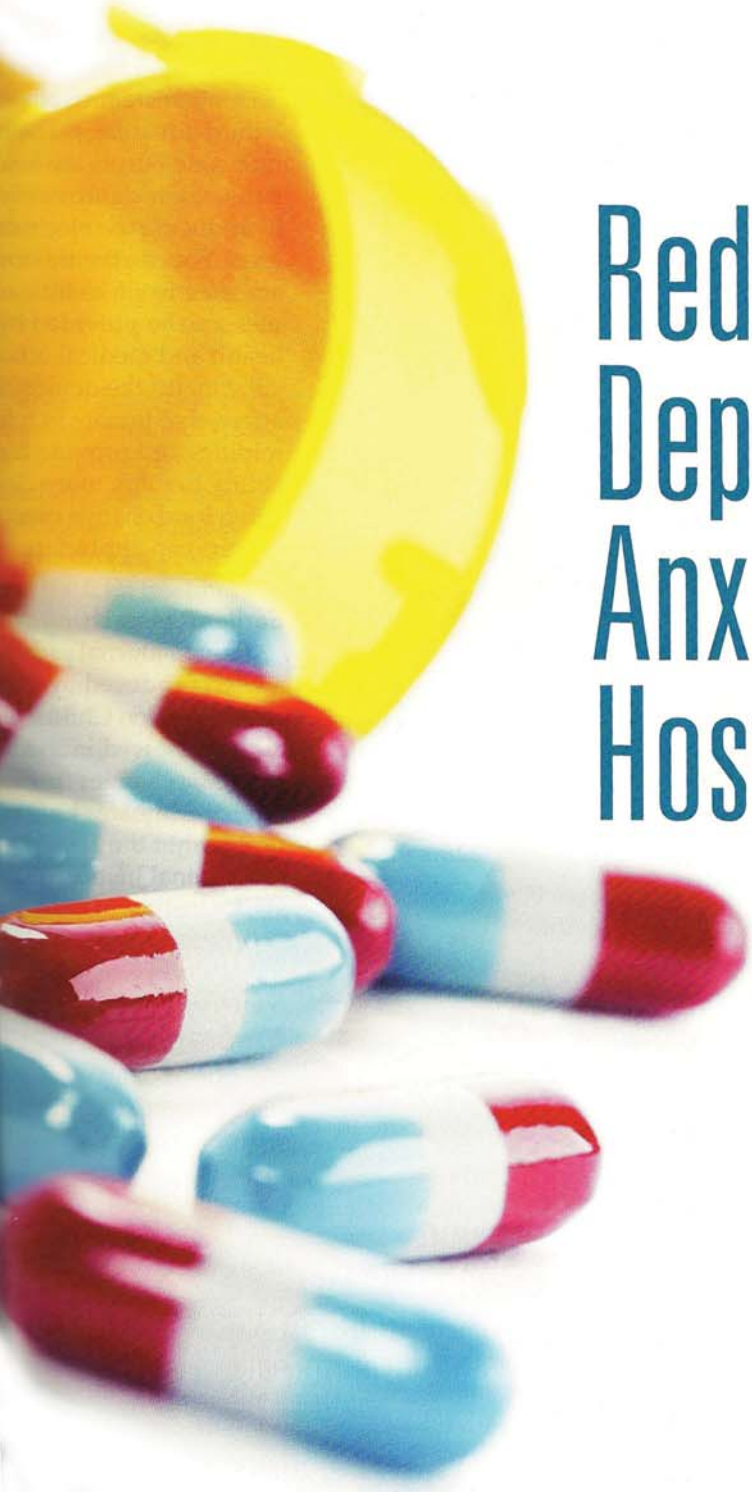

Reducing Depression, Anxiety, and Hostility . . .

Without Pharmacological Medications

RONALD R. MELLEN AND
JULIA TALLEY

Criminal justice professionals are becoming increasingly aware that biological predispositions contribute to offender behavior as much as social and psychological issues. The study presented here examines a treatment that can change the way the brain functions biologically.

