effects the anterior lobe of the brain near the forehead and it ‘s the second most common type of localized epilepsy. The frontal lobes also plays an important role in retaining longer term memories
•which are not task-based.

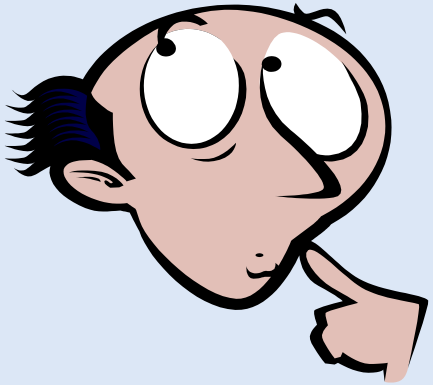
Frontal Lobe

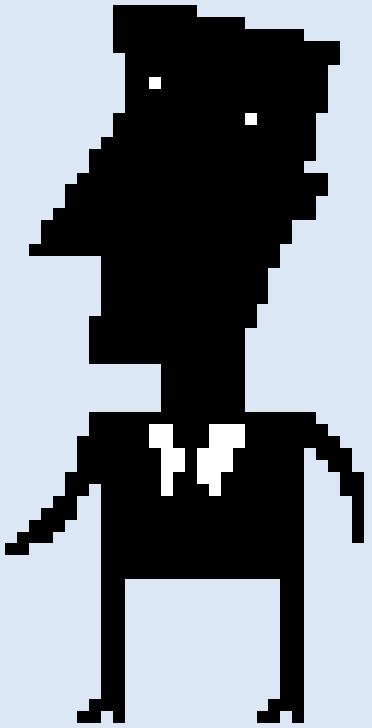
The Frontal lobe is also the center for cognitive control, decision making and emotions. The cognitive controls of the frontal lobes also involve the ability to recognize future consequences resulting from current actions.

Good Evil

Frontal Lobe

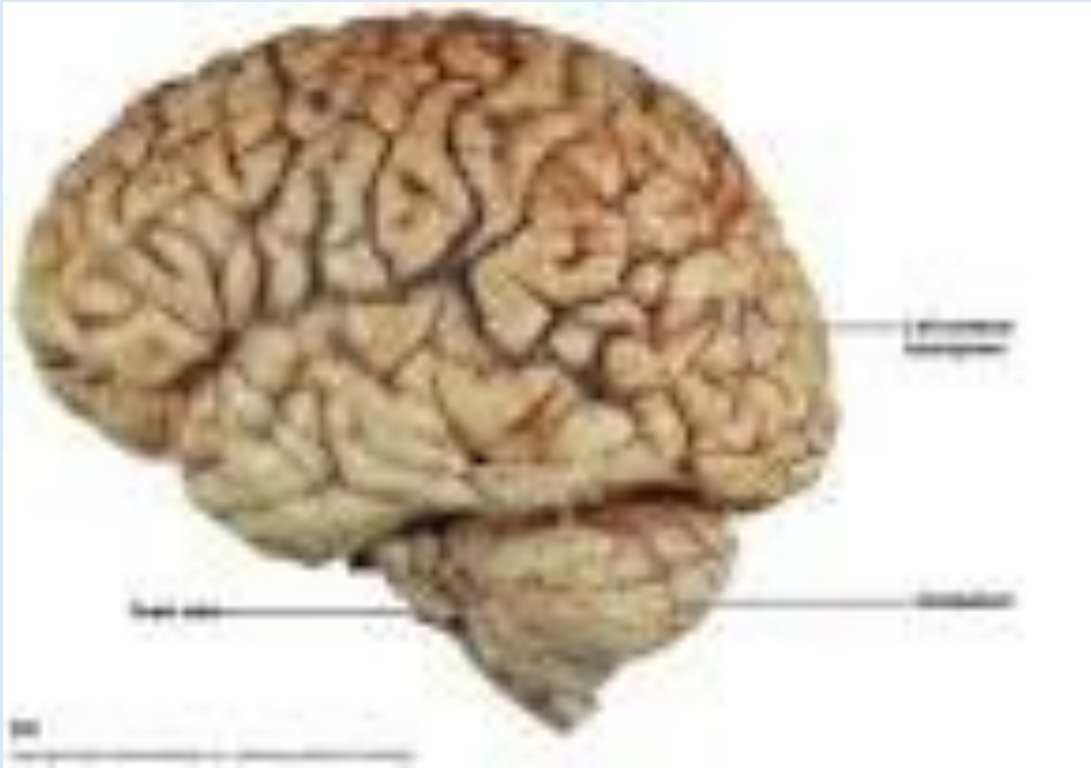
Memories associated with emotions are often derived from input from the brain's limbic system. However, the frontal lobe modifies those emotions to generally fit socially acceptable norms.





