

Non-Invasive Natural Healing with Directed Energy™
Understanding Shockwave and Pulsed Electro-Magnetic Frequency

Chapter 1

***Introduction to
Shockwave Therapy***



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First a little about me. I am originally from Chicago. I graduated from National College of Chiropractic in 1993. I am a 10-year Veteran of U.S. Marine Corps and Illinois Army National Guard. In 2025, after 32 years of practice, I retired from both private practice and military practice and I continue provide CEU education classes.

My goal is to share my years of clinical Chiropractic experiences and these 21st century therapeutic tools, which I have been using in one of the nation's busiest military Sports Medicine clinics and help others in developing a successful non-invasive natural therapies practice.

As a Sports Chiropractor, I always begin my assessment and treatment with manual Chiropractic and myofascial therapy. But often, this is not enough, especially with our athletes and military. Many times, the patient needs more than our manual therapies. With these therapeutic tools, we can work smarter and we can easily expand the scope of the average clinic, specifically with radial, focused shockwave, PEMF (Pulsed Electro-Magnetic Field) and also laser.

With these "All Cash" tools, you can **Work Smart, Not Hard**. The products I recommend are newer technologies, extremely safe, natural, non-invasive therapies which can be used alone, or better when used in conjunction with other therapies or treatment modalities. And if needed, it can be used along with other non-invasive and invasive medical procedures, such as dry needling, micro-hydro-dissection, PRP & Stem Cell therapy.

As a highly credentialed, experienced, and progressive Board-Certified Sports, Extremity, International & Military Chiropractor, I have over 32 years of experience practicing in many multi-discipline clinics, including 28 different civilian clinics. I have over 16 years of Military Chiropractic clinic management in 4 different multi-discipline U.S. Navy Sports Medicine military clinics working alongside Navy Sports M.D.'s, Anesthesiologists, DPT, ATC's, PA's and more. I have treated tens of thousands of patients from all branches of U.S. Military, U.S. Special Forces, and foreign military, from infants to seniors to world champion power lifters, NFL & NBA professional athletes and even some Rock n Roll superstars as well as many patients with unique and special conditions. I also have past HMO Utilization Management & Clinical Review experience as a Clinical Care Manager for the Nation's largest Chiropractic HMO. I have used spinal decompression, whole body vibration, class III & Class IV Lasers. (Acupuncture in Chicago). I also worked for a few nutritional companies.

I was one of only nine Chiropractors working for the U.S. Marine Corps. Over the years, within both my military and civilian clinics, I have met with numerous sales managers, manufacturers, CFO's and owners of many brands of PEMF, Shockwave and Lasers and more, searching for the best therapies for the best value. In my busy military practice, I have done extended, long-term demo use of numerous therapies (Laser, PEMF, Shockwave, WBV & more). I will share this knowledge with those progressive practitioners looking for the best non-invasive products at the best price.

I have done numerous product comparisons and extensive clinical use and can share my experiences with you.

If you are looking to purchase, Please don't just buy from a sales rep; invest and learn from an EXPERIENCED CLINICIAN & COLLEAGUE while supporting others in our profession. Please contact me, I can put you in touch with honest ethical sales team from the companies I recommend. Please feel free to contact me. Thank you,

Dr. Larry Basch, D.C., CCSP, CCEP, ICSC



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Shockwave isn't just the Wave of the Future

it's the **TSUNAMI OF THE PRESENT**

This statement is from

Dr. Karsten Knobloch, MD, FACS - Germany & Austria

Univ. Professor of Surgery & Sports Medicine / European Shockwave Researcher & Expert

My lectures and paper is based on science and the facts of various types of PEMF, Laser, radial and focused shockwave machines. I am not affiliated with any single company. Over the years, I have used numerous types and brands of therapies and machines in the busiest Navy Sports Medicine clinics, treating a wide variety of simple and complex sports and combat injuries.

I will share my personal preference based on my experiences and the following:

**Initial Purchase Cost
Probe Revision Cost
Cost per Treatment**

**Sound Decibel Output
Research
Manufacturer**

**Science
Experts in the Field**

NOTE: IRS Section 179 may allow business owners to deduct the full purchase price of qualifying equipment and software that was purchased or financed during the tax year, rather than depreciating it over the asset's useful life.

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You will get better, faster clinical outcomes, generate more referrals resulting in more income.***

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The high-quality brands recommended are Approved for Government & Military Purchase thru DoD Prime Tier 1 Vendor

Shockwave Therapy Is A Revolutionary Cellular Healing Modality

Introduction

Let's work Smarter, not Harder. Neuromusculoskeletal (NMSK) disorders are one of the leading causes of morbidity and mortality worldwide and their non-surgical therapeutic treatment options remain limited. Numerous research and clinical studies have shown the potential of extracorporeal shockwave therapy (ESWT) as a **safe, non-invasive, cost effective** and innovative option to address many NMSK disorders.



This amazing technology is a successful modality for many soft tissue and neuro-musculo-skeletal conditions seen in athletes, non-athletes and seniors.

Extracorporeal means outside the body, hence Extracorporeal Shock Wave Therapy (ESWT). Extracorporeal shock wave therapy is the non-invasive transcutaneous application of high-energy acoustic waves to break down tissue or to promote natural cellular healing and repair. ESWT evolved from the much higher intensity extracorporeal shock wave lithotripsy (ESWL) which is used to break up kidney stones. It was later found that decreasing the energy used could produce beneficial effects on a wide variety human tissues.

Physically, a shockwave is an abrupt change in pressure with a velocity higher than the speed of sound in the medium where it propagates. Thus, shockwaves are pressure waves with a very short rise time, very high pressure, followed by a wave of negative pressure (tensile wave), longer in duration but much lower in amplitude than the initial peak.

Shockwave History

The effects of shockwaves on the body were first noticed during World War II with the use of naval depth charges against submarines. These underwater explosions near humans led to lung disruption, despite the fact that there were no signs of outer physical trauma. In Germany in the 1950s thru the 1970's there was a flurry of studies into shockwave use in medicine. Lab experiments had shown that shockwaves could disintegrate ceramic when shot through water. In 1971 in Munich, Germany the first experimental machine was developed and used to break up kidney stones, this was called Lithotripsy. In 1983, the First Commercial Lithotripter, The Dornier Lithotripter HM3, was produced in Germany. Since 1985, shockwave has been used to treat organs such as the Gall Bladder, Bile Duct, Pancreas, Salivary Glands.

Over the last 35 years, interest in these modalities grew, researchers began exploring their therapeutic potential of shockwaves. During the 1990s and early 2000s, numerous research teams shared findings suggesting that Extracorporeal Shockwave Therapy (ESWT) could be used as a therapeutic tool. In the 1990's reports about shock wave therapy on tendinitis were published. Further investigations lead to successful treatment of epicondylitis and heel spur with reported success rates between 70% and 80%. Researchers demonstrated the use of ESWT to reduce pain and promote healing in bone, tendon, ligament and fascia in patients with musculoskeletal disorders, and to reduce spasticity in patients with neurological disorders. Because of the increasing significance of shockwave therapy on soft tissue diseases, commercial machine development accelerated. Design, protocol, and contents of the published studies may differ slightly from manufactures, but all publications agree that ESWT show high efficiency but very low complications and side effects.

