

Guest-editorial

Electromedicine in NeuroRehabilitation

Electromedicine is therapeutic intervention via electricity or magnetism, rather than through chemicals. As with all medical disciplines, it is also an attempt at understanding observable phenomenon. While the use of electromedicine in clinical practice is achieving an impressive reemergence based on the superior efficacy of modern technologies, there is still much to be learned about how various modalities work. To explain the observable phenomenon, we must look beyond our current understanding of physiology. This issue contributes to that mission while also providing the results of original research and practical information useful to the clinician.

Ray Smith takes us beyond the currently accepted neural and chemical theories of information processing. He discusses the maintenance of homeostasis with an emphasis on peptides, and the ligand-receptor system of Candace Pert. In the context of some of the symptoms and diseases that microcurrent stimulation can treat, Smith suggests that the results may be achieved by stimulating peptide responses from immune and other cells.

Abe Liboff and K.A. Jenrow review the physical parameters of different types of electromagnetic devices and discuss their mechanisms of action, including behavioral changes. While emphasizing neural functions and the electrical properties of neural tissues, this paper takes us far beyond the action potential into new theories of information processing. It also warns us away from using magnetic fields that are too weak, or electrical currents that are too strong. There is a useful discussion about various specific aspects of a therapeutic waveform and its effects on the nervous system focusing on the brain leading us to a better understanding of the brain itself. The authors emphasize the importance of frequency, and how combining AC and DC signals in a method known as cyclotron resonance can be tuned to the frequency of specific ions. Indeed, such is the case with devices dedicated to repairing non-

union fractures, an outgrowth of Becker's pioneering research.

We are truly honored to have a new contribution to the literature from Robert O. Becker, the father of modern day electromedical sciences. Becker has spent 50 years studying regeneration. His research led him to the use of electrical iontophoretic introduction of free silver ions. Here, he introduces a newly developed silver nylon fabric as an alternative to human embryo stem cell research that has both ethical and technical difficulties. Becker disproves the dogma that embryogenesis can not be reversed. He provides us with in vitro and clinical proof of human regeneration. He then provides nine fascinating cases of infected, non-healing wounds unresponsive to standard treatment, of which six had been advised amputation. In all cases infection control was achieved within one week. Full healing with the restoration of all local tissues to their normal state took three weeks to three months. Diabetic patients with peripheral neuropathy demonstrated transitory return of normal sensation along the nerves proximally and peripherally to the treated areas, diminishing over a period of one year. The silver nylon exhibited superior infection control, restored normal innervation and local circulation, and left little or no evidence of the original ulcer or wound. Becker suggests that silver ions, with an appropriate delivery system, might also be of therapeutic value in treating diabetic peripheral neuropathy.

Stuart Donaldson's group offers us a controlled study examining diffuse muscle coactivation (DMC) in fibromyalgia syndrome (FS) patients. The authors introduce the term and define DMC as an increase from resting tonus in the electrical activity of muscles during movement that does not involve that muscle and is not part of the agonist-antagonist unit. This paper also contains an excellent discussion of fibromyalgia, a relatively new disease that seems to be reaching epidemic levels, including differential diagnostic factors between FS and myofascial pain syndrome. DMC ap-

pears to be centrally mediated. FS is diffuse and somewhat elusive. Correlations were found between DMC and the appearance of tender points that could lead to objective diagnostic criteria for FS. As DMC was also found to a lesser extent in the controls, it may prove to be a screening test for the early detection of FS.

In Part 2, Donaldson's Group further examines the electrical characteristics associated with the tender points of FS, most prevalent around the neck. It was previously thought that muscle tension is not a prominent pathogenic factor in FS. While only a small sample, the finding that FS patients overall root mean square muscle activity increased by 80% from resting levels compared to 21% in the controls may be highly significant. This is especially true in light of the fact that no observable movement occurred in the muscles tested. The authors suggested that if movement of the head causes increased electrical activity of muscles throughout the body it is possible to see how fatigue and associated muscle pain would occur over time. They then suggest that the solution would be to improve muscle tonus, while avoiding severe exercise.

Terry Oleson provides an extensive overview of auriculotherapy which involves the use of electrical modalities on reflex points of the external ear to diagnose and treat somatic neurological and neuromuscular disorders. He reviews the history, theories, clinical

studies, and neurophysiological research which has examined the field of auriculotherapy. A primer on auriculotherapy is provided, including the anatomy of the auricle and a discussion of master points. Perspectives on both the French and Chinese Systems on various points are discussed, as are treatment applications.

Christian Thuile and Manfred Walzl of Austria provide two prospective research studies on the use of a low frequency, low energy magnetic field system to treat the ubiquitous problems of low back (L5/S1) and whiplash injuries. In a controlled trial of 100 patients, they found significantly less pain and reduced time to achieve painless walking in the magnetically treated group as compared to the drug treated group.

Also included in this issue are two unsolicited articles from Dr. Thornton and Dr. Freedland and colleagues.

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