

# Arthur E. Guedel Memorial Anesthesia Center

## Electrical Anesthesia

*By Merlin Larson, M.D.*

Electrical anesthesia was one of the failed hopes of the 20th century. The idea of passing electric currents through the brain to produce anesthesia originated in 1902 with S. Luduc. He passed currents between the cranium and the lumbar spine and produced a behavioral state that closely resembled “anesthesia” in dogs and cats. Many investigators pursued the idea, and their research culminated in several books on the subject, all published in the sixth and seventh decades of the 20th century.

Stuart Cullen, the first Chairman at UCSF, had an interest in electrical anesthesia and recruited Robert H. Smith into his department to study the subject. Smith’s book, entitled *Electrical Anesthesia* (Thomas, Springfield, Ill.), was published in 1963, and it describes his experiments with animals. This was the era of “halothane hepatitis” and “methoxyflurane renal failure,” so the possibility of providing anesthesia without the use of potentially toxic drugs was appealing. An additional advantage would be that emergence would be nearly instantaneous once the electric current was turned off. Unfortunately, the electrical anesthesia techniques were beset with several problems, and these included electrode burns, apnea, convulsions, cardiac arrhythmias, and lack of muscle relaxation.

Although the electrical anesthesia idea has not survived, one individual—who was not an anesthesiologist—claimed to use electrical anesthesia for short procedures without complications. Walter J. Freeman was a neurologist/psychiatrist who played a role in developing the use of curare. In contrast to his anesthesiologist contemporaries, he bypassed animal experiments and developed his electrical anesthetic methods without prior studies. Two books have recently been published on Freeman (*The Lobotomist*, El Hai, J. Wiley and Sons, Hoboken, New Jersey, 2005; *My Lobotomy, A Memoir*, Dully H. and Fleming C. Crown Publishers, New York, 2007), and they briefly outline his influence on our specialty and also describe some of his unusual anesthetic methods.

Walter J. Freeman’s career began in 1924 as director of psychiatric research at St. Elizabeth’s Hospital in Washington, D.C. Freeman had studied medicine at Yale and the University of Pennsylvania and was highly motivated to succeed as a physician. His maternal grandfather, W. W. Keen, was a former President

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of the AMA, and a notable surgeon who was mentioned in the previous Guedel page as one of the surgeons who had operated on President Grover Cleveland in 1893.

In 1935, Freeman came under the influence of the Portuguese physician Egas Moniz, who had developed psychosurgical methods for treating schizophrenia. Moniz was eventually awarded the Nobel Prize in 1949 for developing the prefrontal lobotomy for mental illness.

At St. Elizabeth's, Freeman collaborated with the neurosurgeon James W. Watts in 1936 and began to simplify and perfect the prefrontal lobotomy for schizophrenia described by Moniz. His "improved" operation, which later became known as the "ice pick" lobotomy, evolved without approval from research committees. Freeman had found the administration of anesthetics to be cumbersome, so he invented a portable electroshock machine that, when connected to the 120-volt wall outlet and positioned across the head, would jolt the patient into a period of unconsciousness long enough for him to perform the lobotomy. The operation was performed for a variety of psychiatric illnesses and chronic pain syndromes. With his selected chronic pain subjects, Freeman claimed that pain was still present after the lobotomy, but the patients paid little attention to it. Freeman's humble opinion was that he deserved the Nobel award, perhaps to be named along with Moniz as a co-recipient.

The actual streamlined operation consisted of hammering a sharp steel probe through the superior orbital rim into the brain. The probe was then maneuvered back and forth to sever the connections of the frontal lobe. After the probe was removed, he often injected blood into the wound to further traumatize the frontal lobe. Bilateral lesions were made in quick succession before the patient emerged from the electrically induced anesthetic. He transported the electro convulsive machine in his car. His "leucotomes," which resembled ice picks, were carried in his coat pocket.

The operations that Freeman performed number into the thousands and were mostly done in an office setting. He traveled extensively to state mental hospitals across the country, and demonstrated his procedure with little regard for sterile technique or adequate informed consent. Complications were severe but ignored. Uncontrolled bleeding, broken probes, and infectious complications together led to a morbidity that was at least 12 percent, possibly higher. Although Freeman kept records, he considered these complications acceptable and often ignored them in his lectures. Eventually Watts was so appalled with the evolving technique that he severed his relationship with Freeman and left the partnership.



