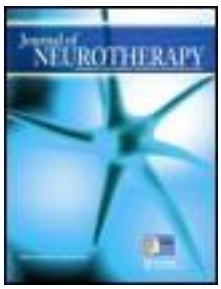

Journal of Neurotherapy: Investigations in Neuromodulation, Neurofeedback and Applied Neuroscience

Introduction

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Introduction

D. Corydon Hammond, PhD

This volume introduces the reader to a unique, innovative neurofeedback/neurotherapy technology called the Low Energy Neurofeedback System (LENS). The LENS treatment method has gradually evolved over the past 16 years primarily through the innovations of Len Ochs, PhD. In this volume you will read about the LENS, its historical evolution, and its application in the treatment of a variety of diagnostic problems.

By way of introduction, let me offer a personal perspective. In the 1990s I listened to meeting presentations by Len Ochs and felt extremely puzzled. He often expressed his belief that neurofeedback clinicians were overtraining their patients and that many patients did not need 30-minute long training sessions. In fact, he said that sometimes even 10 seconds of treatment might be too much. At that point in time the previous version of the LENS used photic stimulation in association with the EEG biofeedback. In my clinical work I often used a neurofeedback system that had similarities to the LENS in its use of photic stimulation. However, despite using what seemed to be relatively similar equipment, I simply could not resonate with Len Ochs' statements about over-stimulating patients by having lengthy treatment sessions. My training sessions with patients were 30 minutes long and yet, in the majority of cases, my patients reported significant improvements in their symptoms following this traditional neurofeedback. Finally, I dismissed what Dr. Ochs was saying. It simply did not fit with my own clinical experiences.

Soon after the beginning of the new century I came to understand the reason for the disparity between our clinical experiences. Len Ochs asked the Lawrence Livermore Labs to do an analysis of his equipment. They discovered, much to everyone's surprise, that the extremely weak photic stimulation associated with his treatment was not the operative factor. The analysis determined that there was a unique element with the system–an exceptionally tiny electromagnetic pulse was being delivered down the electrode wires to head of the patients. The timing of the electromagnetic pulses was determined by the way in which the lights were timed to flash in relationship to the dominant brainwave pattern of the patient. The LENS system now became comprehensible to me. It was understandable that some patients could feel over-stimulated by this treatment–the LENS training was completely different from other neurofeedback systems. A very weak electromagnetic signal was influencing the brain, which could understandably have the potential influence of over-stimulating someone if they received too large a dose.

Research has found that the far far stronger electromagnetic field emitted by a cell phone can have potential negative effects on EEG brain patterns. For instance, Kramarenko and Tan (2003) found that after 20 to 40 seconds of cell phone usage, slow wave activity (2.5-6.0 Hz) appeared in the contralateral frontal and temporal areas. These slow waves, lasting for about one second, reoccurred every 15 to 20 seconds at the same recording electrodes. After

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the cell phone was turned off the slow wave activity progressively disappeared, and local changes decreased and disappeared after 15 to 20 minutes. They found similar changes in children, but the slow waves had higher amplitude and appeared earlier in children (10 to 20 seconds) than adults. They found that their frequency was lower (1.0-2.5 Hz), occurred at shorter intervals, and had a longer duration. Research thus suggests that cellular phones may reversibly influence the human brain, inducing abnormal slow waves in the EEG of awake persons. In contrast, as you will read in this volume, a few seconds of exposure to the much weaker electromagnetic fields from LENS has a therapeutic effect of reducing high amplitude slow activity in the EEG. The difference seems to be that (a) the electromagnetic signal is far weaker, and (b) it is individualized and updated 16 times each second so that it remains at a frequency that is consistently faster than the patient's dominant EEG frequency.