Left Temporal Lobes

- The temporal lobes of the brain is the regions that extend along each side of the brain.
- According to some experts the temporal lobes are the most common site of localized epileptic seizures, although seizures beginning in the temporal lobes can extend to other parts of the brain.



Left Temporal Lobe

•When damage or interruptions occur on **the left side** of the brain or the left temporal lobes, this can lead to the loss of declarative (verbal) memory.

Right Temporal Lobe

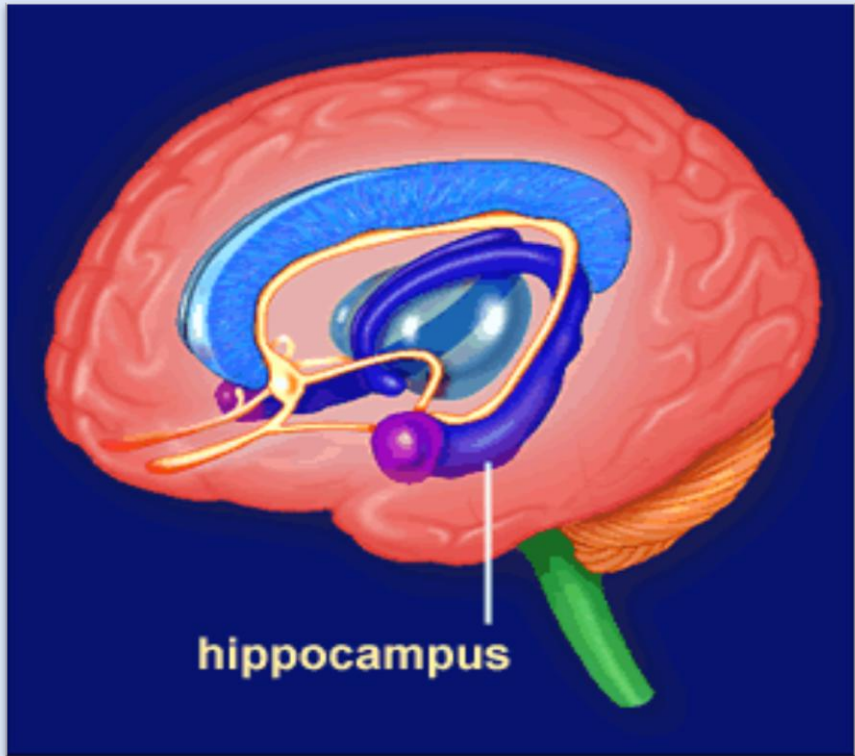
- If damage occurs on the right side of the brain or **the right temporal lobe**, episodic (visual) memory is affected.
- The person will find it difficult to remember what he saw and will have problems processing objects and directions.

Occipital lobe

- Epileptic seizures can also occur in the occipital lobe, a region found at the back of the brain behind the temporal lobes.

