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The Electro-Acuscope/Myopulse System:

Impedance-monitoring microamperage electrotherapy for tissue repair

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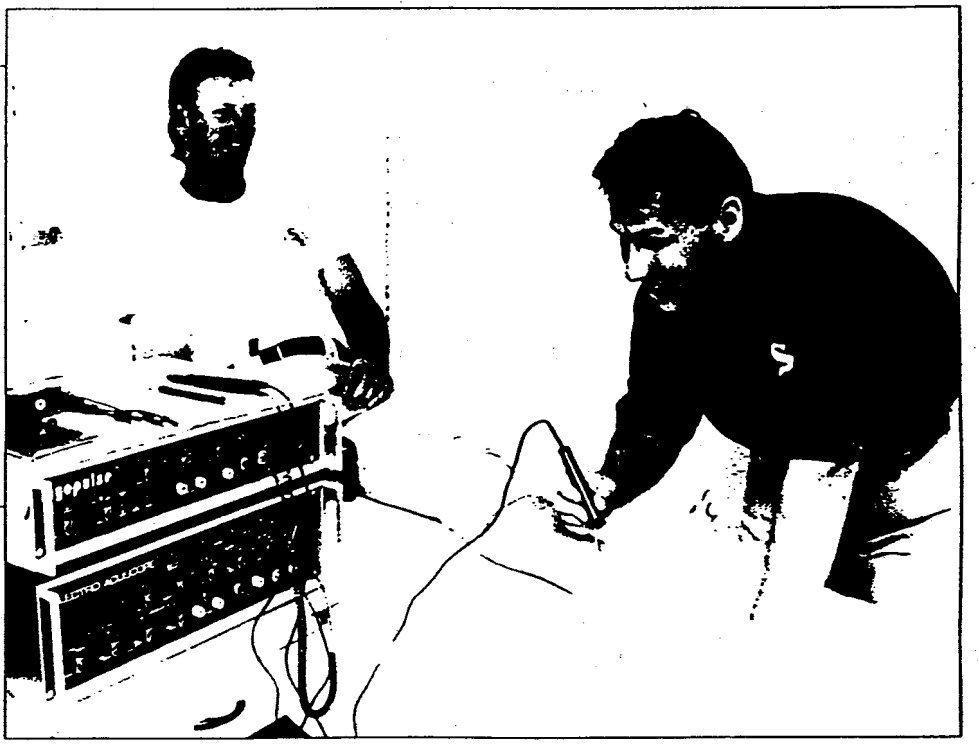
Golfer Jack Nicklaus, runners Joan Benoit and Mary Decker, and football players Freddie Solomon and Terry Bradshaw are among the many athletes who created public awareness of the dramatic improvements produced using Electro-Acuscope/Myopulse treatment. Media coverage of their injuries and recoveries, however, illuminated neither the modality's mechanisms of action nor its vast range of clinical applications, in part because the system was referred to as the "miracle machine" and the "magic box." Worse, these terms led many to believe that this equipment, established for more than a decade, was experimental and mysterious. Confusion with more primitive forms of electrotherapy also was common.

Unfortunately, the misconception that all electrical stimulation therapies are alike persists. Those involved in the use and further development of these modalities, however, point out that various types of electrotherapy have in common only their noninvasive nature and their use of electrical current. For example, TENS is intended to remove or reduce the patient's perception of pain, while galvanic stimulation produces muscle contraction and hence a strengthening effect. While these modalities certainly have their place, they differ radically from the Electro-Acuscope/Myopulse system both in mechanism and effect. Using microamperage rather than milliamperage current, with the waveform continuously adjusted according to measured tissue impedance, the Electro-Acuscope/Myopulse accelerates tissue repair. Pain relief, though commonly experienced by patients, is a secondary effect of the stimulus; muscle contraction is not produced.



Herm Schneider, ATC, head athletic trainer for the Chicago White Sox, administers treatment on relief pitcher Bobby Thigpen.

Because of its profound effects on tissue repair, the Electro-Acuscope/Myopulse system can be applied to a broad range of clinical conditions successfully. Early in the application of this technology, this wide utility was sometimes misconstrued to the system's detriment. Those who had not pursued the literature on the cellular effects of Electro-Acuscope/Myopulse technology mistakenly assumed that the diverse conditions for which the system was heralded as treatment indicated that its effect was largely psychosomatic. Fortunately, the reverse is true: As accelerated tissue repair is beneficial in a vast array of clinical presentations, the system benefits patients due to its physical, rather than psychological, effects.

Though awareness of the mechanisms involved in tissue repair gains a constantly growing audience, further informational efforts will be needed in order to eradicate persistent myths. As a family practitioner with a subspecialty in physical medicine, Steve Center, MD, of San Diego has noted that, "Even some of the physicians who refer patients to me for Electro-Acuscope/Myopulse treatment still confuse this technology with TENS, despite my efforts to educate them. This modality does not block the nerve signal; this treatment is corrective." Furthermore, the current is generally below the patient's sensation threshold, so that the tingling or burning sensations typically noted during less sophisticated forms of electrotherapy are not produced.

