BOOK REVIEWS

Electrotherapy: evidence-based practice (12th edition)


Edward B Clayton’s Electrotherapy and actinotherapy was first published by Bailliére, Tindall and Cox in 1949, an amalgamation of Electrotherapy with the direct and low frequency currents (1944) and Actinotherapy and diathermy for the student (1959). It still bore the title Clayton’s electrotherapy in its 10th edition, edited by Sheila Kitchen and Sarah Bazin (Saunders, 1996). In the meantime, though, the fashionable catchphrases “evidence-based” and “evidence-based medicine” had been introduced (in 1990 and 1996, respectively), and the book’s next incarnation was revamped to its current title, with Kitchen as sole editor. The current edition has again been edited single-handedly, by Tim Watson, Professor of Physiotherapy at the University of Hertfordshire, and was published in 2008 by Elsevier under the Churchill Livingstone imprint. Associated material can be accessed (and downloaded) by purchasers at http://evolve.elsevier.com/productPages/s_1451.html (accessed 12 May 2009). Further useful information is available at Watson’s own website, Electrotherapy on the web, at http://www.electrotherapy.org/ (accessed 12 May 2009).

Watson’s emphasis throughout, as shown in his own thorough and well constructed contributions to this volume, is on evidence-based practice as an integration of “individual clinical expertise with the best available external clinical evidence from systematic research” (p vii). Not all his co-contributors have been so careful, however, and there is still room for improvement if the book’s contents are to conform consistently with its title.

The book contains 21 chapters in five section: (1) Introduction and scientific concepts (8 chapters); (2) Thermal and non-thermal modalities (4 chapters); (3) Electrical stimulation modalities (7 chapters); (4) Ultrasound imaging (1 chapter); and (5) Contraindications, dangers and precautions (1 chapter, “Guidance for the clinical use of electrophysical agents”, published in 2006 by the Chartered Society of Physiotherapists). Comparison with my battered and much read copy of the 10th edition (I have not seen the 11th) gives some surprising results:

In Section 1, for example, many of the chapters have been little changed, apart from excluding some historical accounts of the development of particular modalities, re-ordering bits and pieces within chapters or sections, updating references and illustrations (the latter mostly through a judicious use of colour rather than anything else) and in some cases altering author attributions. Here only one chapter (ch. 6, “Physiology of pain”, by Leslie Wood) is significantly different from the same contributor’s earlier version (referencing in both is disappointing).

Thus it would seem that the scientific underpinnings of electrotherapy have not altered that much within the last 12 years or so, despite a clear acceleration of change in many other areas of scientific research.

In Section 2, on the other hand, apart from the complete omission of two chapters on the currently unfashionable modalities of microwave diathermy and ultraviolet, there are also considerable changes and improvements in Sheila Kitchen’s chapter on “Heat and cold application” (which already, back in 1996, included a brief disquisition on “evidence for clinical efficacy”), a much improved presentation on “Pulsed and continuous shortwave therapy” by Maryam Al-Mandeel and Tim Watson, and a very informative chapter on “Therapeutic ultrasound” by Watson and Stephen Young. These last two chapters contain a wealth of new evidence for efficacy, whereas “Low-intensity laser therapy” by David Baxter, the other chapter in this section, is relatively little changed, apart from more precise indications of when laser therapy should be used for best results. Curiously, Baxter no longer includes references to Semion Rochkind’s research on tissue repair.

Section 3, in many ways of most relevance to acupuncturists, starts with a completely rewritten “Introduction to low-frequency currents” by Deirdre Walsh, based solely on up-to-date references, followed by a rather technical chapter on “Neuromuscular electrical stimulation” by Mary Cramp and Oona Scott (with much new material, but only a page on clinical studies—on Bell’s palsy, rheumatoid arthritis, chronic heart failure and Duchenne muscular dystrophy).

This is followed by a more clinically oriented “how-to” chapter on “Neuromuscular and muscular electrical stimulation” by Suzanne McDonough, with a good evidence base (although it only consists of a relatively small number of studies). After this comes the longest and most ambitious chapter in the book, Mark Johnson’s contribution on TENS. His approach is comprehensive and critical (sometimes perhaps overly judgmental), based on a wealth of recent research studies, both experimental and clinical. He even briefly mentions various “TENS-like devices”, such as Alex Macdonald’s transcutanous spinal electroanalgesia and hand-held piezoelectrical stimulators such as the PainGone device.

While acknowledging that some opinion leaders define acupuncture-like TENS (AL-TENS, or low frequency, high amplitude TENS), without reference to muscle contractions, and that many research reports also do not mention motor effects, Johnson characterizes it as “the induction of forceful but non-painful phasic muscle contractions at myotomes related to the origin of the pain” (p262). He also feels justified in explaining—somewhat dogmatically—that AL-TENS operates by selective activation of Aβ (Group I) afferents (mistyped as Aδ), resulting in activity in ergo-receptors and Group III (Aδ) afferents, as opposed to “intense TENS” (high frequency, high intensity TENS) that activates Aδ fibres directly.

