

## JUST MY OPINION: THOUGHTS FROM EPILEPSY.COM EDITORIAL BOARD MEMBERS



### Risks and Benefits of Epilepsy Surgery: Are We Missing A Boat?

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Medical disciplines are celebrated for their successes, defined by their challenges and haunted by their failures. Epilepsy surgery, a long and deep partnership between neurosurgery and neurology, has pockets of progress punctuating a field with little movement. Advances in neuroimaging and neurophysiology/invasive electrode monitoring have expanded the diagnostic arsenal. Novel stimulation and direct-to-brain drug delivery paradigms form an exciting pipeline to future therapies. Yet, it is frustrating to review Penfield's outcomes from 50 years ago and wonder just how far we have come.

Unilateral temporal lobe epilepsy and extratemporal lobe epilepsy due to localized lesions are the success stories of epilepsy surgery, with seizure-free rates over 60%. In highly selected groups (e.g., patients with mesial temporal sclerosis on their non-dominant side and concordant seizure onsets), seizure-free rates exceed 80%. Among the estimated 500,000 US and 10,000,000 worldwide cases of medically refractory partial epilepsy, less than a third have unilateral temporal lobe epilepsy or extratemporal epilepsy with well-circumscribed lesions. What about the other two-thirds?

The past decade documents some improved outcomes that largely reflect improved patient selection. But improved outcome for who? And for the two-thirds who are not offered surgery, is it really better patient selection? Perhaps the goal should be to seek a lower percentage of seizure-free outcomes. Our target population should be widened, away from the "sweet center" of unilateral temporal lobe and extratemporal cases with localized lesions, to include those who are less likely to achieve seizure freedom.

The field of epilepsy surgery focuses on seizure-free outcome as the marker of success. But have we ignored palliation, the opportunity to improve quality of life through a reduction of seizure frequency and medication burden. For the approximately majority of patients with medically refractory partial epilepsy who are "not good candidates for epilepsy surgery", we need to deeply reconsider our definition of "good candidate". How did we come to decide that seizure freedom was synonymous with surgical success?

Epilepsy surgery shares with cerebral tumor and other neurosurgeries, a spectrum of disease substrates and a range of respective acceptable outcomes. These outcomes range from permanent alleviation of the disease to palliation or prolongation of the time to recurrence of the disease process. What all of these therapies share is the intention to improve the patient's quality of life. Yet epilepsy surgery, unlike tumor surgery, is perceived as failing unless seizures are completely controlled. Our current demands for epilepsy surgery success restricts patient selection, being analogous to restricting tumor surgery to only benign or low-grade tumors. Evaluating success based solely on seizure resolution may deny therapy to patients who may gain worthwhile improvement otherwise. As epilepsy surgery becomes better refined are patients being

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**June 4-5, 2009**  
**II International Symposium on Epilepsy**  
Buenos Aires, Argentina

**June 15, 2009**  
**Hallway Conversations: Interview with Dr. Christopher M. DeGiorgio**  
Epilepsy Talk Radio

**June 17-19, 2009**  
**Epilepsy Update Course**  
Guayaquil, Ecuador

**June 19-20, 2009**  
**5th Epilepsy Colloquium Erlangen: Networks and Epilepsies**  
Erlangen, Germany

**June 18, 2009**  
**Hallway Conversations: Interview with Dr. Martha Morrell**  
Epilepsy Talk Radio

**June 22, 2009**  
**Hallway Conversations: Interview with Dr. Gregory Worrell**  
Epilepsy Talk Radio

excluded from consideration?

Who are these patients with refractory partial epilepsy whose seizures are frequent enough to restrict their lives, who have tried and failed multiple antiepileptic drugs and drug combinations; who live with ongoing seizures and side effects? For many, epilepsy is a progressive disorder, with deteriorating cognitive and behavioral function, increased rates of suicide and sudden unexplained death (SUDEP). Memory, attention, mental processing speed, executive and language functions, and social skills can all decline over the years of seizures pounding on the brain. Depression, anxiety disorders, psychosis all become more frequent with chronic epilepsy. Perhaps most startling are the rates of SUDEP. Among patients with refractory epilepsy who are considering surgery, the yearly rate of SUDEP is between 0.5 and .9%. Over a decade, that is a 5-9 rate. That does not include deaths from drowning, driving, accidents, and other causes. We need to re-examine the benefits as well as the risks of the status quo.

Epilepsy surgery is definitely not for everyone with refractory partial epilepsy. Many patients have multiple or widespread foci that overlap with functional cortex. Surgery could leave a permanent deficit without any benefit. Yet some patients with two or even three seizure foci can benefit when one or two main foci are resected. Seizure frequency and severity may be reduced by 50% or more. Hardly a cure, but a better place. And for some, potentially life-saving. Our challenge is to increase the frequency of seizure free outcomes, but also help patients who cannot currently achieve seizure freedom.

The field of epilepsy surgery needs to move beyond the myopic focus on seizures. Yes, well designed studies have examined deficits in naming and short-term verbal memory after dominant temporal resections. Yet, what do we know about real life executive and social functions after frontal lobe resections? Not much. More recent studies have addressed employment, quality of life, and mood. However, we have ignored or avoided questions that Penfield raised a half century ago concerning the epileptic substrate that he believed caused adverse inter ictal effects.

Nociferous cortex is defined as dysfunctional epileptogenic tissue that fails to perform its normal functions and impairs the function of other brain areas. Penfield and Jasper introduced the concept of nociferous cortex in describing the dramatic behavioral improvements after hemispherectomy in an aggressive boy: "Among patients who have large areas of abnormality in one hemisphere, abnormal behavior may appear, together with advancing mental retardation. The behavioral abnormality is often a more important complaint than the seizures themselves. Radical complete excision may correct the abnormal behavior, stop the seizures, and allow improvement in the patient's mental state." How do we systematically identify both deficits and improvements after epilepsy surgery? What can we do to predict postoperative cognitive and behavior changes before surgery? Restricted epileptogenic foci can be nociferous. For example, non-dominant anterior temporal lobectomy can improve verbal memory. Temporal lobectomy can improve metabolic functions ipsilateral and contralateral to the seizure focus, cortically and subcortically. Preoperative depression and anxiety often resolve after ATL.

Excellent surgical centers may improve outcomes through diagnostic and therapeutic advances as well as more restrictive patient selection. We must address the problems faced by those epilepsy patients who do not meet the more rigorous selection criteria. As epilepsy surgery becomes better refined are patients that would benefit from surgery being excluded from consideration?



### **In Memory of Susan S. Spencer - An Extraordinary Epilepsy Doctor and Researcher**

The Epilepsy Community suffered a great loss with the unexpected passing of Dr. Susan Spencer, a prominent Yale Neurologist. [Read more here.](#)

**June 28-July 2, 2009**  
**28th International Epilepsy Congress (ILAE & IBE)**  
Budapest, Hungary

**June 28 - July 31, 2009**  
**VIREPA Distance Education Courses**  
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**July 12-17, 2009**  
**3rd Baltic Sea Summer School on Epilepsy**  
Kiel Germany

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- **June 15 - Trigeminal and Vagus nerve stimulation with Christopher DeGiorgio, MD, UCLA**
- **June 18 - Responsive Neurostimulation with Martha Morell, MD, Neuropace Incorporated**
- **June 22 - Seizure Prediction and Devices Incorporating the Science with Greg Worrell, MD, Mayo Clinic Rochester**

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