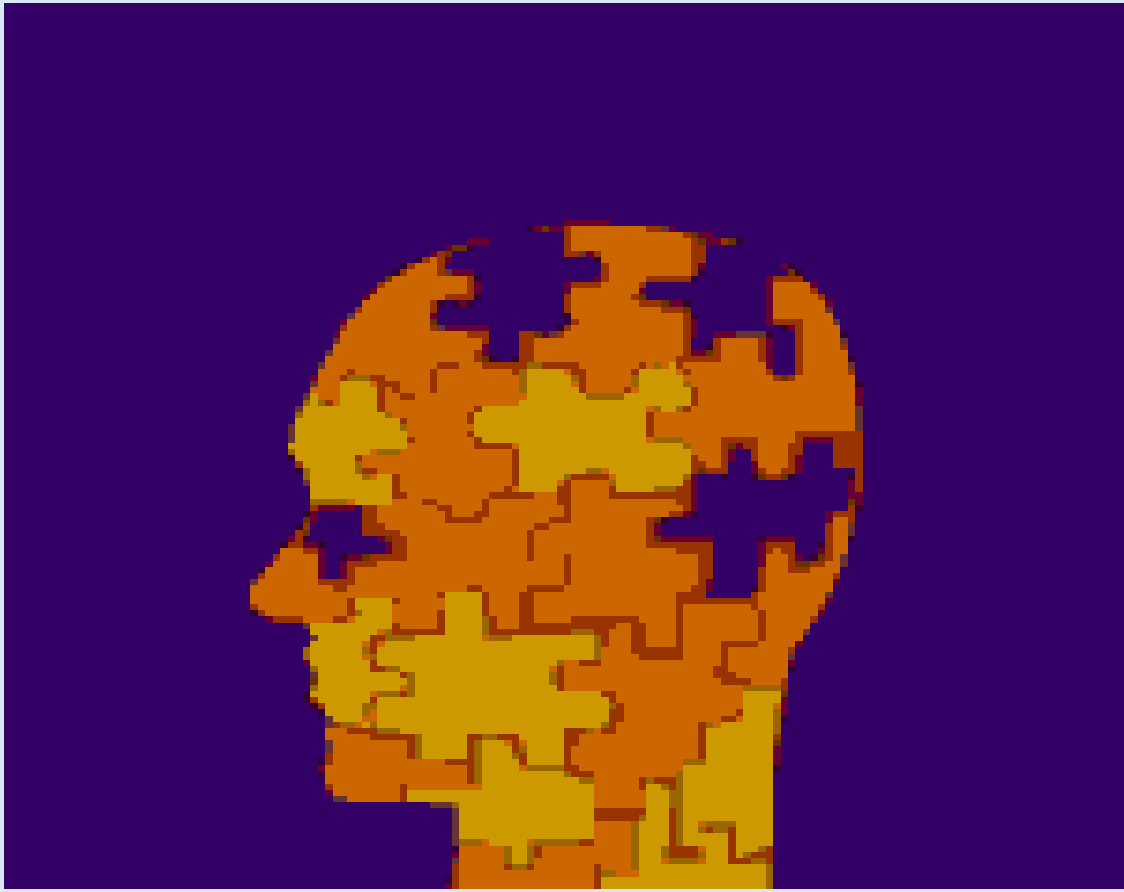
Hippocampus

Located within the temporal lobes, the hippocampus acts as a memory indexer by sending memories out to the appropriate part of the cerebral hemisphere for long-term storage and future retrieval when necessary.



Hippocampus

- The hippocampus is most essential to the processing of information and memory. More simply put, the hippocampus helps to encode memories, and then helps to find them when you want to remember something;



Phases of Seizures and Memory Loss

Epileptic seizures can affect memory functioning differently during each phase of an actual epileptic seizure. However, in each seizure phase, some level of memory loss is always present.

Phases of Seizures and Memory Loss

- **The Aura phase**
  - Is the first phase of a seizure and involves alterations in smell, taste, visual perception, hearing, and emotional state. This Phase is actually a small partial seizure that is often followed by a larger event.
- **The Ictus phase**
  - Is the second phase of a seizure. In order for memory to work properly, the brain needs continuous self-monitoring. During the **Ictus phase** of a seizure which is the actual seizure activity, this self-monitoring system is generally disrupted.

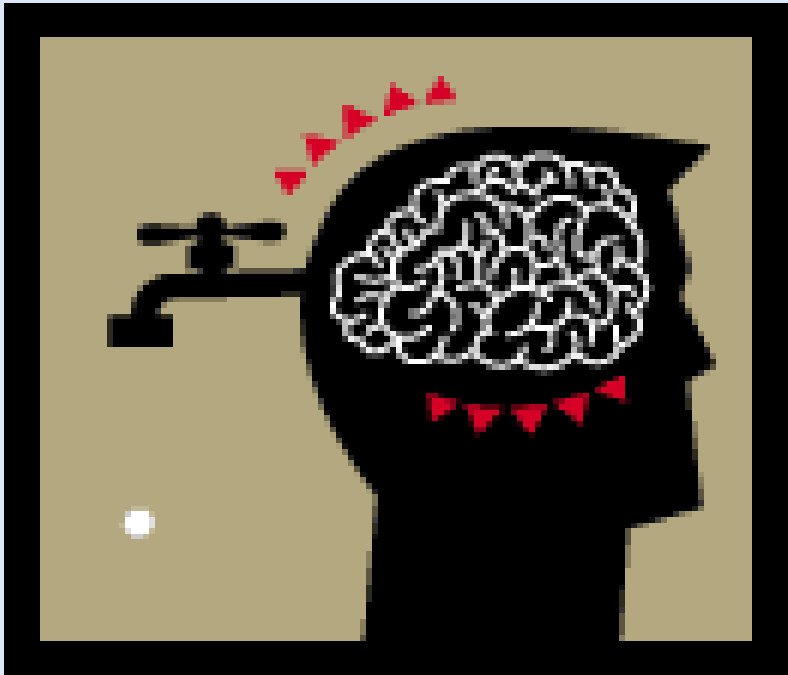
Phases of Seizures and Memory Loss (cont.)