Extracorporeal Shockwave Therapy (ESWT) has evolved into an effective, non-invasive treatment for musculoskeletal injuries. Whereas the original shockwave devices were used to disintegrate tissues, orthopedic ESWT therapy can cause regeneration in tissue. This therapy elicits a number of biological responses at the tissue level and deeper into the cellular and even molecular levels, which impact the management of many injuries. But some treatments are very painful and require numbing cream or anesthesia.

Applications

Lower Extremities

- Plantar fasciitis / heel spur
- Achillodynia
- Tibial stress syndrome
- Patellar tendinitis
- Calf muscles
- Thigh muscles
- Trochanteric tendinopathy
- Pseudarthrosis

Upper Extremities

- Low Back & Hip Pain
- Shoulder Pain
- Neck pain
- Calcific Tendinitis
- Craniomandibular dysfunction (CMD)
- Lateral & Medial Epicondylitis
- Carpal tunnel syndrome (CTS)

Biological Effects of Shockwave

- Increased Microcirculation
- Vasodilation due to release of nitric oxide
- Cell matrix stimulation (mechano-transduction)
- Release of Substance P
- Analgesia effect (pain-gating)
- Increase of cell wall permeability (cell metabolism)
- Stimulation of growth factors (neovascularization)
- Stimulation of stem cells (cell proliferation)

Many Names and Manufacturers of Equipment

Both forms of Extracorporeal Shockwave Therapy (ESWT) are acclaimed among today's most innovative medical technologies as they revolutionize treatment possibilities. ESWT is evidence-based, accelerates healing, treats the root cause of pain, and dramatically accelerates recovery time which is especially advantageous in treating athletes. Both types of ESWT are non-invasive and require no downtime for the patient.

THERE ARE TWO TYPES OF EXTRACORPOREAL SHOCKWAVE THERAPY (ESWT)

Acoustic or Radial Pressure Wave, (RPW) is well suited for patients and athletes suffering from acute and chronic musculoskeletal and connective tissue disorders. Due to lower speed and lower peak pressure during the mechanical generation of radial pressure waves, this form is best suited for broader, superficial structures.

Focused Shockwave (SW or fSW) penetrates deeper into the tissue, allowing delivery of more **focused** power to targeted depths. This non-invasive approach with true shockwaves is used to treat chronic tendinopathies and various other soft tissue injuries to reduce pain and inflammation quickly while accelerating repair and generating natural healing with stimulation of the body's own innate growth factors and stem cells. In medical circles and athletics, it is hailed as an evidence-based technology and an alternative to painful steroid injections and sometimes even surgery.

Much of the research and cellular benefits have been misrepresented between Radial Pressure Wave (RPW) and (SW) aka True ShockWave. Not all shock waves are created equal. Many people confuse the Radial Pulsed Wave (RPW) created by a mechanical stylus tool with the advanced technology Electromagnetic or Electrohydraulic Extracorporeal ShockWave Therapy. Unfortunately, the term "shockwave" is very often misused, and the science can be complicated. There are many names, manufactures and types of "shockwave" therapy machines. Most are **not True Shockwave**, but rather the less expensive, less advanced technology, less powerful acoustic or radial pulse wave therapy machines. Radial Pressure Wave devices have been incorrectly referred to as "shock wave" for so long that it has stuck, though it is technically not correct.

According to shockwave experts and associations such as the [International Shockwave Institute](#) and [International Society for Medical Shockwave Treatment \(ISMST\)](#) these Radial Pressure machines do not generate the required energy and therefore Can Not and Do Not produce True Shockwaves. True shockwaves require this higher energy to create cellular MECHANOTRANSDUCTION . While Radial Pressure Wave or RPW has limits, it also has many therapeutic benefits.

To better understand the differences in the technology, we will discuss both RPW and focused ESWT in detail.

Two Distinct Types of Technical Principals of Extracorporeal Shock Wave Therapy (ESWT)

1. Acoustic or Radial Pressure Wave (RPW)

2. Extracorporeal Shockwave Therapy (ESWT) aka True Shockwave or SW

These two technologies differ in their generation of the wave and physical characteristics and in the mechanism of action. However, they do share some similarities.

Names / Types

- Radial Pressure Wave (RPW)
- Acoustic Pressure Wave Therapy
- EPAT (Extracorporeal Pulse Activation Therapy)

***Not a True Shockwave**

- Piezoelectric Therapy
- ESWT (Extracorporeal Shockwave Therapy)
- fESWT (focused Extracorporeal Shockwave Therapy)
- Shockwave / focused Shockwave (SW or fSW)
- Focused "StemWave" brand
- Less focused "SoftWave" brand
- Storz Duolith fESWT

**These Generate a
True or focused ShockWave (fSW)**

The International Society of Medical Shockwave Treatment describes the characteristics of Radial & True or focused Shockwaves below.

Radial Pressure Wave (RPW)

- > Travels 22 MPH – No True Shockwave Produced, Penetrates 1.5 inches
- > “Ordinary” sound wave with pressure up to 30 Mpa and much higher rise times of about 3us
- > Good for Superficial Muscle, Tendon, Ligaments, along Bone, but not over the bone

True or Focused Shockwave (fESWT or fSW)

- > Travels 3350 MPH creating a True Shockwave, Penetrates 4.7 inches
- > A single pulse with a wide frequency range (from approximately 150 kHz up to 100 MHz),
- > High Pressure amplitude (up to 150 Mpa) and Low tensile wave (up to -25 Mpa)
- > Small pulse width and short rise time of up to a few hundred nanoseconds.
- > Good for Superficial & Deep Tendon, Ligament, Bone injuries.
- > Best for Deeper Injuries, Disc, Cartilage, Neovascularization and Mesenchymal Stem Cell Activation

Introduction to Radial Pressure Waves

Radial shockwaves, also called extracorporeal pulse activation technology (EPAT), uses a set of pressure waves to stimulate the healing of damaged tissues and breakdown of scar tissue and soft tissue adhesions. EPAT is not a true shockwave, but it does have a moderate regenerative effect on superficial tissues. It is good for repairing superficial muscle tissue and makes a good companion to focused and defocused shockwave therapy.

A brief history of shock wave therapy

Shock wave therapy as we know it first came into practical use in the 1980s in Germany, originally in the form of focused true shock wave (F-SW). As with the emergence of any new intervention, there was immediately a great deal of interest and hype surrounding it. Researchers began conducting clinical trials, but with no real guidelines on parameters, results were conflicting. At the same time, therapists were treating through trial and error, with outcomes ranging from very good to poor. This led to a drop in interest during the 1990s, with practitioners becoming disillusioned with F-SW, due also in part to the relatively large size and high cost of the devices.

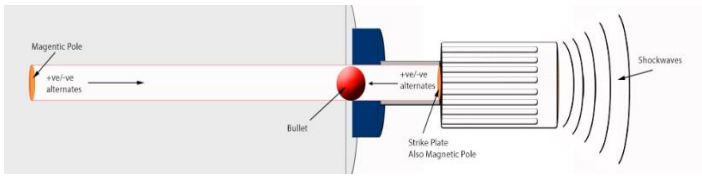
However, with the advent of modified modalities, better research, and advanced technology to study the therapeutic effects on a molecular level, interest in shock wave therapy was rekindled around the end of the 1990s. Manufacturers began building more affordable clinic-based F-SW devices, and therapists became better at incorporating shock wave therapy into their treatments, all of which helped lead to better outcomes for patients.