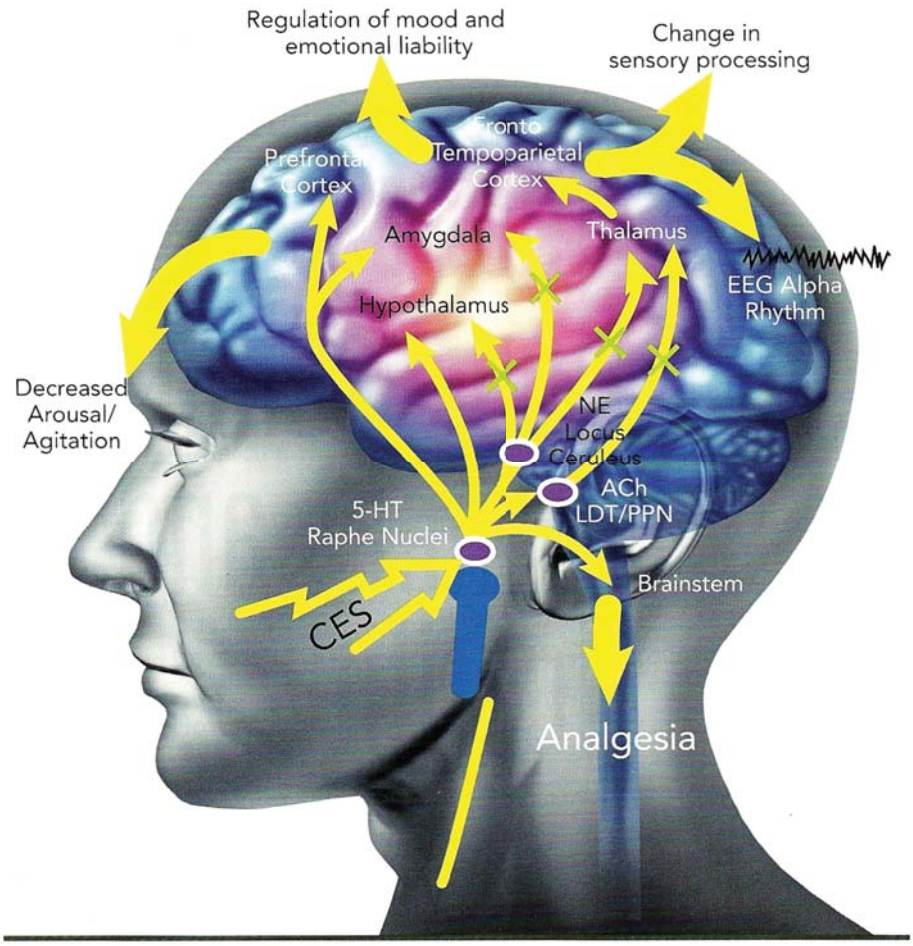

Figure 1. Areas of the Brain Believed To Be Influenced by Cranial Electrotherapy Stimulation.

The goal of this study was to determine whether volunteer jail inmates would benefit from a simple and inexpensive treatment that could help improve their psychological functioning while attending an in-jail drug treatment program. The device used, a cranial electrotherapy stimulation (CES) unit, is approved by the FDA for the treatment of depression and anxiety. The electric current utilized is miniscule: it would need to be increased 11,000 times to turn on a 60-watt light bulb. Inmates/subjects do not experience any sensations while using it.

The CES device has been well researched and used in more than 125 studies involving human subjects. One study reported that more than 90 percent of patients experienced reductions in their clinical symptoms when success was defined as a 25 percent or greater in symptom relief (Kirsch, 2002).

The CES device attaches to inmates' earlobes and, via a nine-volt battery, sends a soothing micro-current into a subject's brainstem. The affected neurons are then encouraged to produce more of the neurotransmitter serotonin. Increased levels of serotonin provide patients with relief from depression and anxiety, as with pharmaceutically based SSRI (selective serotonin reuptake inhibitor) antidepressants.

