

The American Physical Therapy Association Position on the Applicability of NeuroMuscular Electrical Stimulation Technology

Summary of Highlights

According to the [American Physical Therapy Association](#), the goal of physical therapy or physiotherapy is to “**improve mobility, restore function, reduce pain, and prevent further injury by using a variety of methods, including exercises, stretches, traction, electrical stimulation, and massage**”.⁽¹⁾

Many studies which show the systemic and localized benefits of full resistance exercise serve to support the [Creighton University study published in the esteemed Peer Review Journal “Clinical Physiology”^{\(6\)} that documented the full resistance exercise benefits of high voltage low amperage AC output muscle stimulation technology](#) (referred to herein as “Tesla Based Technology™” or “TBT™”) utilizing the patented electrical transmission developed by the world’s all-time most prolific inventor Nikoli Tesla to defeat Thomas Edison in the Great Transmission War at the turn of the century when the nation was being wired for electricity. Tesla won that famous technology duel with Edison because only Tesla’s super low amperage AC output technology could overcome the resistance of distance high voltage transmission challenge which generated so much heat when Edison’s DC output approach was used. **The human body has the very same resistance issues causing DC output muscle stimulators to generate much more discomfort and heat (which can injure patients), thus limiting treatment times and intensities, thereby limiting results. Only TBT™ can output the high voltages needed to create super deep contractions which patients can tolerate for extended time periods recreating the full exercise experience and results.**

The [Agency for HealthCare Policy and Research](#) has also endorsed the use of Electrical Stimulation for the treatment of pressure ulcers in the [Public Health Service Pressure Ulcer Treatment Guide number 15 for clinicians published by the US Dept. of Health and Human Services](#). In fact, Electrical Stimulation was described in that report as “**the only adjunctive therapy with sufficient supporting evidence to warrant recommendation by the panel**”.

In a study conducted at a major university and published in a major journal, **TBT™ generated ElectroMuscular Stimulation (EMS) treatments were shown to provide the exact same benefits as full resistance exercise, even for patients who could not otherwise tolerate such activity.** In comparison, standard heat and massage treatments may give short-term relief for woman suffering with fibromyalgia though they have not been shown to have any long lasting benefits such as those provided by the high voltage low amperage treatments.

Knowledgeable PTs providing women’s healthcare should be aware of the benefits provided by TBT™ as compared to less capable E-Stim technology to understand why this proprietary equipment can more effectively treat this population, significantly decreasing their disability and greatly improving their quality of life.

Risk is possible when efficient interventions are not rendered. Risk of ineffective care exists when a physical therapist lacks education in the bio-psycho-social issues that can affect treatments for various women’s health conditions.

“Electrotherapy is used for relaxation of muscle spasms, prevention and retardation of disuse atrophy, increase of local blood circulation, muscle rehabilitation and re-education, maintaining and increasing range of motion, management of chronic and intractable pain, post-traumatic acute pain, post surgical acute pain, immediate post-surgical stimulation of muscles to prevent venous thrombosis, wound healing and drug delivery”.

“Reputable medical and therapy Journals have published peer-reviewed research articles that attest to the medical properties of the various electro therapies”.

The women’s health physical therapist can intervene by providing a comprehensive, holistic treatment of the individual that might include...electrical stimulation. PTs must keep pace and be accountable for their role in the delivery of physical therapy services. This is particularly important as the physical therapist moves to function as a primary care provider in the health care system.

“The least invasive, lowest risk, lowest cost interventions such as in-office and home self-care by patients with EMS should be tried prior to higher risk interventions or long term reliance on pharmacological agents”.

The [Agency for Health Care Policy and Research](#) lists treatment recommendations such as pelvic muscle rehabilitation via Kegal exercises, biofeedback, vaginal weight training, and **pelvic floor electrical stimulation**.

“The well informed and well prepared women’s health physical therapist is properly prepared to evaluate and treat this population via the above mentioned interventions”. Without proper education, awareness of the difference and advantage of TBT™ EMS technology, training in its use and credentialing, therapists are unlikely to obtain the awareness and advanced skills needed to optimally treat many conditions. **Most PTs** are not properly informed as to the limitations of Kegal exercise to affect the deep pelvic floor muscles and **are woefully uninformed** as to the significant advantage of extremely high voltage low amperage TBT™ AC output technology to increase the girth of the deep pelvic floor muscles that have atrophied post-partum.

Where patients cannot tolerate the high amperage of DC output EMS units and therefore do not achieve any lasting benefits from such a limited form of EMS (Most PTs are unfortunately only aware of this type of EMS), TBT™ has been shown to be able to overcome the resistance of distance without the burning or discomfort associated with DC output systems, thus allowing for the rejuvenation, strengthening and increased girth of the proper musculature so the bladder can once again be properly controlled without surgery or drugs. **Incontinence can thereby be completely corrected permanently** with the renewed muscle tissue maintained via Kegal exercise which can only strengthen the deep pelvic floor muscles only after the girth of those muscles has been increased via targeted TBT™ high voltage low amperage AC output treatments.