Having learned about the Lawrence Livermore Lab analysis, I could now comprehend how the LENS training operated and, therefore, no longer believed that Len Ochs must be from another galaxy far, far way. Nonetheless, I was still troubled by one other contingency. Dr. Ochs talked about a few patients feeling side effects associated with LENS treatment. Prior to understanding the operative mechanism in LENS treatment, patients often received 5, 10, or even 20 minutes of treatment. This could certainly cause some patients to feel over-stimulated or fatigued. Even though I observed that refinements in both the equipment and clinical procedures were being made, I was still concerned about even a small percent of my patients having a side effect where they felt "wired or tired," even though this rarely lasted for more than one day.

Another reservation stemmed from my lingering doubts about how sessions could produce therapeutic changes when they only consisted of the delivery of a few seconds of stimulation. Even though I saw encouraging research appearing on the use of LENS treatment with fibromyalgia (Donaldson, Sella, & Mueller, 1998; Mueller, Donaldson, Nelson, & Layman, 2001) and traumatic brain injuries (Schoenberger, Schiflett, Esty, Ochs, & Matheis, 2001), I was still skeptical. The professor part of me wondered how much of a placebo response was involved. It certainly seemed possible that positive expectancies could be fostered by clinicians, leading to placebo responses. Consequently I simply continued using more traditional neurofeedback which I knew was usually effective.

An experience then challenged my thinking. Two years before editing this volume, I was a participant on a panel at a professional society meeting with Dr. Stephen Larsen, a decade long colleague of Dr. Ochs. Stephen was talking about his experiences in using LENS with animals. For example, he described a dog that had been hit by a car, began having seizures, and had become aggressive. After a small number of sessions the seizures ceased and the dog's former pleasant demeanor returned. As I heard these case reports of animals, in contrast to my patients, it seemed very hard to imagine that a dog who was having electrodes placed on his head was reasoning at some level, "Gosh, this is going to make me feel better, quit biting people, and stop having seizures!" I decided to investigate LENS more seriously. I first reread the published research reports and then talked with therapists in three different countries who had been applying LENS clinically. I was favorably impressed and obtained training from Len Ochs.

Although I had casually known Len Ochs for many years, as I studied hours of videotapes of him teaching and then spent two days being individually tutored by him, I was deeply impressed by his personal characteristics. In a field focused on technology, he emphasizes the importance of the therapeutic relationship and creating rapport. He exudes a kindness and caring. What was perhaps most impressive was the fact that despite more than three decades of clinical experience and the creative innovations he has brought to this field, he remains modest and refreshingly honest. He candidly admits how much is still not known about LENS treatment, how it achieves its effects, and the fact that LENS treatment does not succeed with all patients.

In spite of his unpretentiousness and the fact that LENS research is still in its infancy, I am convinced that Len Ochs has created a technology that has great therapeutic potential. It is for this reason that I decided to edit this volume. LENS is unique in that it does not require the pa-

tient to "work" during neurofeedback. The fact that the patient is not required to have the impulse control, attention, or stamina to concentrate for significant periods on a computer screen can be particularly appealing. These factors open up new possibilities for the treatment of patients who are very young, oppositional, seriously autistic or disabled, minimally able to cooperate, and even for the humanitarian treatment of animals with brain-based disorders.

In over 30 years of clinical practice as a psychologist I have been cautious about new treatments that lacked research support. In particular I have been wary of any therapeutic approach that presented itself as being the "one true light"–a panacea for all the various clinical conditions we find in our patients. This has also been my stance since entering the field of neurofeedback fourteen years ago. I have tried to remain open to learning from different individuals and approaches within the field. Many experienced professionals have things to offer and a single approach to neurotherapy is unlikely to produce positive outcomes with everyone. I have studied the research on iatrogenic effects that began being published in the 1960s and 1970s. This research informs us that when a therapist follows a unitary approach to treatment and fails to individualize therapy, this is one of the primary factors associated with producing adverse and negative effects. Thus I have remained eclectic in my approach to the practice of neurofeedback. I value still having my traditional neurofeedback tools available to me, and I prize the addition of LENS to my therapeutic armamentarium.