Throughout the research program additional advantages for the use of CES were discovered. First, it tends to produce inexpensive long-term improvements in inmate behavior when occasional "booster" sessions are included. A second advantage is its low cost—a benefit for jail budgets. The unit costs a few hundred dollars, a significant savings compared to long-term use of SSRIs. The low incidence of side-effects is a third advantage. The most common side-effects are headaches and nausea, which are easily treated by reducing the electrical current level. Fourth, the treatments, which are effective in as little as 20 minutes, can be provided by mental health and medical officers in the jail. Finally, the device can calm an aggressive inmate in a few short minutes and provide him with the ability to think more clearly—a behavioral change most jail security officers can appreciate.

Earlier Research

From a journal publication and a DVD produced by forensic psychiatrist Allen Childs (2005), the authors viewed immediate and dramatic changes in violent mentally retarded inmates housed in a special unit within the Texas Department of Criminal Justice. CES was the staff's treatment of choice because pharmacological and behavioral modification treatments had proven ineffectual.

In addition to Dr. Childs' research, the principal investigator had completed two earlier single-case studies with violent county jail inmates in substance abuse treatment programs. In one study (Mellen & Mitchell, 2008) the inmate/subject was only days from being sent to the State prison system for failure to complete the program due to violent outbursts against other inmates and a jail security officer. His improvement during 15 treatment sessions lasting 30 minutes each was significant enough to allow the director of the detention center to promote him to pod leader. In addition, he completed the program successfully, thus avoiding a prison sentence.

The inmate/subject in the second single-case study (Mellen, Manners, & Ruckers, 2010) had a history of head trauma and violent behavior, including using his personal vehicle in an attempt to run over a sheriff's officer. BRIEF–A (Behavior Rating

Inventory of Executive Function–Adult) results showed clinical-level dysfunction in the inmate's prefrontal cortex (Roth, Isquith, & Gioia, 2005), the part of the brain where humans make decisions such as controlling emotions, planning for the future, and good life choices. After 12 treatment sessions, the inmate's scores had all returned to the normal range.

In a third study, CES was prescribed as a treatment for individuals whom the court referred to an outpatient substance abuse treatment program (Mellen & Palmer-Shedd, 2009). The dropout rate for those receiving the CES treatment was 29 percent, and the control group dropout rate was 59 percent. The treatment group was assessed for clinical symptoms before and after treatment. The Brief Symptom Inventory (BSI) identified important reductions in anxiety, depression, and hostility along with improvements in the ability to relate interpersonally (Dergogatis, 1993).

Present Study

CES was used again in the present study, but this time the inmate/subject pool was completing an in-jail substance abuse treatment program. There were 12 randomly assigned inmates each in the treatment group and the control group. The treatment group inmates received 15 sessions, each lasting 30 minutes. Again the BSI (Dergogatis, 1993) was administered along with the BRIEF–A (Roth et al., 2005). A measure of personality, the 16 Personal Factors (16 PF) (Cattell, 2002), was also conducted, along with inmates' self-reported personal daily assessments (PDAs).

The results indicated that inmates' clinical symptoms were lessened following treatment. This included a reduction in overall stress, far fewer physical complaints caused by anxiety and stress, less obsessive/compulsive thinking, reductions in scattered and confused thinking, and improved interpersonal communications.

The subjects' personalities also demonstrated improvement, according to the 16 PF. Inmates showed increased emotional stability, openness to change, and less apprehensiveness and tension.

Seven of the 12 subjects in the treatment group had elevated scores on the BRIEF–A, as had the individual in the second single-case study cited previously, again suggesting significant dysfunctions in the prefrontal cortices. Problem areas included a reduction in the ability to shift from one topic to another, damage to short-term memory, trouble controlling emotions, a reduced ability to self-monitor, and problems staying on track while completing a task. Put simply, they had trouble with self-control and the ability to live an organized life.

Results from treatment showed improvements in the inmates' working memory and the capacity to think with greater flexibility. (An example of working memory is keeping a phone number in mind while dialing it.)

Finally, the inmates in the treatment group felt more positive about themselves, as indicated by results on the PDA. There were 17 issues to address on the PDA, including, for example, the ability to concentrate, control of anger and feelings of anxiousness, feelings of happiness and hope, and participation in the treatment program. When results from the first-day PDAs were compared to those completed on the last day of CES treatment, 15 of 17 variables reflected positive changes in the inmates as a group. Results included a 40 percent reduction in feeling anxious, a 35 percent improvement in managing anger, a 32 percent improvement in the ability to concentrate, a 30 percent feeling of happiness, and two traits at 26 percent of feeling confident and hopeful. Marginal improvement was noted in such traits as depression (3 percent), feeling lonely (4 percent), and feeling overwhelmed (4 percent).

