

## Open Your Class Activity: Ben Carson “Gifted Hands”

**Directions:** Ben Carson is known for conducting hemispherectomies on patients with severe cases of epilepsy. This surgery inevitably causes challenges for patients. For each of the following situations use your knowledge of the functions of the brain to explain the challenges we would expect to see in the patient described.

**Disclaimer:** For most activities, both hemispheres of the brain are engaged. The myth about individuals being “right” or “left” brained should be discounted. While each hemisphere holds some unique functions, the other hemisphere is also involved in carrying out those functions. Be careful not to think of hemisphere functions in isolation.

**Case Study#1:** A patient has had surgery in their right temporal lobe and a large part of this area was removed due to a cancerous tumor. Explain the results this surgery likely had on the patient.

The right temporal holds the right auditory cortex and is also responsible for facial recognition. Because of the damage, the patient may lose some of their auditory responsiveness and may experience propognosia (loss of the ability to recognize faces).

**Case Study #2:** A 4-year old patient has been having epileptic seizures contained to their left frontal lobe. Because of the severity of the seizures; doctors have had to remove the vast majority of the left frontal lobe. Explain the difficulties that the patient may encounter after the surgery.

The patient would likely lose the ability to produce speech because Broca’s area is held in the left frontal lobe. The loss of the left motor strip, also in the left frontal lobe, would likely result in paralysis for all or parts of the right side of the body. Higher order thinking also resides in the frontal lobe so the patient may encounter a decrease in cognitive abilities. It is likely that due to the patient’s young age that they would be able to regain most of the lost functions because young brains demonstrate greater levels of plasticity by developing new neural pathways directed to the right rather than left hemisphere.

**Case Study #3:** If the patient in the aforementioned case study had been a 43-year old patient instead of a 4-year old, how would we expect the post-operative recovery to differ? Explain.

The 43-year old patient would likely never experience a full recovery because as we age, the brain loses the ability to change and rewire itself. The removal of the left frontal lobe in this case would likely lead to a relatively permanent loss in speech production and right side paralysis.

**Case Study#4:** If a patient was suffering from Rasmussen’s syndrome, which involves nearly constant seizures confined to the right hemisphere of the brain what type of surgery might a surgeon conduct in order to save the left hemisphere? What structure of the brain is the focus of this type of surgery?

A hemispherectomy may be in order to protect the left hemisphere of the brain from damage due to the seizures. Often times patients with Rasmussen’s syndrome experience complete paralysis if left untreated. The corpus callosum would need to be cut in order to sever the two hemispheres from one another.

**Case Study#5:** A patient is experiencing extreme swings in their emotional state. They move from rage to intense fear unexpectedly. Later, it is found that they have a large, benign tumor in their brain. Based on the symptoms of the patient, where would you expect the tumor to be found and why?

It is likely that the tumor is impacting the emotional limbic center of the brain, which is responsible for emotional responses and contains the hypothalamus, amygdala, and hippocampus.