Only extremely high voltage full resistance internal exercise of the proper pelvic floor muscles delivered at very low amperage via **proprietary TBT™ AC output technology** has been shown to be able to properly saturate the few active muscle fibers in the wasted muscles allowing them to be saturated to the point that the voltage will overflow into the inactive fibers and exercise them to the point of exhaustion where the body will then recruit new fibers and thus **increase the girth of those muscles.** This is **not possible with any other technology available today other than via TBT™ AC output technology.**

The American Physical Therapy Association Position on EMS Why Tesla Based Technology™ (TBT™) Is More Effective

Including a Discussion of the Role EMS Plays in Key Women's Health Issues

According to the American Physical Therapy Association, the goal of physical therapy or physiotherapy is to “improve mobility, restore function, reduce pain, and prevent further injury by using a variety of methods, including exercises, stretches, traction, electrical stimulation, and massage”.

The use of electrotherapy has been widely researched and the advantages have been well accepted in the field of rehabilitation ⁽¹⁾

The American Physical Therapy Association acknowledges the use of Electrotherapy for: ⁽²⁾

1. Pain management. Where TENS units are used to cover up pain signals, deeper contractions via TBT™ can be tolerated more frequently for longer time periods and are used to resolve and eliminate the CAUSE of the pain rather than just disrupt the pain signals to the brain.
2. Treatment of neuromuscular dysfunction via: Improvement of strength; Improvement of motor control; Retard and reverse muscle atrophy; Improve local blood flow.
3. Improved range of joint movement, mobility and motion and to relax muscle spasms by inducing repeated stretching of contracted, shortened soft tissues.
4. Inducing tissue repair via enhanced microcirculation and protein synthesis allowing the body to better heal wounds and restore integrity of connective and dermal tissues.
5. Resolving acute and chronic edema by accelerating the absorption rate and by increasing blood vessel permeability to improve mobility of proteins, blood cells and lymphatic flow.
6. Increasing peripheral blood flow and induce improved arterial, venous and lymphatic flow
7. Iontophoresis; Increased circulation improves delivery of pharmacological/nutraceutical agents allowing for lower drug doses, reduced drug toxicity and improved bio-availability and targeting.
8. Urine and fecal incontinence by strengthening associated musculature ie deep pelvic floor muscles in the case of female incontinence. Treatment often leads to complete continence.
9. Better capillary circulation to all treated tissues often results from the reduction or elimination of edema achieved through deep muscle contractions for extended time periods. The subsequent reduction of edema-associated post capillary pressures increases the velocity of blood flow in the small arterials enabling the natural elongation of blood cells measuring 7 microns at rest to streamline their circumference down to 3 or 4 microns at speed allowing them to fit into the tiny 5 micron capillaries for proper healthy delivery of glucose and oxygen and proper elimination of cell waste products such as acids and carbon dioxide. The resulting strengthened musculature can improve all physiological functions that have atrophied from disuse or poor circulation and elimination of toxins and cell waste.
10. Besides improving function, pain signals associated with degeneration and disuse are often eliminated once the condition causing the pain is removed via the stimulation and renewed use of atrophied musculature. This effect has applications for many physical maladies throughout the body which often benefit from such deep stimulation resulting in a return to normal function. Applications are systemic from the toes to the nose and everywhere in between such as pelvic pain, impotence, incontinence, range of motion issues, choked off nerve function from inflammation to name a few with too many other maladies to mention which all benefit from such strengthened musculature and return to normal function. Such weight bearing exercise has even been shown to play a key role in increasing bone density and flexibility thus reducing fracture risk.

Electrotherapy is used for relaxation of muscle spasms, prevention and retardation of disuse atrophy, increase of local blood circulation, muscle rehabilitation and re-education, maintaining and increasing range of motion, management of chronic and intractable pain, post-traumatic acute pain, post surgical acute pain, immediate post-surgical stimulation of muscles to prevent venous thrombosis, wound healing and drug delivery.

Reputable medical and therapy Journals have published peer-reviewed research articles that attest to the medical properties of the various electro therapies. Yet some of the treatment effectiveness mechanisms are little understood. Therefore effectiveness and best practices for their use in some instances are still anecdotal. Many studies which show the systemic and localized benefits of full resistance exercise serve to support the Creighton University study published in the esteemed Peer Review Journal "Clinical Physiology"⁽⁶⁾ that documented the full resistance exercise benefits of high voltage low amperage AC output TBTTM technology not achievable via any other currently available technology.

