

**Cranial Electrotherapy Stimulation Treatment of Cognitive Brain
Dysfunction in Chemical Dependence**
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Several studies have shown that cranial electrotherapy stimulation (CES) is useful in treating brain dysfunction associated with alcoholism. A double-blind study replicated the latest of these findings in 60 inpatients and extended them by treating individuals with alcoholism and other chemical dependencies. Treatment effects were assessed on three subscales of the WAIS that are alinical indicators of organic brain syndrome. No placebo effect was found. CES appears to be a valuable adjunct to rehabilitation programs for addicted persons and can effect changes in areas not addressed by other treatment modalities.
(J Clin Psychiatry 45: 60-63, 1984)

Cranial electrotherapy stimulation (CES) has found wide use in most of the developed countries since the late 1940's and early 1950's. However, serious investigation of this treatment did not begin in the United States until the 1960's, and more than half of the U.S. studies on CES have been published since 1975¹. These studies have confirmed the clinical usefulness of CES in treatment anxiety, depression, and insomnia.

Although these symptoms are invariably found in alcoholism and other chemical dependencies during and after withdrawal, no studies on CES in this patient population appeared in the U.S. literature until 1975. In the first study, Smith² found that 36 inpatient alcoholics showed significant improvement on depression and anxiety measures of the Profile of Mood States after 15 days of CES, 40 minutes per day. The sham-treated controls did not improve.

Earlier, Smith had found that over 70% of his patients had short-term memory loss as measured by the Benton Visual Retention Test (BVRT) and that they did not improve on this measure during a 90 day inpatient rehabilitation program. In fact, some 30% continued to deteriorate during that time³. Following his 1975 study, Smith found a strong correlation between one of the improved scales on the POMS and the BVRT. He then studied 227 inpatients (30 controls) and found that 15 40-minute CES treatments halted the memory loss process in all treated patients and significantly improved their short-term memory. The controls did not improve in fact several continued to deteriorate during the study⁴.

At about the same time Gomez⁵ found the methadone patients could be successfully withdrawn using CES alone. In his study, no improvement was seen in sham-treated patients or in controls waiting to enter the program. The withdrawal in Gomez' study was accomplished in 10 30 minute CES treatments over a 2 week period.

In the mid-1970's other studies began to appear regarding cognitive dysfunctions associated with alcoholism⁶⁻¹¹. It was found that the "organic brain syndrome" in alcoholism began with the first cocktail party drinking and ended with the full-blown Korsakoffs psychosis. Clinical theory at the time held these changes to be irreversible.

Papers then were published which suggested that the process was not irreversible, with some improvement

¹ Smith RB: Cranial electrotherapy stimulation. In Mykelbust J, Cusick J, Larson S, et al: Neural Stimulation. Boca Raton, FL. CRC Press, 1982

Smith RB Cranial Electrotherapy stimulation. In Mykelbust J, Cusick J, Larson S, et al: Neural Stimulation. Boca Raton, FL. CRC Press, 1982

³ Smith RB, O'Neill L: Electrosleep in the management of alcoholism. Biol Psychiatry 10: 675-680, 1975

⁴ Smith TB: Widespread brain damage in alcoholics. Med ann District of Columbia 41: 634-686, 1972

⁵ Gomez E, Mikhail A. Treatment of methadone withdrawal with cerebral electrotherapy electosllp. Presented at the annual meeting of the American Psychiatric Association. Detroit. May 1974

chart. The flap was then lowered, concealing the meter from both the therapist and the patient, and the control on the double-blinding device was turned to one of the previously selected random numbers. At that point the current was turned off completely for one fourth of the patients, all of whom thought they were receiving treatment. The therapist remained blind to the treatment condition. Each patient was treated with the same double-blind device at each session, with the same dial setting.

Table 1. Pre- Versus Posttest Comparisons on WAIS Sub-scales

WAIS Subscale			
Group/Measure	Digit Symbol	Digit Span	Object Assembly
CES-treated (N=26)	3.97	2.83	5.57
Brain Damaged (N=16)	5.48	3.78	5.80
Sham-treated controls (N=6)	1.48	2.42	1.12
Untreated controls (N=17)	0.67	0.21	2.02
Brain Damaged (N=8)	1.33	1.13	1.49

$p < .01$

N = 11 for Digit Span and 15 for Object Assembly due to missing data

Small numbers in each category did not permit comparisons of those who were initially brain damaged.

N = 5 for Digit Span and 7 for Object Assembly due to missing data

RESULTS

The study was completed by 87% of the CES treated patients (N=26). 60% of the sham-treated controls (N=6), and 85% of the controls from the regular treatment program (N=17). It was noted that 80% of the sham-treated patients but only 20% of the treated patients had complained about the ineffectiveness of CES treatment. Following the study, 2 of the complaining sham subjects were given further CES treatment at a current setting of their own choosing; both then said it was a highly effective treatment and later WAIS testing supported these claims.

Since the WAIS and Beta Subscales are both standardized at a mean of 10 and a standard deviation of 3, the patients IQs were computed with the four least questionable of the six Beta subscales, as per instructions in the Beta manual¹⁸ and the WAIS subtest scores compared with the Beta subtest score mean patients were rated dysfunctional on a subtest if they were 2 or more standard deviations below the subtest mean.

It was found that 88% of our subjects were initially dysfunctional on one or more of the three WAIS scales, with 63% dysfunctional on one or more Beta subtests.

Using each group as its own control, Fishers tests of the pre and posttest mean differences were computed²⁰. As shown in Tables 1 and 2, the overall CES treated group improved on all WAIS subscales ($p = .01$), and on five of the six Beta subscales ($p = .01$). Total IQ scores also improved significantly ($p = .01$). Patients who were measurably dysfunctional on one or more of the WAIS scales and subscale IV of the Beta prior to treatment also improved significantly on these measures ($p = .01$) and on overall IQ ($p = .01$).

None of the sham treated controls or the controls receiving routine treatment improved on any of the indices of brain dysfunction between pre and posttesting (average of 30 day interval), although there was significant

Table 2. Pre Versus Posttest Comparisons on the Revised Beta (IQ) Examination

Group	Beta Subscale						Total
	I	II	III	IV	V	VI	IQ
CES treated (N = 26)	3.13	1.79	5.06	3.69	2.23	4.17	5.24
Brain Damaged (N=15)				3.53			3.93
Sham-treated controls (N = 6)	3.03	0.34	3.99	1.52	0.97	0.37	2.54
Untreated controls (N = 17)	2.14	1.42	0.89	0.32	0.84	2.00	1.53
Brain Damaged (N = 9)				0.16			1.47

p = .05

p = .01

Small numbers did not permit comparisons of those who were initially brain damaged

Figure 1. Measures of brain dysfunction before and after CES