Then, towards the end of the 1990s, a newer lower cost technology emerged: radial pressure wave (RPW) therapy. Just as F-SW machines were becoming more affordable, RPW devices turned out to be even cheaper and could be used to treat on a more superficial level over larger areas.

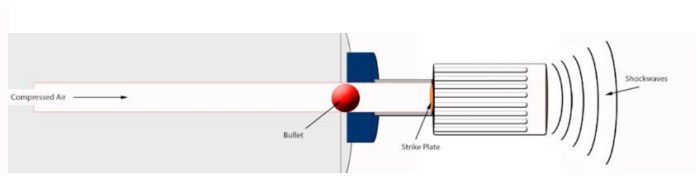
Radial Pulse Waves (RPW) are produced by a less expensive technology. These types of machines generate a radial or pulse type wave, which travels much slower, therefore it is not a true shockwave. RPW does not produce the same deep cellular benefits as a true shockwave. RPW manufacturers describe radial pressure wave as the same as true shockwaves, and sales reps and even practitioners often unknowingly or purposely mislead consumers when suggesting the research and benefit are the same, hence they often claim that the lower priced acoustic or radial pulse wave machines produce the same physiological benefits and clinical results as the more complex and costly true shockwave machines. Unfortunately, this is false and misleading. Actually, these Radial Pressure Wave are more like ordinary sound waves since they achieve a significantly lower peak pressure, a slower rise time and propagate outward without a focal point.

Radial Waves are produced by mechanical stimulation within the handheld probe or applicator which basically pounds on the area treated. Within the probe, a metallic bullet is accelerated at very high speed by pneumatic compressed air or by an electromagnetic mechanism. This metallic bullet hits the tip of the applicator at high speed which creates a pressure wave that can penetrate tissue. The energy of the bullet impacting against the tip of the applicator itself directs kinetic energy which is transferred to the skin on the area of treatment.

This pressure wave propagates from the skin into the body as a spherical or ball-shaped waves, that is in a radial fashion, that gives them the descriptive term of “*radial waves*”. RPW or acoustic waves travel at speeds of approximately 10 meters per second, or **22 MPH**, which is very slow and only a small fraction compared to true shockwave speed. This speed does not break the sound barrier, so no actual shockwave can be produced. These radial waves are not focused into the deeper layers. Radial Pressure Waves have their greatest energy felt at the probe tip and on the surface of the skin, causing pain and as this energy spreads outward, it weakens and dissipates the farther it travels away from the probe. This prevents a deeper, more precise, and effective treatment. These machines require a wave generation mechanism.



Electromagnetic RPW (Ex. Zimmer)



Compressed Air RPW (Ex. Storz)

Some RPW units offer different probe tips for treating various tissues.



Radial Pressure Wave Therapy causes physical / mechanical stress and cellular microtrauma, and this trauma leads to the biological reaction that can aid in the breakup of scar tissue and triggers the neovascularization of the tissue which is the increase production of new capillaries to aid in more blood flow to the tissue. It is an effective treatment method that is used to accelerate healing and recovery for acute and/or chronic muscle, tendon and scar tissue pain, without invasive operations and medications. **Radial Pressure Wave can be used to break up scar tissue, adhesions & calcium deposits.**

My Recommended Radial Pressure Wave Devices

Zimmer enPuls

made in Germany

Electro-Magnetic, High Quality



Storz D-Actor 100

made in Switzerland

Electro-Hydraulic, High Quality



Chattanooga Intellect

made in USA

Electro-Hydraulic, High Quality



RPW are the most common type of “wave” used in most NMSK clinics due to lower cost of the machines. They often call their treatment something wave, whether its Shock Wave, Acoustic Wave, Pulse Wave, Miracle Wave, Pains Wave, or anything to differentiate themselves with others.

*** CAUTION: Be Aware of the Many Cheap, Poor Quality, low priced Knock-offs or copies of the European brands made in China now on the U.S. Market. Cheaper Radial Wave is not Shockwave Wave.**

Various Radial Brands - Made in China

***CAUTION* NOT RECOMMENDED**

**Cheaper, Lower price = Lowest Quality, No Training, No Repair Service, No Product Insurance
You may not be covered by Malpractice**



***CAUTION* THESE CHEAP KNOCK OFFS ARE NOT RECOMMENDED**

Summary of Radial Pressure Waves (RPW)

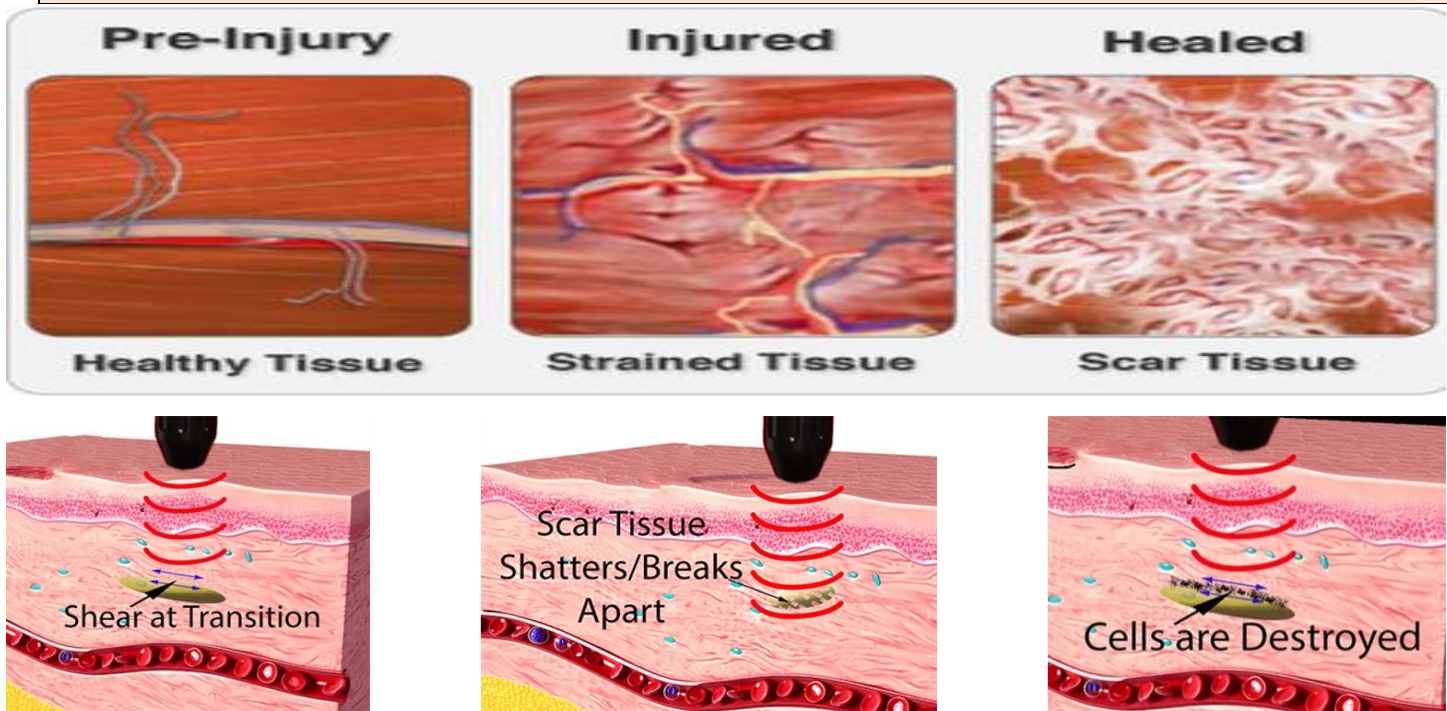
- RPW is a low cost, effective therapy good for Tendons, Muscle Tissue.
- Typical Treatment 8-12 sessions
- RPW Penetration is 3-4 cm maximum or **1.5 Inches**
- RPW is not a True shockwaves.
- RPW is slower speed compared to True shockwaves. These acoustic waves travel at speeds of approximately 10 meters per second, or **22 MPH**, a small fraction of true shockwave speed. This speed does not break the sound barrier, therefore, no actual shockwave can be produced.
- RPW does create Micro Trauma or Tissue damage so typical protocol is one treatment per week.
- RPW is low power, therefore, the penetration depth is only up to 1.5 inches. These are best used on wide areas of the body; the energy produced by the pressure wave is highest at the skin surface, causing pain and diverging and weakening as it penetrates deeper.
- Cannot use over bones, joints, too painful.
- RPW may not be effective for Stress Fractures
- Lower Cost of the Machine, many knock-offs made in China.
- Radial Pressure Waves devices are designated as a Class 1 Medical devices, a status given to personal massagers and do not require regulatory approvals and can be used by anyone, no license required.