Electrotherapy devices have been studied in the treatment of chronic wounds and pressure ulcers. A 1999 meta-analysis of published trials found significant evidence that electrotherapy could speed the healing of such wounds, though it was unclear which devices were most effective and which types of wounds were most likely to benefit.⁽³⁾ The Agency for HealthCare Policy and Research has also endorsed the use of Electrical Stimulation for the treatment of pressure ulcers in the Public Health Service Pressure Ulcer Treatment Guide number 15 for clinicians published by the US Dept. of Health and Human Services. In fact, Electrical Stimulation was described in that report as "the only adjunctive therapy with sufficient supporting evidence to warrant recommendation by the panel". Unlike TBTTM, a recent detailed review by the Cochrane Library found no evidence that electromagnetic therapy, a subset of electrotherapy, was effective in healing pressure ulcers⁽⁴⁾ or venous stasis ulcers.⁽⁵⁾

The Need for a More Ubiquitous Use of EMS for Women's Health Issues

Women's health is changing along with advancing science and research. Risk is possible when efficient interventions are not rendered. Risk of ineffective care exists when a physical therapist lacks education in the bio-psycho-social issues that can affect treatments for various women's health conditions. For instance, a woman with a mastectomy and secondary post-operative lymphedema when referred for shoulder pain would be at risk for complications if the lymphedema were not properly managed via EMS.

According to a 2003 Workforce Analysis, female patients commonly deal with issues of depression (95.3%), altered body image (73.2%), domestic violence (62.4%), anxiety 28 (87.9%), sexual abuse history (75.2%), and/or Cancer other than breast or gynecological (66.4%).

Depression

The National Women's Resource Center, finds that depression afflicts almost 19 million Americans each year, and that up to one in five American women will suffer from clinical depression at some point in their lives. Women are two to three times more likely than men to suffer from depression. Once someone experiences depression, there's a 50% chance of reoccurrence at some point in one's life. Many of the commonly prescribed depression medications have been shown to have soft tissue side effects. This is especially troubling since the original condition that contributed to the initial depression can often be identified as an unresolved soft tissue issue that could have been treated via EMS with such resolution of the initial pain preventing the development of depression in the first place. No pain=no depression=no depression meds=no soft tissue side effects. Cranial Electrical Stimulators have also been shown to be effective at helping to kick start the section of the brain bio-marked to produce neurotransmitters such as dopamine, serotonin and melatonin that may have atrophied from stress. Such cranial stimulation has been shown to be very effective in cases of PMS, ADHD, Anxiety, PTSS, impulse control, addictions and depression. Patients often report immediate benefits after a 40 minute session with CES units.

Bone Health

The NWHRC reports estimates that as many as eight million women in the U.S. have osteoporosis, and that by 2020, 14 million individuals over age 50 will have osteoporosis. Healthy People 2010 states that osteoporosis is a major risk factor for hip fracture, especially in women. They estimate that osteoporosis

contributes to 90% of hip fractures in women, and virtually all persons with a hip fracture are hospitalized for treatment. However, two-thirds of persons who fracture a hip do not return to their pre-fracture level of functioning. Health care expenditures for hip fractures are huge. Healthy People 2010 lists that in 1995, estimates reached \$8.7 billion. It goes on to explain that interventions that reduce the rate of osteoporosis should have a marked impact on the rate of hip fractures. The women's health physical therapist should have knowledge and training in the applicability of EMS in these areas, leading to competency in treating this problematic epidemic. And although osteoporosis increases the risk of fractures, Healthy People 2010 reports that most hip fractures result from falls though some experts surmise that the femoral fracture may have proceeded the fall blamed for the fracture. Some risk factors associated with falls may be amenable to intervention. These risk factors include physical inactivity, muscle weakness, balance deficits, and poor health, all of which are issues the women's health physical therapist should be prepared to address which all may also benefit from the proper application of EMS.

Fibromyalgia

The NWHRC also speaks to the detrimental affect fibromyalgia can have on the female patient. Fibromyalgia affects three million to six million Americans, and as many as 80% of individuals diagnosed are women. The syndrome primarily occurs in women of childbearing age, but children, post-menopausal women, the elderly, and men also can be affected. Fibromyalgia can be physically and financially disabling: A survey patients with fibromyalgia found that 15-25% considered themselves disabled and 26% were receiving at least one form of disability payment. Studies have shown that aerobic exercise, such as swimming and walking, improves muscle fitness and reduces muscle pain and tenderness. In a study conducted at a major university and published in a major journal, TBT™ based EMS treatments have been shown to provide the exact same benefits as full resistance exercise, even for patients who cannot otherwise tolerate such activity. In comparison, standard heat and massage treatments may also give short-term relief for woman suffering with fibromyalgia though they have not been shown to have any long lasting benefits such as those provided by the high voltage low amperage TBT™ treatments.