Though much public awareness of the Electro-Acuscope/Myopulse system has been created, based on the testimonials of athletes and other public figures, evidence to support this modality's usefulness is far from anecdotal. Neither is this system experimental. Many well documented comparative studies, performed using both animal and human subjects, point to the method's efficacy, and to the clarification of its mechanisms of action. Though the full range of beneficial effects produced is quite complex, several important actions have been documented. For instance, microcurrent stimulation of the proper frequency, intensity, and duration induces extracellular calcium ions to enter the cell through pores in its membrane, commonly called voltage-sensitive calcium ion channels. Higher levels of calcium, in turn, encourage increased synthesis of adenosine triphosphate and turn on mechanisms that control DNA and protein synthesis, thus increasing the rate of cellular repair and replication. "This technology has very profound effects in correcting derange-

ments of cellular physiology, and that is why I find it so effective," Center says.

In addition to its tissue repair effects, the Electro-Acuscope/Myopulse system differs from other forms of electrotherapy in two particulars affecting primarily the practitioner rather than the patient: Training is required for proper use of the instrument, and treatment is generally active. "This is in no way similar to galvanic stimulation, where you can put on probes and walk away," explains Joan Shrum-Brown, PT, owner/director of Marguerite Physical Therapy Clinic of Mission Viejo, Calif. "This takes skill and knowledge to apply correctly." Surgeon George Godfrey, MD, founding member of the American Trauma Society of the American College of Surgeons and medical director of Atlantic Industrial Medical Physicians' three-location group practice in Atlantic City, reports an additional favorable effect. "Patients who have had problems for any length of time become extremely appreciative of the fact that a person is treating them actively," he says.

While training is definitely required, it is also easily obtained. User groups receive extensive training on-site, and in-depth courses and seminars are also offered by Electro-Medical, Inc in Fountain Valley, Calif. Courses typically begin with a thorough grounding in the system's physiological effects on both cellular and organ system levels, followed by clinical applications coverage and the provision of treatment protocols for conditions most commonly treated. Shrum-Brown advises, "The physiology portion of the course is phenomenally helpful for understanding Electro-Acuscope/Myopulse technology and what it does. Even those who are not yet using the technology should gain an understanding of its actions and history, for which reason I would recommend this course very highly." For new system users who prefer less physiological background, hands-on training over the course of several days can be provided. Herm Schneider, ATC, head trainer for the Chicago White Sox, recalls, "The distributor spent eight days with us, providing very practical training and treatment protocols." He appreciated the fact that training was tailored to suit his needs, which rarely encompass the theory and mechanics involved in treatment. "Frankly," he jokes, "I don't care if there is a little mouse spinning inside to power this system. It works."

Bobby Thigpen is one of many White Sox players who have benefitted from Electro-Acuscope/Myopulse therapy.

In the case of the Electro-Acuscope/Myopulse System, impedance monitoring and waveform adjustments are the means through which stimulation is constantly modified to induce optimum tissue repair.

To date, the Electro-Acuscope/Myopulse system is the only device that adjusts its waveform continuously in response to the tissue impedance that it monitors. If the low-frequency impedance value of the area being treated differs from a designated value, the waveform will be adjusted accordingly. In addition to delivering the best possible waveform for a given tissue, Shrum-Brown notes, this feature provides the person administering treatment with valuable information. "Impedance monitoring helps you locate the area that you need to treat," she says. "You get constant readouts on tissue impedance that let you know which areas are not conducting."

Though Shrum-Brown has evaluated several types of electrotherapeutic equipment in her practice, including other microcurrent devices, impedance monitoring has induced her to keep four Electro-Acuscopes and three Myopulse units in constant use. "Naturally, we checked out the cheaper systems," she says, "but I find this system most refined and productive of better results."

Because the number of conditions that can benefit from accelerated tissue repair and secondary pain relief is immense, the use made of the Electro-Acuscope/Myopulse system depends heavily upon the user's experience. Shrum-Brown, as one of the system's earliest users, feels that any condition involving nerve or muscle tissue can be improved. She has noted only four reasons that response may be delayed or absent: "Treatment was not given properly, the patient's condition requires surgery, bone is impinging on a nerve, or the patient is defending secondary gain." Shrum Brown also stresses the system's importance as an adjunct to therapeutic exercise, body mechanics, and especially mobilization. "After Electro-Acuscope/Myopulse treatment, the patient is relaxed and pain-free. In mobilization, that is when you can really create change." She uses the system most frequently for patients with muscle spasms, temporomandibular joint disorders, bursitis, arthritis, surgical incisions, sprains and strains, herpes zoster infections, dysmenorrhea, and hematomas.