POSITIVE BENEFITS of Radial Pressure Wave

- Good for Tendons, Muscle Tissue, Breaks up Scar Tissue, Angiogenesis
- Typical Treatment 8-12 sessions
- Affordable Machines
- Staff Can Perform, All Cash

NEGATIVE CONCERNS of Radial Pressure Wave

- Can create Micro Trauma or Tissue damage, so only 1 treatment per week
- Can be Very Painful when treating over or near Bone & Joints
- **NOT A TRUE SHOCKWAVE, LOW ENERGY, No Mechanotransduction**
- Little to No MCS / Stem Cell Activation
- Little to No Growth Factor Stimulation

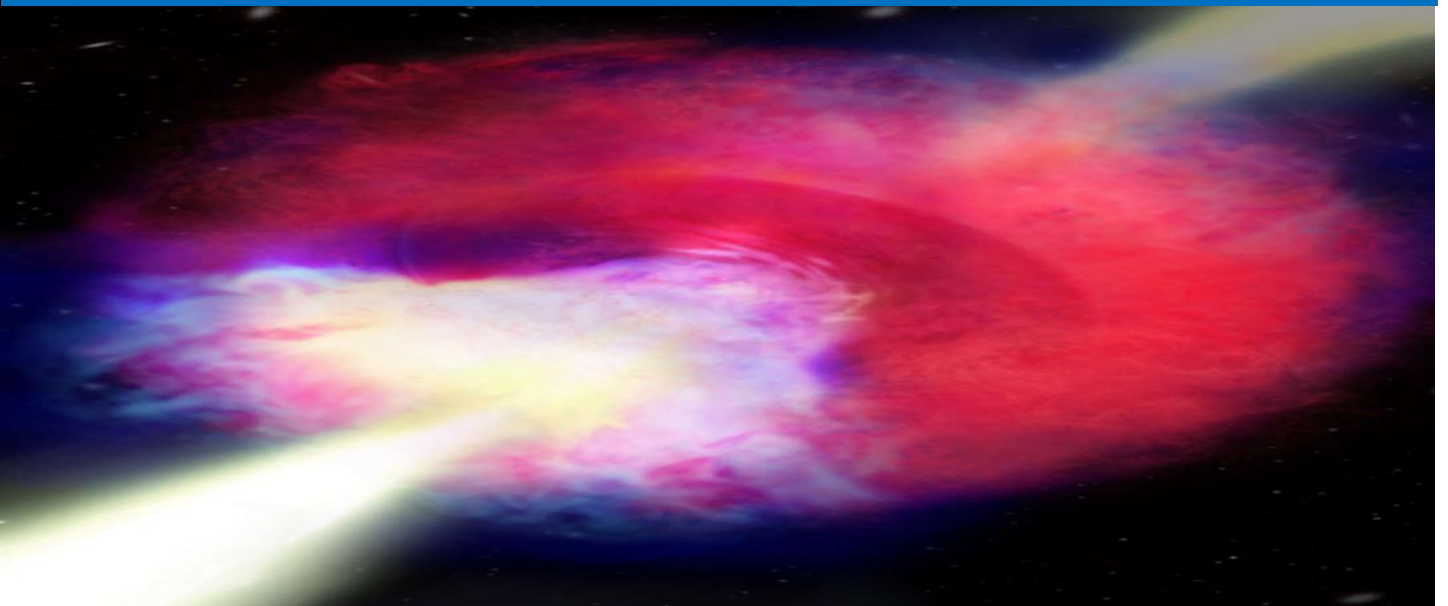


*** Next, we will discuss ESWT or TRUE SHOCKWAVE DEVICES.**

Introduction to FOCUSED Shockwave



True Focused Shockwaves Travel up to 3350 MPH



This causes injured cells to rapidly contract and expand, stimulating your body's own natural Stem Cells & other Growth Factors to assist in safe, Non-Invasive, Natural Healing.

True Focused Shockwaves represent a revolutionary form of mechanotherapy producing deep penetrating acoustic shockwaves.

Dr. Larry Basch, D.C., CCSP, CCEP, ICSC

Certified Sports, Extremity, International & Military Sports Chiropractor

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ESWT or True Focused Shockwave devices

FOCUSED EXTRACORPOREAL SHOCKWAVE OR TRUE SHOCK WAVE (fSW) is growing in popularity, due to decreasing equipment costs, clinical outcomes, advanced research, the increased treatment options, treatment depth, treatment precision and patient comfort over bones, joints and in more acute cases.

Focused and Radial shockwaves differ not only in regard to their physical properties and mode of generation, but also in terms of the magnitude of the standard parameters (pressure amplitude, pulse duration, impact) used and the therapeutic tissue penetration depths achieved.

Orthopedists, Physiotherapists and Urologists are using both devices, but Focused ESWT devices have been shown to be much more effective in certain conditions, less painful, and don't cause micro damage to tissues compared to Radial models.

However, many clinicians are using radial models because of the economical price, and not based on actual research and clinical outcomes.

Urologists prefer Focused ESWT devices for the treatment of diseases like Erectile Dysfunction and Peyronie's disease. However, based on the cost of equipment, the radial devices (RPW) are more common for muscle, tendon conditions such as Achilles tendon, bone fracture treatment, plantar fasciitis.

Why Choose ESWT Over Alternative Injection Treatments?

While corticosteroids offer rapid relief, they come with a plethora of potential complications, including increased risk of infection, atrophy, pain, rupture of tendon or tissue, bleeding, and so on. On the flip side, ESWT allows athletes to stay active as tolerated (as dictated by the injury and the patient). Most patients and athletes can continue with ADLs / training sessions while undergoing ESWT treatments. ESWT is well tolerated by most all ages.

PRP (Platelet Rich Plasma) is commonly utilized in sports medicine settings and can stimulate healing and reduce pain without toxicity within the body. Despite the positives, studies reveal that weight-bearing limitations and reduced activity may be necessary post-treatment, and restrictions may last from 7 days to 6 weeks. Again, ESWT allows for a more rapid return to sport and ongoing training with little to no restriction.