Knowledgeable women's health physical therapists should have the awareness of the benefits provided by TBT™ to effectively treat this population, significantly decrease their disability and greatly improve their quality of life.

Female Pelvic Pain

The NWHRC also has data regarding pelvic pain in women. Nearly 15% of 18- to 50-year-old American women have chronic pelvic pain. It is one of the most common reasons why American women see a physician. Total treatment costs may run as high as \$2.8 billion annually. The cost to the patient is also enormous. Studies and surveys show that a quarter of affected women are incapacitated by pain two to three days each month. More than twice that many are forced to curtail their normal activities one or two days each month. Nine of ten women with chronic pelvic pain have pain during intercourse. More than half say they have significant emotional changes, many reporting they feel "downhearted and blue" at least some of the time. For many, the pain and underlying conditions lead to fertility problems, just at the age when they want children. Thus, chronic pelvic pain is a huge physical, emotional, and social issue for many women through a large age range. The women's health physical therapist can intervene by providing a comprehensive, holistic treatment of the individual that might include manual therapy techniques, exercise, neuromuscular reeducation and electrical stimulation, and stress management. Proper initial treatment and advanced preparation will minimize disability in female patients. The physical therapist must keep pace and be accountable for their role in the delivery of physical therapy services. This is particularly important as the physical therapist moves to function as a primary care provider in the health care system. The ABPTS has established a process for the physical therapy profession for specialization. Competencies need to be measured. Advanced evaluation skills such as pelvic floor examination are required in order to completely establish a plan of care. Currently these skills are not widely taught in the entry-level programs. Advanced knowledge and skills in behavioral and physiological aspects of health across the lifespan are needed. Without adequate preparation, patients may be at risk and treatments may be ineffective. Specialization provides credibility to the practitioner and clearly identifies the women's health physical therapist as having the advanced skills and knowledge to enable efficacious treatment for women.

Incontinence

The National Women's Health Resource Center (NWHRC) discusses the various possible dangers of leaving urinary incontinence untreated, such as skin rashes and infections, loss of self-esteem, emotional distress and self-imposed isolation. There are also financial risks of incontinence. Wilson, et al. estimate the annual direct cost of urinary incontinence in the United States (in 1995 dollars) to be \$16.3 billion, including \$12.4 billion (76%) for women and \$3.8 billion (24%) for men. The least invasive, lowest risk, lowest cost interventions such as in-office and home self-care by patients with EMS should be tried prior to higher risk interventions or long term reliance on pharmacological agents.

The Agency for Health Care Policy and Research lists treatment recommendations such as pelvic muscle rehabilitation via Kegal exercises, biofeedback, vaginal weight training, and pelvic floor electrical stimulation. Behavioral therapies are also listed, which include bladder training and toileting assistance. Furthermore, pharmacologic therapies and surgical therapies are also options. The well informed and well prepared women's health physical therapist is properly prepared to evaluate and treat this population via the above mentioned interventions. Without proper education, awareness of the difference and advantage of TBT™EMS technology, training in its use and credentialing, therapists are unlikely to obtain the awareness and advanced skills needed to optimally treat those types of conditions. Most PTs are not properly informed as to the limitations of Kegal exercise to affect the deep pelvic floor muscles and are woefully uninformed as to the significant advantage of extremely high voltage low amperage TBT™AC output technology to increase the girth of the deep pelvic floor muscles having atrophied post partum.

Where patients cannot tolerate the high amperage of DC output EMS units and therefore do not achieve any lasting benefits from such a limited form of EMS (Most PTs are unfortunately only aware of this type of EMS), TBT™ has been shown to be able to overcome the resistance of distance without the burning or discomfort associated with DC output systems, thus allowing for the rejuvenation, strengthening and increased girth of the proper musculature so the bladder can once again be properly controlled without surgery or drugs. Incontinence can thereby be completely corrected permanently with the renewed muscle tissue maintained via Kegal exercise which can only strengthen the deep pelvic floor muscles only after the girth of those muscles has been increased by targeted high voltage low amperage AC output treatments via True Tesla®.

Only extremely high voltage full resistance internal exercise of the proper pelvic floor muscles delivered at very low amperage via proprietary AC output TBT™ has been shown to be able to properly saturate the few active muscle fibers in the wasted deep pelvic floor muscles allowing them to be saturated to the point that the voltage will overflow into the inactive fibers and exercise them to the point of exhaustion where the body will then recruit new fibers thus increasing the girth of those key muscles. High Voltage Low Amperage AC Output TBT™ is the only electrical stimulation technology available in the world today that has been shown to be able to actually reverse muscle atrophy via full resistance exercise so powerful even top body builders cannot overcome its contractions even though they can tolerate the world's deepest contractions for extended treatment periods long enough to generate new muscle growth.

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