According to Mark Kana, PT, supervisor of physical therapy for Southwest General Hospital and its Sports West Clinic in Middleburg Heights, Ohio, "the best response depends not on the specific diagnosis, but on the skill of the user. The modality's applications are limited only when the user is not employing the full spectrum of treatment." Over the past three years, Kana has used the Electro-Acuscope/Myopulse system to treat a variety of conditions involving the neck, back, hip, knee, ankle, and shoulder.

Schneider uses the systems primarily for acute injuries. "We have been known to treat a sprained ankle within three minutes," he says. "We have just about excluded ice and the routine treatments for sprains and bruises, and we treat injured players immediately as they come out of the game."

"I use the Acuscope predominately for acute and chronic pain," Center says, "mainly of musculoskeletal origin: automobile accidents, lumbosacral sprains, shoulder strains and rotator cuff tears, and sports injuries." Center also uses the Electro-Acuscope/

Myopulse system to treat herpes zoster neuralgia, local skin infections, decubitus ulcers, post-CVA spasticity, chronic fatigue syndrome, migraine and vertebrogenic headaches, and carpal tunnel syndrome.

Godfrey says, "The most impressive results are found in the severe muscle contraction headaches associated with injuries to the muscles of the upper chest, upper thorax, and neck. At times, the headache is gone within 30 seconds." He also employs Electro-Acuscope/Myopulse treatment for chronic problems produced by strains and sprains, carpal tunnel syndrome, acute joint injuries, acute neck injuries, whiplash, trauma, skin ulcerations, arthritis, and the palliative care of ruptured disc patients who are either unable or unwilling to undergo surgery.

Though most users consider the Electro-Acuscope and the Myopulse as a single, integrated system, the two devices differ in their applications. The Electro-Acuscope is effective in treating acute and chronic conditions, inflammation, edema, and pain. The Myopulse is particularly effective in treating muscle and connective tissue. The two devices are often used sequentially for several conditions. In sciatica, for example, Shrum-Brown first conducts Myopulse treatment to reduce muscle spasm and then turns to the Electro-Acuscope to decrease nerve irritation.

Occupational medicine's uses for the system have been particularly gratifying. "We have relieved pain, restored motion, and gotten patients back on the job a lot more quickly," Godfrey says. Employers whose staff members have been treated note similar results. As Martin R. Daniel, ATC, manager of rehabilitation and safety for Walbro Corp of Cass, Mich, reports, "The Myopulse and Electro-Acuscope have paid for themselves many times over...Our workers' compensation costs have been decreased by over 50% since adding these two modalities to our in-house rehabilitation program." Given the system's effectiveness in treating carpal tunnel syndrome, its utilization in such settings is expected to grow in proportion to the increase in reported cases of CTS.

Practitioners have noted that patients often display a strong preference for Electro-Acuscope/Myopulse therapy over other forms of treatment. Kana reports that none of his patients have expressed any trepidation or resistance to his recommendation of Electro-Acuscope/Myopulse treatment. "I generally begin by describing the optimum environment for cellular repair and how this system produces that environment, giving patients as much information as possible. I also give them reprints of articles concerning this modality so that they can learn more about the treatment between visits." Patients not only educate themselves, but often become enthusiastic proponents of the system and begin "referring" friends and relatives for treatment. Often, Kana says, "They get up off the treatment table shocked at the immediate improvement. Many are able to walk comfortably or tie their shoes, for example, for the first time in months or years."

Patient satisfaction is produced by several factors. First, the treatments are not only painless but generally imperceptible. Second, the patient is not left alone in a room as with so many other modalities. Third, the secondary effect of pain control often lasts for an extended period after treatment. Finally, effectiveness is obvious and immediate. "We have gotten used to seeing contusions dissipate before our eyes during treatment," Schneider says. "As soon as they are injured, players now call for and expect Electro-Acuscope/Myopulse treatment."

In at least one instance, patient enthusiasm motivated a practice to institute Electro-Acuscope/Myopulse therapy. When Godfrey's group practice hosted a three-day demonstration of the system, patients who had undergone only one treatment contacted Godfrey repeatedly with requests that the modality be made available to them. "The reason that we purchased the equipment was that our patients were feeling so much better that they were seeking me out to tell me," he says. "That is very unusual; I have never seen patients go to such lengths before."

Marathon swimmer Paul Asmuth finished second in a 21-mile swim after undergoing treatment for myositis and capsulitis of the shoulder with the Electro-Acuscope/Myopulse system.