Important improvements were clearly observed post-treatment as measured by the BRIEF–A, BSI, 16 PF, and PDA.

Discussion

Study results provided additional support for the use of CES as a treatment for inmate populations. The important improvements observed in the treatment group were not found in the control group. These results support findings from earlier studies. When CES was used to treat offender populations, in the post-treatment environment, they tended to be less depressed, anxious, and hostile. In addition, they demonstrated greater clarity in their thinking.

Clearly, inmates vary in their response to CES treatment. However, it was noted that the greater the need for treatment, the

more likely the inmate was to show improvement. Two anecdotal observations help demonstrate this. One inmate had only one elevated score on his BRIEF–A; it reflected trouble with self-monitoring. His score was in the low clinical range (67, where 65 was the lowest score indicating pathology). His improved score of 63 moved him into the nonclinical range, but the score was still somewhat elevated.

On the other hand, another inmate's results offered a sharp contrast. On his BRIEF–A, all 12 scales were in the clinical range, with an average score of 80. However his average score post-CES treatment was a remarkable 51, which is very close to the average score of 50 found in healthy subjects. In addition, all of his individual scores were within the normal range. The dramatic return of his frontal lobe functioning paralleled his personal response to the treatment. Before entering the CES treatment program, this inmate was aggressive and always intimidating in his conversations with security staff and other inmates. As he progressed through the 15 treatment sessions, he demonstrated positive changes in his interaction style. Also, he requested permission to continue using the CES when the research project was completed. Permission was granted.

Despite its frightening name, cranial electrotherapy stimulation can provide jail mental health and medical staff with a new dimension for their treatment programs. Of special interest to jail security staff, disciplinary courts, and jail administrators was the reduction in inmate hostility. ■

References

Cattell, R. B. (2002). *The 16 Personality Factors Questionnaire*. Institute for Personality & Ability Testing (original work published 1949).

Childs, A. (2005). Cranial electrotherapy stimulation reduces aggression in a violent retarded population: A preliminary report. *Journal of Neuropsychiatry & Clinical Neurosciences, 17*(4), 548–551.

Dergogatis, L. R. (1993). *Brief Symptom Inventory*. Minneapolis, MN: National Computer Systems.

Giordano, J. (2006). *How alpha-stim cranial electrotherapy stimulation (CES) works*. Mineral Wells, TX: Electromedical Products International.

Kirsch, D. (2002). *The science behind cranial electrotherapy stimulation* (2nd ed.). Edmonton, Canada: Medical Scope Publishing.

Mellen, R., Manners, K., & Ruckers, J. (2010). Improved pre-frontal lobe functioning, reduced clinical symptoms and reductions in excessive alpha & theta bandwidth activity secondary to an alpha-stim SCS treatment regimen with a violent/aggressive jail inmate: A single case study. *The Correctional Psychologist, 42*, 8–15.

Mellen, R., & Mitchell, S. (2008). Cranial electrotherapy stimulation: A case study. *The Correctional Psychologist, 40*, 4–8.

Mellen, R., & Palmer-Shedd, J. (2009). The alpha-stim SCS as a treatment for clinical and stress symptoms in a court-ordered out-patient alcohol and drug dependent population: A provocative report. *The Correctional Psychologist, 41*, 8–11.

Roth, R., Isquith, P., & Gioia, G. (2005). *Behavior Rating Inventory of Executive Function—Adult version*. Lutz, FL: PAR, Psychological Assessment Resources.

Ronald R. Mellen, Ph.D., is a professor in the Department of Criminal Justice at Jacksonville State University in Jacksonville, Alabama. He may be reached at *rmellen@JSU.edu*. **Julia Talley** is a research assistant in the Department of Criminal Justice at Jacksonville State University, Jacksonville, Alabama. She holds a bachelor of science degree.