While ESWT machines are an investment, remember, just one patient case per month will cover the cost of the lease.

This therapy will expand your scope of treatment while helping more patients avoid risky and painful injections. It will also expand your cash collections and help you grow your practice and be more competitive. More and more clinics are adding ESWT to their practice.

****To be the best clinician, you need the best, most advanced tools, don't be left behind.***

True Shockwaves have well defined characteristics which differentiate them from the Radial Pressure Waves

True Shockwave or focused Extracorporeal Shock Wave Therapy (ESWT) activates the body's own endogenous Mesenchymal Stem Cells (MSC's). ESWT causes Mechanotransduction; the release of Chemo-attractant factors and a number of regeneration and growth-associated molecular signaling factors in the treatment area, which stimulates Migration, Proliferation, and Differentiation of Mesenchymal Stem Cells, resulting in Revascularization, inhibition of Inflammation, Tissue Regeneration and Remodeling. The Spectrum of treatable conditions is constantly increasing from MSK, to Wound Healing, Nerve Regeneration, Cardiovascular, Urogenital dysfunctions.

Examples of Shockwaves in Nature



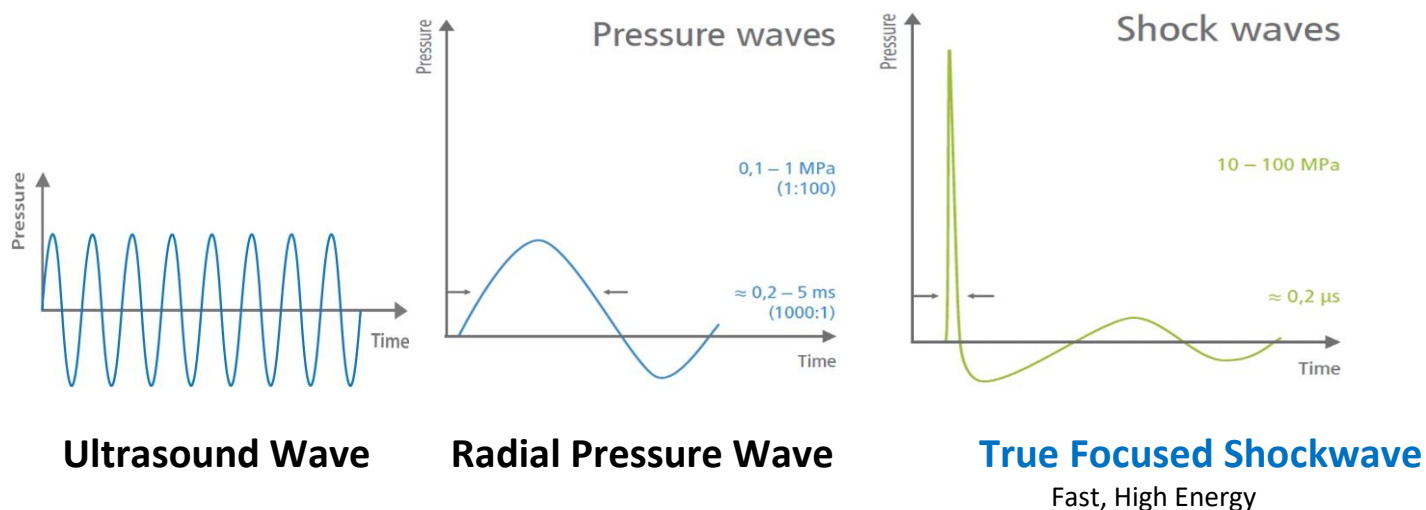
Benefits of True Focused Shockwave

Stimulates

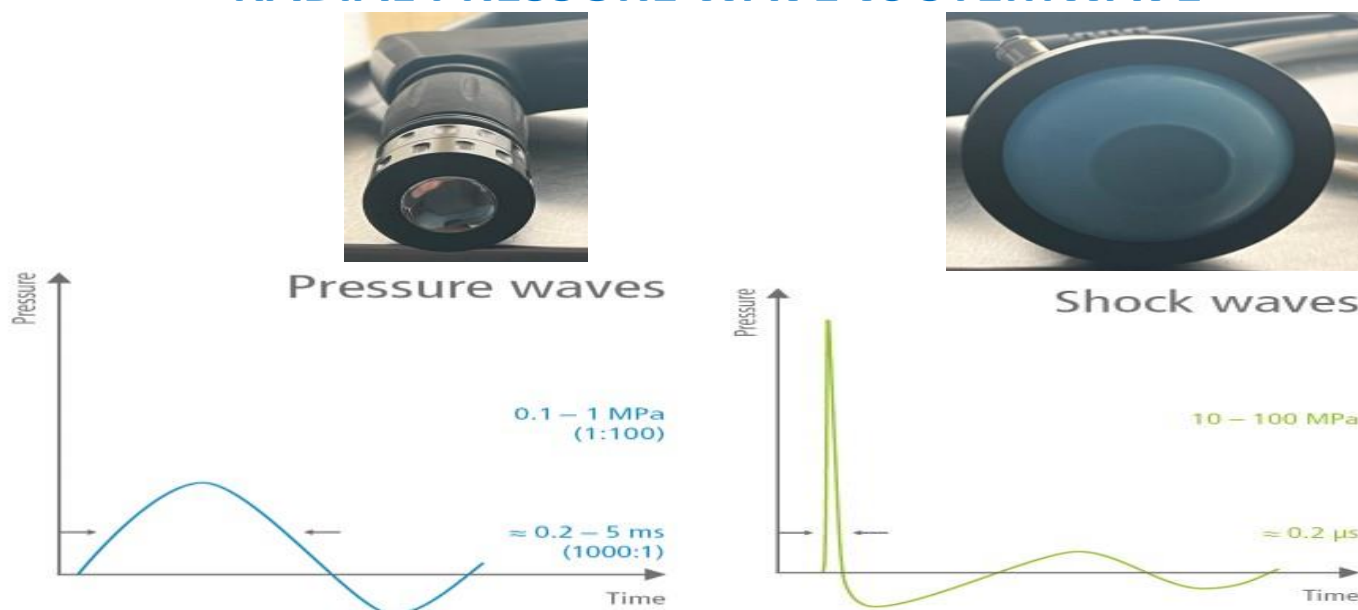
- Increased Growth Factor Migration
- Increased Stem Cell Migration
- Growth Hormone Production
- Anti-Inflammatory - Toll Like Receptors
- Release Substance P - Reduces Pain
- Increases Cell Permeability
- Accelerates Cellular Healing
- Release of Nitric Oxide
- Neovascularization
- Mild Side Effects

When our body recognizes an injury, whether it is a macro (big) trauma, or micro (small) trauma, those injured tissues have to be able to communicate with the rest of our body in order to inform it of the damage and then signal the body to naturally repair. This is done when damaged cells release different growth factors from the cell membranes, such as chromatin (affects DNA health), proteins, and RNA (it forms stable double helix RNA when released in this fashion). In some spaces it is also called cytoplasmic/cytosolic, or even messenger RNA. Researchers call this group of released chemicals, Damage/Danger Associated Molecular Patterns (DAMPs). DAMPs create inflammatory processes and can even play a role in disease formation due to the inflammation they create. What is interesting about this grouping of chemicals is that it is currently believed that RNA is responsible for the heavy recruitment of the healing agents (this is discussed below with research to validate this point). The body responds to injury by activating the innate immune system along with bringing in stem cells (to rebuild damaged tissues) due to a response from a certain type of receptors, called toll-like receptors (TLR). The most involved and studied are the TLR2, TLR 3, TLR4, and TLR5. The human body has 10 TLRs but there is a bit of a debate to this. The ones that most apply to our discussion about reduction of inflammation and regeneration are the TLR3 and TL4.