My own clinical experience with LENS suggests that it is not always superior to other types of neurofeedback–but what approach within psychology or psychiatry is always successful? With many patients, however, I have found that LENS treatment produces unusually rapid, even startling symptomatic improvement. In the same way that we teach our patients, I believe that it is likewise important for clinicians to not engage in dichotomous reasoning, either-or thinking. Our treatment options are not limited to a choice between either using the LENS or reliance on more traditional neurofeedback approaches. Many clinicians will use LENS as well as other neurofeedback modalities, sometimes with the same patient. Thus when I have a patient who has experienced 8 to 10 LENS sessions and he or she does not display some symptomatic improvements, I will often add traditional neurofeedback and reduce the dosage of LENS training. This decision stems from two factors. First, Len Ochs often says, "Less is more." By this he means, as he explains in his paper, that sometimes a lack of symptomatic improvement may stem from the patient receiving too large an amount of stimulation/feedback. Therefore, I may reduce the amount of LENS input from perhaps six seconds (one second at each of six electrode sites) to only two seconds, and spend the remainder of the session doing more traditional neurofeedback. The second rationale for adding another modality is something that I have already emphasized–nothing works for all patients. In still other cases I have seen the rapid symptomatic improvements that commonly occur with LENS in the first 10 to 20 sessions, but then progress may have slowed, but further improvements are still desired. In such a case, other traditional neurofeedback modalities may also be added to the therapy.

This volume provides a valuable introduction to LENS. It begins with an extensive overview by Len Ochs. His introduction includes information about the historical evolution of his equipment, theoretical background, and practical information about the clinical use of LENS. The next contribution is a very well done, double-blind, placebo-controlled research study with fibromyalgia. What may surprise our readers is that this study by Kravitz and his colleagues did not produce the hoped for results. It is nonetheless included (with the encouragement of Dr. Ochs) because we can learn as much from publishing negative results as from positive outcomes. We should not be afraid to publish such studies. Two commentary articles follow the fibromyalgia study. They are illuminating in helping us understand the reasons that the Kravitz study did not produce positive results. The first commentary by Len Ochs elaborates details that were unknown at the time of the study about the operative mechanism in the feedback, and about the excessive dosage level that was being administered. The second commentary by Mary Lee Esty, a co-author of the Kravitz research study, discusses the multi-causal nature of fibro-

myalgia and the fact that no single modality, such as neurofeedback, can hope to address all of the etiologic factors. The Esty commentary will prove enlightening for all clinicians working with fibromyalgia, and it will encourage more thorough pre-treatment assessment and a broader conceptualization of interventions that may be helpful with this condition.

The next contribution is from the Stone Mountain Center, led by Dr. Stephen Larsen. This large clinical research paper presents a case series of 100 patients treated with the Low Energy Neurofeedback System. The systematic symptom ratings provide impressive documentation of the rapid treatment effects that commonly occur with LENS training and their relationship to reductions in EEG amplitudes. This study is particularly encouraging because it demonstrates the effectiveness of LENS with a very broad range of symptoms in only 20 sessions. The next clinical paper is by Dr. Curtis Cripe, who presents three case reports on his work with the LENS in the treatment of serious neurodevelopmental and learning disability problems. Although LENS treatment is only one component within his treatment model, Dr. Cripe describes the invaluable role that he has found it to play. The final contribution is by Dr. Stephen Larson and his co-workers on the use of LENS training with animals that are experiencing neuro-behavioral problems.

We do not yet have enough controlled research in the field of neurofeedback in general, including with regard to LENS treatment. This volume, and the few studies that have already been published, simply provide an encouraging foundation from which to proceed. For me, however, one of the most exciting aspects of LENS treatment is that by its very nature it lends itself to conducting double-blinded placebo controlled experiments with both animals and humans–something that holds tremendous promise for advancing the field of neurofeedback in gaining acceptance by the evidence-based medical, psychological, neuroscience, and academic communities. Such studies are already underway and we look forward to learning more from their results.

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