The Postictal phase

- is the period in which the brain recovers from the insult that it has experienced. Some people with epilepsy can experience unusual electrical activity within the brain between seizures. However, the confusion that can occur following a seizure can prevent the attention and memory process from working properly.

Avoiding memory loss in epilepsy

The main objective in Epilepsy management is to treat the symptoms; which are the seizures and to prevent them from reoccurring. While there is no cure for epilepsy, there are several methods used to manage it. These methods include but are not limited to surgery, vagus nerve stimulation, dietary restrictions and medication.



AEDs Effects on Memory

While medications are the most utilized treatment option for seizures, Studies suggest that many of the available antiepileptic drugs, especially the older ones, can have a negative effect on cognitive function, including memory. These effects are usually modest; however, they can have a significant impact in certain populations of patients while performing certain activities.

AEDs Effects on Memory

- To decrease negative side effects, reducing the dose or switching to one of the newer AEDs might have less influence on cognitive functions and may improve the quality of life for susceptible individuals.
- Although alteration of cognition might reflect a chronic adverse effect of AEDs, be aware that the negative effects of the drugs are only one of several factors that may have a greater and far more negative impact on memory.

AEDs Pearls

- If you are experiencing undesirable side effect from your medication, never attempt to self regulate. Instead, notify your health care provider .
- Ultimate outcome of any therapy for epilepsy is to ensure that damage to the brain is prevented and thus, avoid memory loss altogether.
- Memory decline may be stopped and even reversed if seizures are fully controlled

Memorization Aids

While some memory problems cannot be cured, it is possible to adapt to having a memory impairment, making it easier to cope and live a relatively normal life. Individuals with epilepsy can improve their memory with the use of memory aids. These can be extremely beneficial not just as sources of information but also as sources of visual and auditory memory. Now, lets briefly talk about techniques to enhance memory.

Memorization Aids

I f memory loss is experienced or anticipated , the use of devices to prompt discrete or recurring events are very helpful. Something as simple as a clock, note pads, diaries, photos or journals of autobiographical events can assist in preserving memory. Additional items such as watches, pill boxes, personal digital assistive devices, computers for storage, calendars and basic memorization activities are also helpful in enhancing recollection. Of greater importance is the fact that being proactive in the utilization of these devices allows the individual an opportunity to preserve information /memories that they may be in danger of losing should epilepsy cause lasting damage in the brain.

In Summary

- Epilepsy is linked to a spectrum of progressive disorders pertaining to the mental processes of perceiving, thinking and remembering.

- Seizures are associated with cognitive/memory dysfunction, which may at times be location specific.

- Age at onset, frequency and duration of seizures are indicators of deficits related to memory loss

- Memory decline may be stopped and even reversed if seizures are fully controlled.

- If you are experiencing undesirable side effect from your medication, never attempt to self regulate. Instead, notify your health care provider .

Resources

People with epilepsy can enjoy full, active lives. Most are able to live seizure-free by taking medication on schedule. For the remainder, there are many resources for coping with uncontrolled seizures. A specialist can help create strategies for reducing the impact seizures have on a person with epilepsy. The Epilepsy Centers of excellence , the American Academy of Neurology and the Epilepsy Foundation provide listings of neurologists who specialize in this area. Contact information for these organizations are listed on the last slide of this presentation.

Contact Links

- Epilepsy Center of excellence
  http://www.epilepsy.va.gov/ecoe.asp

- American Academy of Neurology
  www.aan.com

- Epilepsy Foundation
  www.epilepsyfoundation.org

That concludes this session.

We have time for a few questions and/or comments.

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