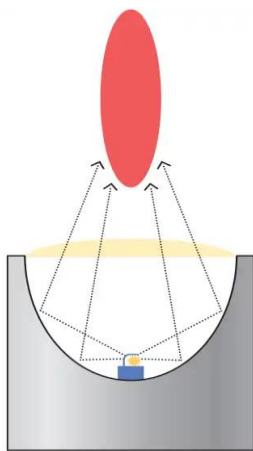
Ultrasound waves are periodic oscillations with narrow bandwidth and does not have peak pressure and fast rise times. True Shockwaves have 1000 times the pressure as ultrasound. Radial Pressure waves are acoustic pneumatic pulses with a low steeping effect, slow rise time with comparatively large negative pressure tensile wave **means more pain. The waves are shallow and have the highest energy and pressure located directly at the applicator's surface.** True Shock waves are intense acoustic pulses that build up extremely quick with **high positive pressure, fast and steep rise** time followed by comparatively **small negative pressure** (tensile wave).



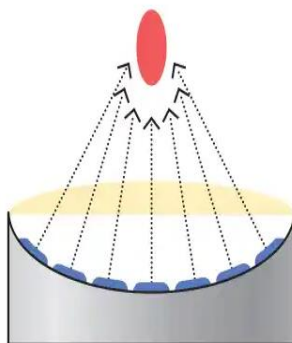
RADIAL PRESSURE WAVE vs STEMWAVE



True Shockwave technology is **FOCUSED**, utilizes a internal REFLECTOR which allows for a larger, deeper treatment area with increased accuracy.



Shockwave



Piezoelectric



Radial Pressure Wave

True Shockwaves have much higher Energy, Power, Speed, Depth of Penetration

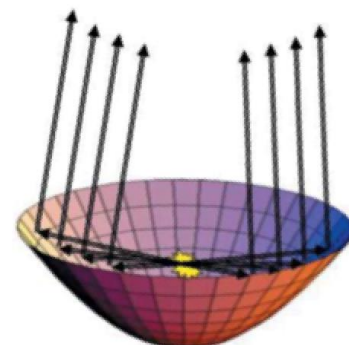
	True Shockwave	Radial Pressure Wave
Pressure	10-100 MPa	0.1-1 MPa
Pulse Duration	0.2 nanoseconds	0.5-5 milliseconds
Energy	20-35 milli Joules	150-200milli Joules
Pressure Gradient	100-150 MPa/mm	0.1-0.5 kPa/mm
Pressure Field	Focused	Radial / Divergent
Penetration	Larger / 4.7 Inches	Small / 1.5 inches
Target	Cell Membranes	Tissues

MPa is mega Pascals 1=100 MPa is equivalent to 100 – 1000 times the atmospheric pressure.
Pulse Duration is approximately 1000 nanoseconds, so much faster and stronger than RPW.

True Shockwaves are generated in water because they travel faster than the *SPEED OF SOUND (3350 mph)*** or the distance of 15 football fields in one second and travel up to 4.7 inches into the body.**

To put this into perspective, U.S. military fighter jet travels faster than the speed of sound and create a shockwave during flight. They occur in nature in the atmosphere during explosive events, such as lightning strikes, or when a jet breaks the sound barrier.

Shockwaves are produced within a probe where water and a “spark plug” create a spark of energy causing a rapid increase in pressure or a “micro-explosion” within the water filled probe. This energy is then reflected towards the injured tissues. Focused Extracorporeal Shockwave Therapy (fESWT) is applied into small focal areas of 2–8 mm diameter in order to optimize therapeutic effects and reduce negative effects on the surrounding tissue. The physical effects seem to be dependent on the energy delivered to a certain area. The shockwave energy per unit area is called the energy flux density (in mJ/mm²). It reflects the flow of energy in a perpendicular direction to the direction of dissemination. The energy flux density is an essential parameter of dosage of fESWT.



Focused ShockWave

- Deeper Penetration 8-12 cm deep or 4.7 inches
 - More Research on Focused or True Shockwave
 - Less Painful
 - Can use over Bones & Joints
 - Less Treatment 1-3 Sessions, More energy directed into the tissue
- Within Focused ESWT, there are three ways to produce the wave:
- **Piezoelectric**
 - **Electromagnetic**
 - **Electrohydraulic**

ShockWave therapy *does not cause tissue damage*, can be used over bone & joints and treat a wide variety of conditions

STORZ & Chattanooga Focused Shockwave Probe (ElectroMagnetic) Below Left



SOFTWAVE Less Focused Shockwave Probe (ElectroHydraulic) Below Right



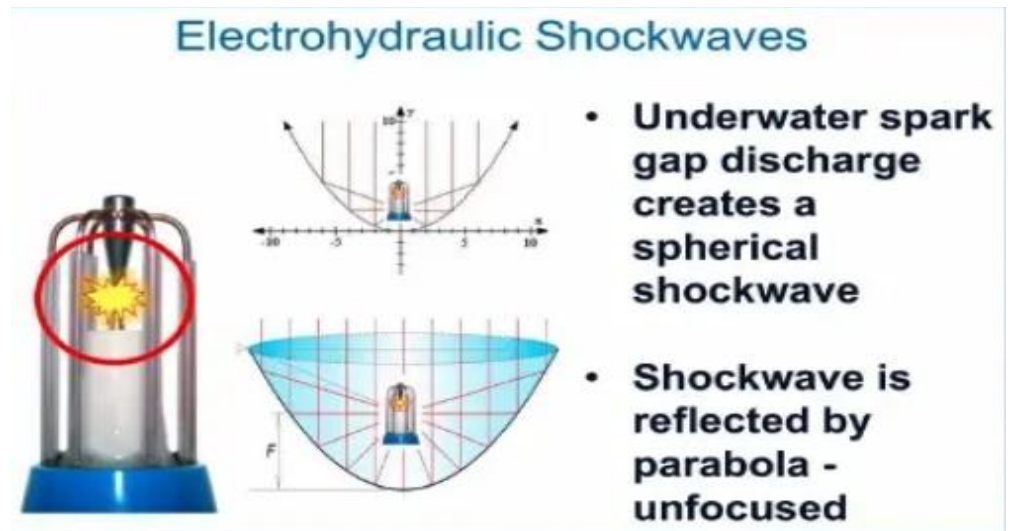
True Shockwave technology utilizes a reflector to generate a shockwave within water in the probe which then travels into the body more than **4x the speed of sound** to stimulate the body's natural healing response.

