Cranial electrotherapy stimulation
FOR THE TREATMENT OF ANXIETY, DEPRESSION, INSOMNIA AND OTHER CONDITIONS

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By Dr Daniel L Kirsch
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Cranial electrotherapy stimulation (CES) is a US Food and Drug Administration (FDA) recognised treatment for anxiety, depression and insomnia that involves the passage of microcurrent levels of electrical stimulation across the head via electrodes placed bilaterally on the ears.

The recommended treatment protocol for the treatment of anxiety is typically the application of CES for 20 minutes to 1 hour daily for 2 to 3 weeks, and then on an as-needed basis. The patient adjusts the current to a comfortable level. By the end of the first week of treatment, symptoms have usually subsided significantly or resolved completely. CES is a non-medication therapy that may be used alone as the sole treatment for anxious patients.

CES is the name suggested by the FDA for this medical treatment that arrived in the USA in the early 1960s as 'electrosleep'. It had been developed in Russia as a treatment for insomnia as a way of inducing sleep. It was thought that by significantly reducing the current from that used in electroanaesthesia, one could induce a relaxing, natural sleep.[1] Much of the early CES research in the USA involved the determination of which wave shapes, pulse rates, and current intensities were necessary to induce sleep in patients. They soon discovered that one could not reliably use electrosleep parameters to induce sleep in patients.[2-7]

Serendipitously, it was found that while CES was not putting them to sleep, psychiatric patients who had been previously refractory to treatment, experienced significant improvement in symptoms of depression and anxiety, among several others.[8-12]

Like most new medical treatments, CES was attacked from all sides. It had to be proved that stimulation of such small intensity – below sensation threshold in blinded studies – could even get into the brain,[13-15] that it evoked changes in the electroencephalogram (EEG),[16-20] and that it was effective whether or not the patient went to sleep.[21] In addition it had to be shown that its effect was present above and beyond the patient's level of suggestibility,[22] and that it was effective over and beyond any placebo effect, which was never found in studies designed to measure for it.[10, 23-24]

Among the more than 150 CES human and animal studies

published in the USA few reported the means and standard error of the means required for meta-analyses of the studies. However three such analyses that were performed all concluded that CES was unquestionably effective for the treatment of anxiety.[25-27]

One possible mechanism of action was elucidated at the University of Tennessee Medical Center by Pozos and his co-workers, who completed five studies on groups of canine subjects in which psychoactive medications were used to disrupt the neurotransmitter balance in their brains, causing Parkinson-like symptoms. Once all drugs had been removed from their blood, half the animals that were then provided normal kennel routine came back to normal within 4 to 7 days. The half that were given CES in addition to their normal kennel routine, returned to normal behaviour in 2 to 8 hours suggesting that CES rebalances neurotransmitters.[28]

Very early on in the USA, CES began to be used in treating the substance abstinence syndrome in which patients suffering from various substance addictions suffered intensively from anxiety, depression and sleep disturbance. Because that group has proven susceptible to cross addiction to psychoactive medications, and because they are also more resistant to the effects of such medications than non-addicted patients, CES soon became a treatment of choice in both inpatient and outpatient treatment programmes for this group of patients.[29-33]

In 1976, the USA Congress passed the Medical Device Amendments Act, giving FDA control over medical devices. Subsequently, the FDA called CES before its Neurology Panel in 1978, and the Panel recommended that it be approved immediately for the treatment of anxiety. They recommended that it be called back later to assess the several other uses that had become apparent in the published literature. The FDA decided that if electrosleep did not actually put people to sleep it should be called something else, and they developed 'cranial electrotherapy stimulation' as the new rubric for its use in America. The FDA also decided to leave CES as a prescription device, for the treatment of anxiety, depression and insomnia, the approved indications for CES as of this writing.

To date, there have been over 126 published studies and 31 reviews based on human subjects, and 29 animal studies.[34] The most recent human studies have shown CES to be a significantly effective treatment for fibromyalgia,[35-36] reflex sympathetic dystrophy (RSD),[37] and for pain treatment.[38] In the fibromyalgia and RSD studies, in addition to pain, patient anxiety was measured with standardised psychological measures and found to improve significantly, with a strong correlation found between the patients' level of anxiety and self-rated pain scores.