The reasons users state for their adoption of the Electro-Acuscope/Myopulse system naturally vary, but they share a common element: The system is able to fulfill needs left unmet by any other form of treatment. Shrum-Brown began using the Electro-Acuscope/Myopulse system 11 years ago because no other therapeutic regimen was suitable for her nursing home patients. "Geriatric patients could not tolerate electrogalvanic stimulation because of pressure from muscle contraction," she says. "I got much better acceptance with the Electro-Acuscope/Myopulse system because it does not produce discernible sensations in these sensitive patients."

The previously unsatisfied demands met by the Electro-Acuscope/Myopulse system can be societal as well as clinical, as Center reports. "It really concerns me that there are so many people on habit-forming medications in this country, with no attempts made to correct their underlying problems. Now that I am providing

Electro-Acuscope/Myopulse treatments, I rarely prescribe narcotics and muscle relaxants. I have very few patients on habit-forming medication, which to me is a great benefit." Center adds that the Electro-Acuscope/Myopulse system can save patients and their third-party payors large sums by making extensive diagnostic testing unnecessary in many instances. "When I get a patient with a rotator cuff strain, for example, I could do $1,500 worth of tests before I begin treatment, as many physicians would. By instituting Electro-Acuscope/Myopulse treatment immediately, I both conserve health care resources and avoid exposing the patient to diagnostic testing radiation. It would help both patients and payors if medicine could employ this type of early intervention more often," he continues. "Though I still treat many patients conventionally as well, in some cases I am able to begin Electro-Acuscope/Myopulse treatment before doing a workup."

In many instances, the results noted by patients following Electro-Acuscope/Myopulse treatment are striking—one reason that the system's use in the treatment of world-class athletes has garnered so much attention. Because their ability to compete often depends upon perfect physical function, athletes have traditionally been among the most aggressive in demanding Electro-Acuscope/Myopulse treatment for their injuries. Even in locales without professional teams, athletes seek practitioners who provide Electro-Acuscope/Myopulse treatment. As Godfrey reports, one such athlete provided him with dramatic evidence of Electro-Acuscope/Myopulse treatment's effect. Marathon swimmer Paul Asmuth sought Godfrey's aid for myositis and capsulitis of the shoulder only days before a 21-mile marathon swim that included a punishing final stretch against the tide. "After five Electro-Acuscope/Myopulse treatments, Asmuth was able to outdistance a swimmer ten years his junior, finishing second and proving how rapidly his shoulder condition had improved," Godfrey says.

Twin sister triathletes Barbara Alvarez, PhD, and Angelika Casteneda, 48, were both able to resume active competitiion after undergoing Electro-Acuscope/Myopulse therapy. Casteneda was treated for tibialis anterior tendinitis one week prior to participation in a 100-mile race. Alvarez's condition, after receiving 3-5 treatments for a hamstring strain, improved rapidly, enabling her to return to competition.

Center also has treated marathon athletes, in his case twin runners, with impressive results. He sees equally dramatic improvements in non-athletes, however. "In 1986, a patient who had experienced severe headaches three times a week for 20 years consulted me. I performed two Electro-Acuscope treatments. Ever since those initial treatments, this patient's frequency and severity of headache have dropped to a mild occurrence every six to eight weeks; she has a maintenance Electro-Acuscope treatment every two months."

Since the Electro-Acuscope/Myopulse system's effectiveness has been both impressive and well-documented over the course of 12 years among thousands of patients, why is this treatment not available to every patient? Several answers to this question suggest themselves:

- Health care providers sometimes exhibit a tendency to ignore therapies outside the realm of their current research or interests.
- As a whole, the medical profession is slow to accept change.
- A considerable body of research on electrotherapeutic action focuses on cellular effects and is thus published in physiology journals; given the volume of medical information published, these journals are not widely read among those involved in active patient treatment.
- Because the Electro-Acuscope/Myopulse system's actions are neither chemical or thermal, they constitute a radically different approach to physical medicine. In addition, the modality does not fit the traditional pattern of surgical and pharmacological intervention that characterizes Occidental medicine.

- Because the devices are noninvasive and can be operated by nearly all health care practitioners, their endorsement by physicians might threaten medical control of the therapeutic process.
- Beyond basic TENS and muscle stimulation, electrotherapy is very rarely included in medical school curricula.
- When compared with the ease of writing a prescription for medication, Electro-Acuscope/Myopulse treatment may seem time-consuming, even though the benefits are obviously greater.

Though such biases and educational deficits remain to be remedied, those who now offer Electro-Acuscope/Myopulse treatments will continue to see gratifying results, both for their patients and for their practices. Center had expected Electro-Acuscope/Myopulse treatment to be a useful but limited adjunct to his practice, but finds that "Now, it has taken over half my practice." While this places him in an enviable position, he hopes that more physicians and other health care practitioners will soon join him in providing their patients with superior results. "I think that every doctor should have an Electro-Acuscope/Myopulse system in the office," he concludes, "right next to the microscope and the centrifuge. This treatment should, for the benefit of patients everywhere, become that common."