This all occurs in a few nanoseconds

EFFECTS OF SHOCKWAVE ON DAMAGED TISSUE



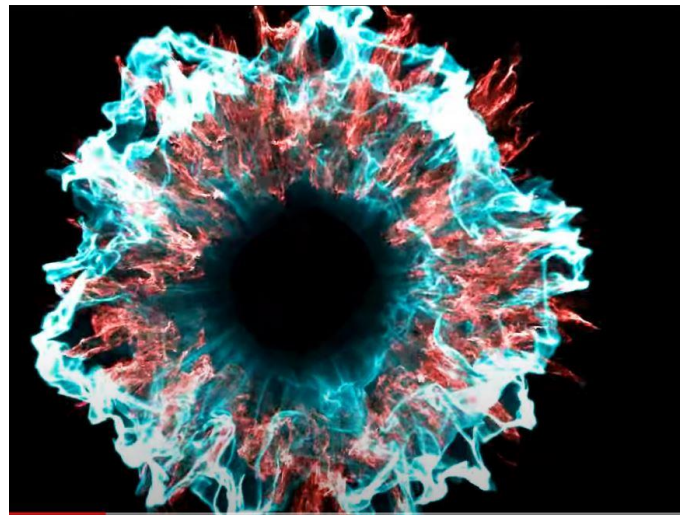
The Focused Shockwaves Activate Your Body's Own Healing Mechanisms



The importance of mechanical stimuli on living beings, as well as the influence that biomechanical deformations can exert on cellular biology and physiology, in health and diseases, have been recently seen a renewed interest in scientific literature, especially with the purpose of possible therapeutical applications.

The reason the focused shockwave device is so effective is the machine allows us to control and focus these shockwaves to such an extent we are able to pass the shockwaves through the outer tissue of the body without any damage and little pain. The focused shockwave energy is delivered to a focus point inside the tissue where the blood vessel and soft tissue degeneration has occurred. Acoustic waves do not penetrate, they create surface level pressure outward causing redness and inflammation only in the outer tissue not deep inside where the rehabilitation needs to occur.

Image of High Energy Shockwave Traveling at 3350 mph



High Energy Shockwaves imparts physical DIRECTED ENERGY to the tissues in the form of absorption, reflection, refraction, & transmission of energy to stimulate cellular growth, repair & regeneration.

Width and Depth Differences

Focused Shockwave uses Electro-Magnetic system
it can penetrate up to **12 cm or 4.7 inches** in a few nanoseconds



**Allows for Deeper
Focused Treatment Area**

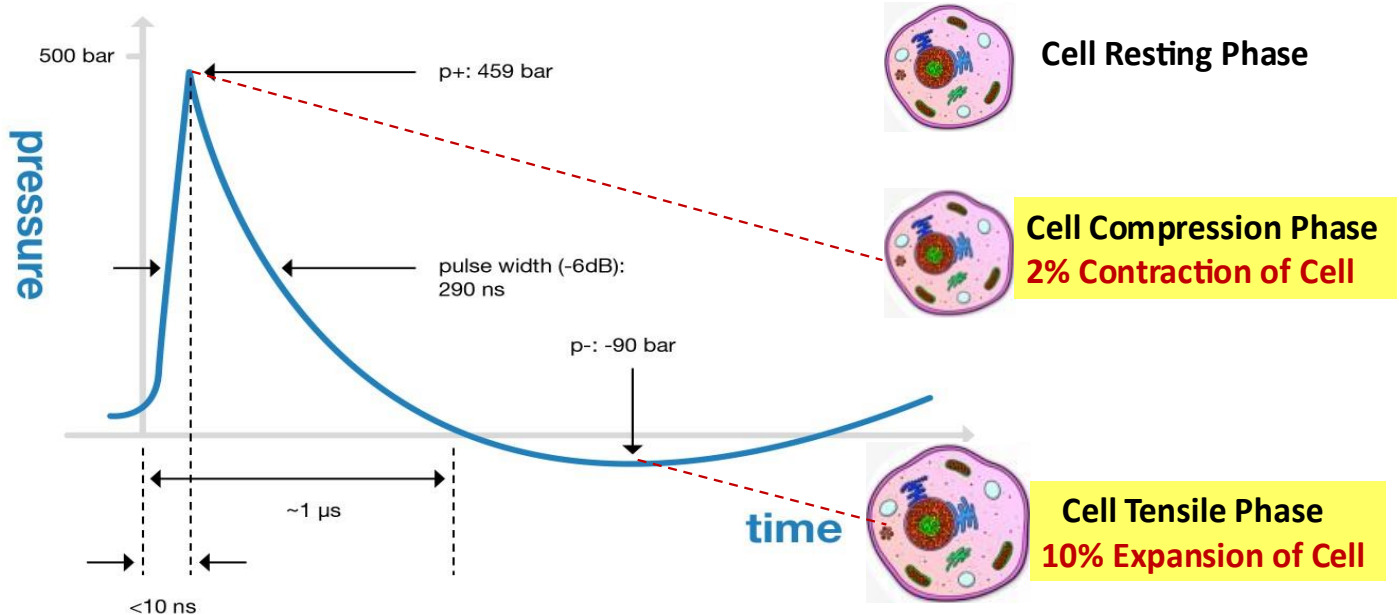


2 cm X 2 cm
0.787 x 1.5 Inches

Mechanotransduction

Cellular Reaction to Shockwave Energy

Rapid High Energy cause **MECHNO-TRANSDUCTION** or very
Rapid Contraction & Expansion of Cell Membranes



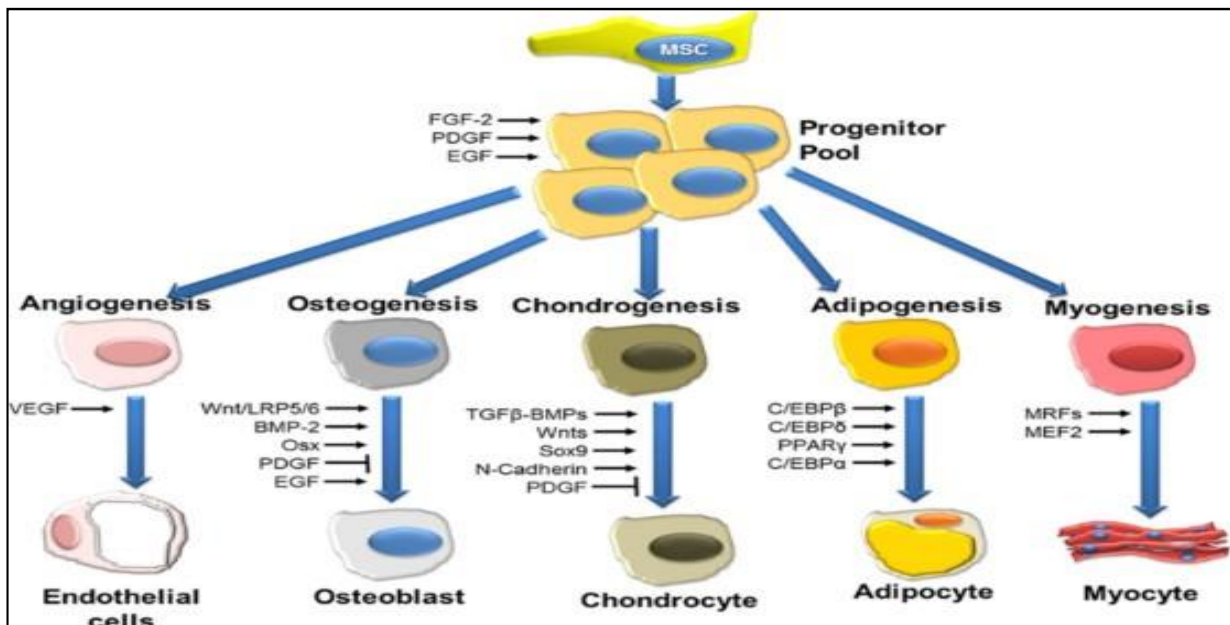
Mechanotransduction

The High Speed of the true Shockwave causes the Stimulation, Migration and Differentiation of our own Mesenchymal Stem Cells to the targeted area.