Discussion

There has now been 50 years of experience using CES in the USA as a non-medication treatment for anxiety and other conditions mentioned in the article, yet it has never reached mainstream status as a treatment modality by members of the medical and allied health care professions. This is most likely due to the fact that no medical school in the USA teaches CES treatment as part of its curriculum, and none of the CES companies has had sufficient staff to visit physicians' offices in the ubiquitous manner of pharmaceutical representatives. Therefore, there has been no formal post-graduate

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inservice or updating of physicians regarding the literature on CES as a treatment modality except for an occasional lecture at a medical symposium. Nevertheless there is increasing interest in these devices and an increasing number of exhibits and exposure of CES devices.

Nonetheless, when physicians who had prescribed CES were asked, those responding were enthusiastic about its effectiveness. Of special interest is the very positive results obtained with some intractable problems such as tinnitus, fibromyalgia, stress reduction, headaches and muscle tension.

Also noteworthy is that among the more than 6 000 patients who have been involved in CES research studies in the USA, and among the many thousands of patients who submitted warranty cards, there has been no significant, negative side-effect reported from the use of CES. Or, as the National Research Council reported to the FDA when asked to evaluate the safety of CES, 'Review of these reports reveals that significant side effects or complications attributable to the procedure are virtually nonexistent'.[40]

It is likely that CES will receive greater attention from medical practitioners as more knowledge is gained about its use and usefulness as a drug-free treatment of anxiety, and other related disorders.

References

A list of the references is available from the *Journal* office, tel. 021-880 1444 or email info@naturalmedicine.co.za.

Illustrating how CES works

By Dr James Giordano PhD

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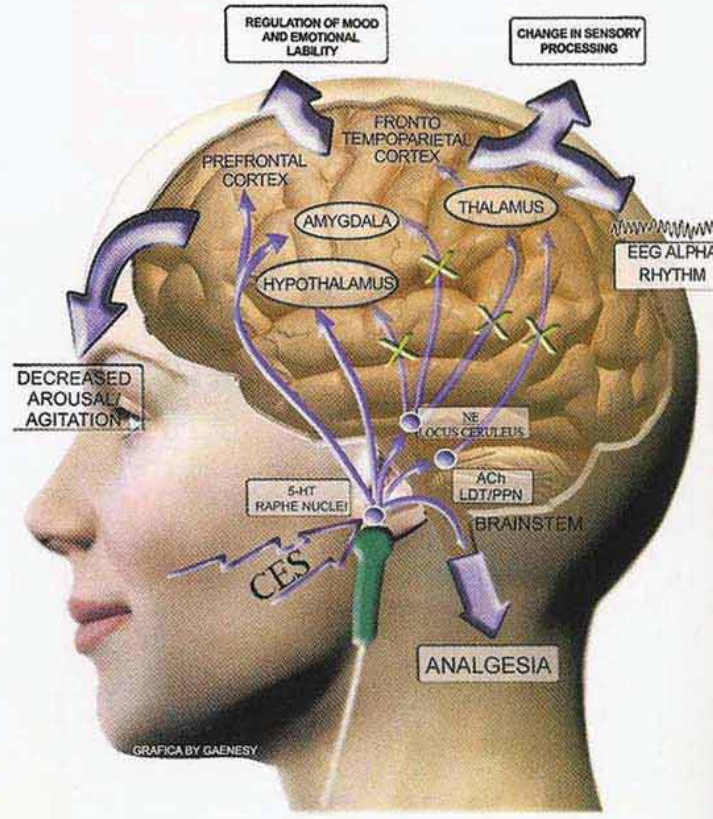
An example of CES, namely Alpha-Stim, appears to activate particular groups of nerve cells that are located at the brainstem, a site at the base of the brain that sits atop of the spinal cord. These groups of nerve cells produce the chemicals serotonin and acetylcholine, which can affect the chemical activity of nerve cells that are both nearby and at more distant sites in the nervous system. In fact, these cells are situated to control the activity of nerve pathways that run up into the brain and course down into the spinal cord. By changing the electrical and chemical activity of certain nerve cells in the brainstem, CES appears to amplify activity in some neurological systems, and diminish activity in others. This neurological 'fine tuning' is called modulation, and occurs either as a result of, or together with the production of a certain type of electrical activity pattern in the brain known as an alpha state, which can be measured on brain wave recordings (EEG). Such alpha rhythms are accompanied by feelings of calmness, relaxation and increased mental focus. The neurological mechanisms that are occurring during the alpha state appear to decrease stress-effects, reduce agitation and stabilise mood, and control both sensations and perceptions of particular types of pain.

These effects can be produced after a single treatment, and repeated treatments have been shown to increase the relative strength and duration of these effects. In some cases, effects have been stable and permanent, suggesting that the electrical and chemical changes evoked by CES technology have led to a durable re-tuning back to normal function.



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