In both cases, Aδ activation leads to extra-segmental analgesia, and the concomitant Aβ afferent activation to segmental analgesia. As he says, “there is a lack of good-quality and systematic experimental work that has directly compared the clinical effectiveness and analgesic profiles of these types of TENS” (p263)—perhaps because, in essence, there is not a huge difference between them in terms of final common neurological pathways.

Chapter 17, by Shea Palmer and Denis Martin, is a complete rewrite of the latter’s earlier version of the chapter on “Interferential current” (IFC), taking theoretical, laboratory and clinical evidence into account. As its authors conclude, “it is still not clear whether IFC is, indeed, efficacious or which aspects of clinical conditions are affected. There is also the key question of whether IFC is any more effective than other, more accessible, forms of electrical stimulation such as TENS” (p311).

As in so many forms of physiotherapy, the attempt to squeeze positive results from research is laborious and still all too often quite unproductive.

The next chapter, “Functional electrical stimulation” (by David Ewins and Sally Durham), covering the application of electrical impulses to the body to restore lost or impaired functions, is less relevant to those practising acupuncture than Watson’s final chapter in this section (“Electrical stimulation for enhanced wound healing”), and more an account of methods used than of the evidence for their usefulness. Watson’s chapter, on the other hand, like his other contributions to this volume, is very much evidence-based. Yet, as he comments, despite the drive towards evidence-based practice, and “although there have been many publications in this research area, especially in more recent years, there appears to be a reluctance to use the therapy in the clinical environment” (p529).

The single chapter in Section 4 (“Musculoskeletal ultrasound imaging”), by John Leddy, is disappointingly not particularly
Schizophrenia, sleep, and acupuncture

Schizophrenia is a complicated mental illness, which I feel is best left to the psychiatrists. Patients hate the side effects of medication. I don’t treat patients with schizophrenia with acupuncture: would this book change my mind?

A large collection of international experts have been drawn together to give their views on the diagnosis and medical treatment of the condition with a dedicated chapter on neuroimaging, which concludes only that schizophrenia is associated with frontal and temporal brain dysfunction. One quarter of the book is taken up with scientific discussion of the disease, which is covered well, but you have to ask yourself whether you would prefer to read this in a conventional medical textbook rather than a book on acupuncture.

The next two chapters look at sleep disturbance because "insomnia is associated with almost all psychiatric disorders" and a poor quality of life. An increase in total sleep with anti-psychotic medication, with an increase in REM (rapid eye movement) sleep latency, was associated with improvement of the schizophrenic state. Reduction in activity of the prefrontal cortex could "explain the hallucinatory, fantasy-rich nature of both dreams and the positive symptoms of schizophrenia". There is evidence to suggest that melatonin affects dopamine systems and improves the quality of REM sleep and schizophrenia, and that acupuncture treatment can increase melatonin levels.

Next is the introduction to Traditional Chinese Medicine (TCM), its history, philosophy, the inevitable "medical acupuncture is rubbish" and that Western medical practitioners do not understand the concepts of TCM and holism. Then the usual comments about how acupuncture cannot lend itself to strict research protocols and "it is an impossible task to condense several thousands of years of accumulated knowledge and wisdom on the topic into a single chapter". In an attempt to resolve TCM's antipathy to Western medicine, neuroimaging is brought out again in a chapter authored by the editors of the book which lists all 83 imaging studies between 1998 and 2007. The research does not tell us much apart from the limbic system may be fired up by acupuncture. This chapter was delightfully TCM free.

We know that the neurotransmitter dopamine is involved in the pathophysiology of schizophrenia and that the positive symptoms may be attributable to an excess of dopaminergic transmission within the central nervous system. Is it possible to control the level of dopamine by acupuncture? Eleven acupuncture on schizophrenia studies were analysed and five showed a positive response to one or more aspects of the illness. Extra Point 1 (Yintang) and GV20 were mostly used, and HT7, GV20, PC6, SP6, BL62 were used in 18 trials for insomnia with good results (but small sample numbers). No study on sleep disorders caused by schizophrenia was identified. Experiments on animals did not find acupuncture research on the levels of dopamine related to schizophrenia. Having found very little research to support TCM principles and in particular the Yin and Yang Heel Vessels, a salient chapter considers: Can acupuncture be used in the treatment of insomnia and schizophrenia? Well, sort of.

Next comes a very heavy chapter on TCM and the treatment of psychological disorders but I’m afraid that the effect of invisible phlegm, congealed blood, the concept of syndrome differentiation, and the relationship between body and mind, simply alienate...
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