



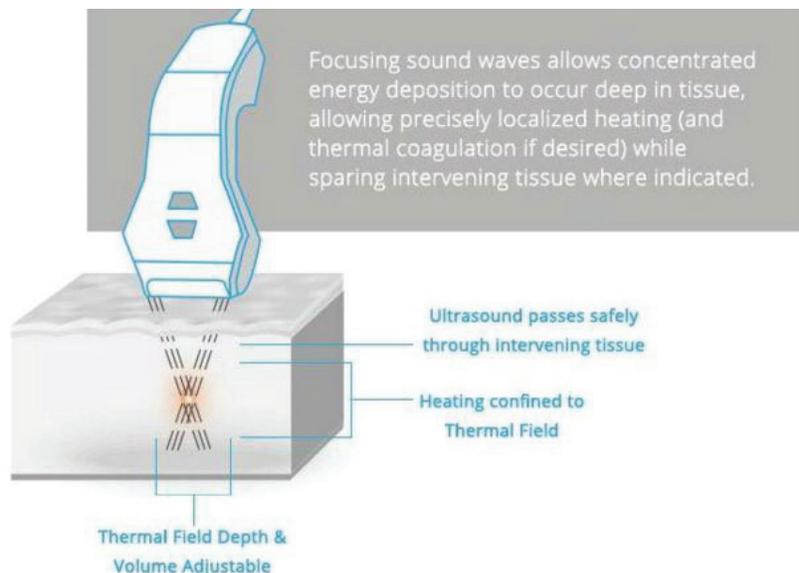
Replacing Scalpels with Sound Waves: Ultrasound's Role in Treating Musculoskeletal Injuries

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Current treatment options for musculoskeletal injuries are painful, expensive, ineffective or overly invasive to the patient. After common conservative therapies such as rest, hot and cold therapy and NSAIDS, patients seek treatment from means such as physiotherapy and physical therapy to low-intensity ultrasound (diathermy) and shockwave therapy.

Taking things a step further, minimally invasive therapies include steroid, PRP and other injections, as well as Radio Frequency treatments. As a last resort, patients and their doctors can opt to repair the injury with invasive surgery. Unfortunately, all of these therapies have proven to be marginally efficacious at best. In the case of minimally invasive injections and other energy-based treatments, patients are subjected to painful treatments, must endure long recovery times and are at risk from complications associated with breaking the skin and intervening tissue. Additionally, some of these treatments, and certainly surgery, are very cost intensive options.

As a result, physicians are left with only two treatment options to provide – to rely on rest, stretching and physical therapy, which is time exhaustive and can be very expensive; 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.



(Courtesy of Guided Therapy Systems)

Identifying that a new solution was needed to address these inefficiencies, Guided Therapy Systems (GTS) has utilized 21 years of R&D expertise and patented technology in ultrasound to develop a low cost, easy-to-use, relatively painless treatment device called Actisound.

The key functions of Actisound are achieved through Intense Therapeutic Ultrasound (ITU) technology, which acts like an invisible scalpel that works up to 20mm below the surface of the skin.

ITU non-invasively creates small zones of thermal injury that restart and enhance the production of endogenous growth factors in connective tissue. This is achieved through three phases of activity. First, the injured area is inflamed by thermal conformal coagulative zones in the vicinity of the damaged tissue. This starts the natural soft tissue repair cascade and peaks inflammation at the injury site. Next is 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 the formation of new musculoskeletal tissue seamlessly reforming the previously damaged organ.

The Actisound engineering team designed this product to be robust, safe, and easy to use. The control system and attached applicators for variety of clinical indications are mobile, have a simple user interface, and require little training for use. Actisound uses high-powered internally focused piezoelectric crystals, which create ultrasound beams passing through acoustic liquids and acoustically matched membrane coupled to the skin. The beam focused below the skin spares intervening tissue and precisely targets the clinically relevant organs to be repaired.

Current clinical studies showed a high-rate of efficacy, easy adoption by practitioners, and fast treatment times with no adverse effects. Compared to other energy sources currently utilized in medical applications, such as laser, microwave and radio frequency, ultrasound is the only non-ionizing energy source that can penetrate non-invasively and safely through intervening tissue and be conformed to a specific shape within the body.

Actisound can treat injuries to the soft tissue such as ligaments, tendons, and muscle. Initial indications include: Plantar Fasciitis, Lateral Epicondylitis, Achilles Tendon Injury, and Patella Tendon injury. Actisound represents a platform technology that is able to enhance the body's healing response; the potential applications in the future are vast.

GTS research and development efforts in diagnostic and therapeutic ultrasonics span over two decades and across medical and aesthetic applications. A number of successful projects with major companies, universities, and U.S. government agencies have resulted in a variety of medical solutions. The unique combination of imaging and therapy ultrasound has enabled clinical applications from the ablation of liver tumors to non-invasive face-lifts in cosmetics. The prevalent nature of musculoskeletal injuries throughout all age groups prompted two years of technical and clinical investigations – thus, the Actisound device was born.