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A new nonsurgical method to treat musculoskeletal injuries without breaking skin or the bank

Written by Michael Slayton, Ph.D., CEO of Guided Therapy Systems | March 16, 2016

Chronic musculoskeletal pain results from various causes and leads to decreased quality of life, work-related disability claims and lost recreation time. Unfortunately, many of the current treatments for these types of injuries attend to the symptoms of the problem rather than healing the source directly.

Typical noninvasive treatments include rest, ice, stretching and strength training; these remedies only go so far as patients often don't effectively manage these practices in the long run, and find themselves battling the same symptoms year after year.

There is also the option of invasive surgery, but that route and the previous therapies mentioned have shown limited benefits. When opting for minimally invasive injections and other energy-based treatments, patients must endure painful procedures, long recovery times and the risks of complications associated with breaking the skin and intervening tissue. Moreover, many of these treatments, especially surgery, are extremely expensive.

As a result, physicians are left with only two treatment options – to rely on rest, stretching and physical therapy, which is time exhaustive and racks up costs over time; or cut into the body – even if minimally. Currently, there is not an effective non-invasive alternative on the market that allows doctors to directly treat soft tissue injuries without breaking the skin and affecting intervening tissue in the process.

However, there may be a solution in intense therapy ultrasound technology, which noninvasively creates small zones of thermal injury that restart and enhance the production of endogenous growth factors in connective tissue through three phases of activity. First, the area becomes inflamed by thermal conformal coagulative zones in the vicinity of the damaged tissue to be repaired, which starts the natural soft tissue repair cascade and peaks inflammation. This is followed by a proliferative phase in which fibroblasts migrate into the targeted area initiating the subsequent deposition of new collagen. Finally, new collagen converts into fibers, along with the formation of collagen fiber cross linkage in the final stage of the repair process, which is labeled the maturation and remodeling phase. This process culminates into formation of new musculoskeletal tissue seamlessly reforming the previously damaged organ.

ITU technology is different from other energy sources because unlike lasers, microwaves or radio frequency because ultrasound is the only energy source that can penetrate safely through tissue and conform to a specific shape within the body. Focusing these sound waves allows concentrated energy deposition to occur deep in the tissue, allowing precisely localized heating while sparing intervening tissue where indicated. It's currently being tested on injuries to soft tissue including ligaments, tendons and muscle, and initial indications include plantar fasciitis, lateral epicondylitis, achilles tendon injury and patella tendon injury.

Guided Therapy Systems has sponsored two clinical trials thus far at the University of Arizona in Tucson and The Core Institute in Phoenix with its ITU device called Actisound. Patients in both trials suffered from chronic injuries that failed all other treatment procedures. The first trial focused on chronic plantar fasciitis, a common cause of plantar heel pain that is the result of a degenerative process of the plantar fascia and its surrounding perifascial structures. It's the most common cause of heel pain and affects 10% of the U.S. population. The double-blinded, sham-controlled study for the treatment of plantar fasciitis showed statistically significant positive results within 12 weeks post-treatment in 81% of treated subjects.

The second trial at The Core Institute was conducted to explore the success of ITU technology on lateral epicondylitis or more commonly known as tennis elbow. This affects up to 3% of the population (both athletes and non-athletes), while chronic problems caused by overuse in tennis players can occur in 40% of cases. When ITU technology was applied to the first 17 subjects in this trial, 83% of patients suffering from lateral epicondylitis reported improvements in elbow pain, and showed significant improvement in daily function. Significant reductions of pain scores per activities were also recorded.

There are worlds of possibilities for this revolutionary technology with the potential to innovate in the musculoskeletal space, and athletic sector in particular. ITU technology is cost-effective and offers a faster procedure time, relatively pain-free treatments, reduced pain and inflammation within 48-72 hours and the repair of soft tissue injuries within 12 weeks. With its ability to initiate and enhance the body's healing response, the potential applications for the technology are potentially life changing for future patients.

Michael H. Slayton, Ph.D. is a physicist, engineer, clinical researcher and entrepreneur whose work has brought intense therapeutic ultrasound (ITU) to the forefront of the aesthetic medical device industry, resulting in more and safer treatment options for patients. Under Dr. Slayton's leadership as Chief Executive Officer and Chief Technical Officer, Guided Therapy Systems (GTS) has become a world leader in intense therapeutic ultrasound and imaging with technologies sold across the globe by many of the most recognizable and respected names in medical devices.

Before founding Guided Therapy Systems, Dr. Slayton served as Vice President of Advanced Development and Board Member for Dornier MedTech GmbH (a Daimler Benz Company). He has more than 30 years of senior management and technical responsibility in engineering, development, and manufacturing functions and has helped develop over 70 commercially successful products ranging from electron beam and laser instruments to a variety of ultrasonic systems. His degrees include a M.S. in Quantum Radiophysics and a Ph.D. in Electrical Engineering from Kiev State University and USSR Academy of Sciences, respectively. Dr. Slayton is currently an adjunct professor at the University of Arizona's College of Engineering.