Over the past 20 years, clinicians have been challenged regularly to accept new forms of electrical stimulation. Earlier, a misleading but highly successful campaign resulted in the universal acceptance of Interferential Current (IFC), despite clear absence of evidence of superiority over existing transcutaneous stimulators.

Market attention then shifted to focus on a new type of transcutaneous stimulator, the so-called “microcurrent” group. Brand names such as MENS, Electro-Acuscope, Myo-Matic, Alfa-stim, Biopulse, and other meaningless names as well as the generic term “microcurrent stimulation” have become the latest option in clinical electrotherapy.

The term microcurrent is equally meaningless. It neither discloses what these stimulators call or cannot do either electro-physiologically or clinically, nor does it make these stimulators any different from other transcutaneous electrical stimulators.

From a generic and objective perspective, these stimulators are pulsatile current (PC) devices that have for the most part a monophasic waveform and other parameters which are summarized in Table 1. The very low peak current and even lower average root mean square (RMSa) current (25-600 μAmp) and very long pulse duration (0.5-5000 msec) seem physiologically the more relevant parameters to consider (Figure 1).

These stimulators are presumably designed not to excite peripheral nerves. Being below the threshold of nerve excitation makes the delivered current non-perceptible to the patient. The major purposes of such sub-excitatatory stimulation according to at least a few promoters is to “heal” the body by introducing the appropriate electrical energy at the cellular level (Biedebach, 1989). How the stimulator or the clinician know the appropriate level of stimulation remains unclear.

Clinical applications of “microcurrent” treatment are divided in the literature to peripheral body sites, or to transcranial stimulation (TCES). Clinicians who manage signs and symptoms of an orthopedic or sports medicine nature (mostly myofascial pain and local inflammations) use predominantly the peripheral stimulation.

The treatment usually involves using two probe electrodes applied to specific tender points in the affected area, followed by stationary self-adhesive pad electrodes placed over the same area. A typical treatment consists of 10 minutes of probing followed by 20
Solomon and colleagues (1985; 1989) found no difference in headache intensity between placebo and subliminal stimulation.

Several independent, double-blind studies in which microcurrent stimulation was compared with placebo stimulation in the management of delayed onset muscle soreness (DOMS) have all resulted in statistically equal measures of muscle strength, pain-free ROM, and postexercise soreness.

Rolle et al. (1994) stimulated minutes of pad stimulation (Noto & Grant, 1986; Picker, 1990).

Psychologists and behaviorists seem to prefer the application in which the two electrodes are placed transcranially. The major clinical indications for TCES are headache, insomnia, anxiety, and craving for alcohol and/or drugs (Patterson et al., 1984; Shealy et al., 1989).

Very limited clinical data are available in support of successful clinical outcomes. Furthermore, much of these data are subjective and far from conclusive. Among privately published reports, one can find data on improving the amount of weight lifted after each of six 30-min treatments (Noto & Grant, 1986; Picker, 1990; Scott & Picker, 1983), promoting muscle strength and endurance, and saving treatment costs compared to other modalities (Noto & Grant, 1986).

Additional areas where claims for success have been advanced include management of various orthopaedic sprains and strains (Picker, 1990; Scott & Picker, 1983), wound healing (Barron et al., 1985), and pain relief (Lerner & Kirsch, 1981).

Transcranial applications have been associated with attempts to minimize tension and migraine headaches (Cassuto et al., 1993; Solomon & Guglielmo, 1985; Solomon et al., 1989), minimizing withdrawal of signs and symptoms associated with alcohol and drug detoxification, enhanced general relaxation, and improved short-term memory (Cassuto et al., 1993; Childs & Crimson, 1988; Patterson et al., 1984; Shealy et al., 1989).

Very few objective studies have been completed to date in which the nonperceived (subliminal) microcurrent stimulators were compared with placebo.

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Rolle et al. (1994) stimulated with a MENS unit for 30 minutes 3 times a week for 2 weeks. They reported similar effectiveness compared to placebo in managing rest and activity pain, grip strength, and pain-free wrist ROM associated with chronic elbow epicondyritis. Sinnreich and associates (1992) treated coracoacromial arch pain for 30 minutes and reported, at the end of a single session, that pain relief was significantly better in the placebo group.

The only peer-reviewed, published, prospective, double-blind clinical study that showed better

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Table 1  General Description of “Microcurrent” Stimulators

| Waveform  | 1. Reversing D.C.  
|           | (when frequency ranges 0.1–0.5 Hz)  
|           | 2. Monophasic pulses  
|           | (when frequency ranges 1–999 Hz)  
| Mode      | Continuous pulses  
| Pulse Duration | 0.5–5000 millisecond  
| Pulse Frequency | 0.1–999 Hz (adjustable)  
| Polarity  | Yes (option of reversing polarity every 2–3 sec)  
| Peak Current | 25–999 Microamp (RMSA usually 1/2 of peak)  
| Channels  | Most units offer two  

Note: Pulse duration = 1/2 × pulse frequency (e.g., 0.5 × 500 = 1 millisecond).

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Figure 1 Typical pulse properties of a microcurrent stimulator. Peak = peak current; RMSA = root mean square averaged over 1 sec; A = pulse duration; B = interpulse interval. (Note: A = B).