**Figure 1:** **Above:** Electroshock anesthesia was delivered prior to the “ice pick” lobotomy. **Below:** Dr. Walter Freeman is shown starting the procedure. (Permission obtained from Basic Books, Inc. Publishers, New York. Image appears in: Valenstein, Elliot S. *Great and Desperate Cures. The rise and decline of psychosurgery and other radical treatments for mental illness.* Basic Books, Inc., New York, 1986).



**Figure 2:** Electroshock anesthesia provided a few minutes of immobility during which the probes were hammered through the orbital rim and then manipulated to sever the connections between the frontal lobe and the thalamus. (Permission obtained from Basic Books, Inc. Publishers, New York. Image appears in: Valenstein, Elliot S. *Great and Desperate Cures. The rise and decline of psychosurgery and other radical treatments for mental illness.* Basic Books, Inc., New York, 1986).

In 1958, Freeman moved to California to promote his ideas in the Bay Area. Throughout his career he was involved with organized medical societies, such as the AMA and also several international and local organizations. Once established in private practice in Los Altos, California, he joined the local medical society and was instrumental in designing and opening a new hospital (El Camino) located in Mountain View on the San Francisco Peninsula. El Camino Hospital opened in 1961, mainly through Freeman's persistent and tireless attendance at meetings with community officials and zoning commissions.

Walter Freeman performed his last lobotomy at Herrick Hospital in Oakland in 1967. The patient died and his privileges were terminated. El Camino Hospital had earlier removed his surgical privileges after he operated on a patient without following the proper protocols. Freeman died 35 years ago in San Francisco, still convinced that his ideas would prevail.

Freeman's contribution to anesthesiology began prior to his macabre obsession with the prefrontal lobotomy. After a few years at St Elizabeth's Hospital, Freeman opened a private practice in Washington, D.C., and joined the clinical faculty at George Washington University Medical School. When Richard Gill,

whose collected artifacts reside in the Guedel Museum, returned to the United States in 1932, he was advised to consult with Freeman about a troubling painful spastic condition that had developed following a fall from his horse. Freeman was unable to treat Gill's symptoms but suggested that if enough of the arrow poison (curare) could be obtained from the South American jungle, it might be possible to purify the drug and use it for treatment of spastic conditions.

The rest of Richard Gill's life was spent doing exactly what Freeman had suggested. After Gill returned with the curare in 1938, he was unable to find any research interest in the drug and he again sought out Freeman for advice. Freeman suggested that he contact A. E. Bennett at the University of Nebraska who had an interest in the drug. A. E. Bennett's research on curare to prevent bone fractures during Metrazol convulsive therapy was the first practical use for the drug. Lewis H. Wright, a consultant for the Squibb pharmaceutical company, learned of Bennett's research at the 1939 AMA convention, and he thought it might be of use by anesthesiologists. Wright eventually delivered the drug to Harold Griffith, whose paper on the use of curare during surgery appeared in 1942. Thus our 66-year old attachment to the paralytic drugs in anesthesia is indirectly the result of those two consultations between Richard Gill and Walter Freeman in the 1930s.

What about Walter Freeman's anesthetic? Could we perfect his electroshock method to briefly anesthetize sick patients for short procedures? Among his 3,600 procedures, there is no mention of morbidity relating to the electroshock anesthetic. However, his records on this issue were poorly maintained and there are very few comments from the patients themselves. Conceivably the shock was painful to many subjects and some patients may have not actually lost consciousness at all. Howard Dully relayed in his book, *My Lobotomy*, that he required four shocks before the lobotomy was completed. After the lobotomy, the patients were too docile or incapacitated to complain about the anesthetic.

It appears that Freeman's anesthetic could be best described as a short period of immobility, usually associated with unconsciousness, which follows a convulsion. The more common name for this "anesthetic" is the *postictal* state, and it—as well as other abandoned techniques of electrical anesthesia—appears to deserve little additional research attention.