Your Body uses its own Innate Mesenchymal Stem Cells to repair and promote long-term healing.

- Release of Macrovesicles = **mRNA, Growth Factors, Stem Cells**
- Increases cell Membrane Permeability
- Reduces Pain = Reduced Substance P = **Reduced Pain**
- Reversal of Chronic Inflammation = **Reduced Pain**
- Stimulation of Collagen Production = **Tissue Repair**
- Dissolution of Calcified Fibroblasts = **Tissue Repair**
- Stimulates New Blood Vessel Growth = **Neovascularization**
- Release of Trigger Points = **Tissue Repair & Pain Reduction**
- Increased Lactate Concentrations = **Activation Of Krebs Cycle**
- Increased Nitric Oxide Production = **Increased Blood Flow**

True ShockWaves Increase Growth Factor Release
Mesenchymal STEM Cells Release Innate, dormant Growth Factors



Blood Vessels

Bone

Cartilage

Fat

Muscle

Growth Factors and Cellular Effects

Growth Factor

Cellular Factor

PDGF

Platelet Derived Growth Factor

Macrophage activation and angiogenesis
Fibroblast chemotaxis and proliferative activity
Enhances collagen synthesis
Enhances the proliferation of bone cells

IGF-1

Insulin-like Growth Factor-I

Chemotactic for myoblast and fibroblasts and stimulates protein synthesis
Mediator in growth and repair of skeletal muscle
Enhances bone formation by proliferation and differentiation of osteoblasts

TGF- β

Transforming Growth Factor- β

Enhances the proliferative activity of fibroblasts
Stimulates biosynthesis of type I collagen and fibronectin
Induces deposition of bone matrix
Inhibits osteoclast formation and bone resorption
Regulation in balance between fibrosis and myocyte regeneration.

PDEGF

Platelet Derived Endothelial Growth Factor

Promotes wound healing by stimulating the proliferation of keratinocytes and dermal fibroblasts

PDAF

Platelet Derived Angiogenic Factor

Induces vascularization by stimulating vascular endothelial cells

EGF

Endothelial Growth Factor

Cellular proliferation
Differentiation of epithelial cells

VEGF

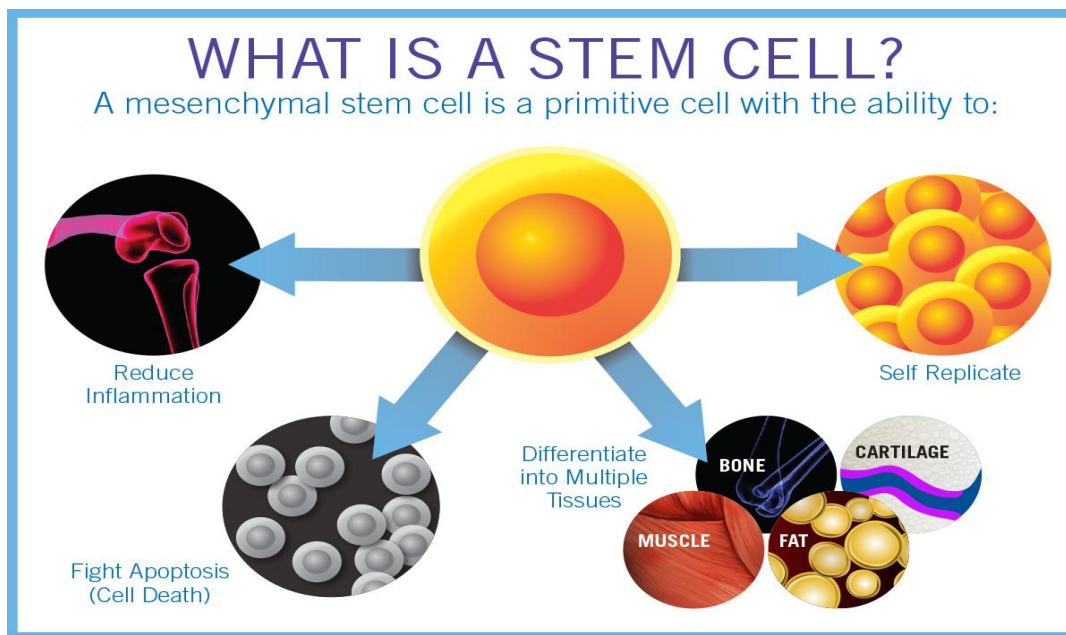
Vascular Endothelial Growth Factor

Angiogenesis
Migration and mitosis of endothelial cells
Creation of blood vessel lumen
Creation of fenestrations
Chemotactic for macrophages and granulocytes
Vasodilation (indirectly by release of nitrous oxide)

HGF

Hepatocyte Growth Factor

Stimulates of hepatocyte proliferation and liver tissue regeneration
Angiogenesis
Mitogen for endothelial cells
Antifibrotic



MSC or Mesenchymal Stem Cells can be considered “Mother Cells” because they can ultimately transform into any other cell type and multiply indefinitely to self renew. In order to maintain the natural body functions, new cells have to be generated regularly. Stem cells are the body’s own reservoir to renew and repair tissue. But many cells lose the ability to renew themselves.

Mechanism of Action

Based on the clinical success of the treatment, the mechanism of action of SW theories suggests the following 4 possible mechanisms of reaction phases of ESWT on tissue.

1. **Physical phase:** This phase indicates that the shockwave causes a positive pressure to generate absorption, reflection, refraction, and transmission of energy to tissues and cells¹¹. Additional studies demonstrated that ESWT produces a tensile force by the negative pressure to induce the physical effects, such as cavitation, increasing the permeability of cell membranes and ionization of biological molecules.

ESWT participates in mechanotransduction, producing biological responses through mechanical stimulation on tissues. Many signal transduction pathways are activated thru **mechanotransduction** signaling pathway, the extracellular signal-regulated kinase (ERK) signaling pathway, focal adhesion kinase (FAK) signaling pathway, and Toll-like receptor 3 (TLR3) signaling pathway, to regulate gene expressions. **“Mechanotransduction”** is a *biological pathway* to which many cell types are sensible: after sensing and processing the mechanical information’s from the extracellular environment, these biomechanical forces are converted in biochemical responses, thus influencing some fundamental cell functions as migration, proliferation, differentiation, and apoptosis.

2. **Physicochemical phase:** ESWT stimulates cells to release biomolecules, such as adenosine triphosphate (ATP), to activate cell signal pathways.
3. **Chemical phase:** In this phase, shockwaves alter the functions of ion channels in the cell membrane and the calcium mobilization in cells.
4. **Biological phase:** Previous studies have shown that ESWT modulates angiogenesis (vWF [von Willebrand factor], vascular endothelial growth factor [VEGF], endothelial nitric oxide synthase [eNOS], and proliferating cell nuclear antigen [PCNA]), anti-inflammatory effects (soluble intercellular adhesion molecule 1 [sICAM] and soluble vascular cell adhesion molecule 1 [sVCAM]), wound-healing (Wnt3, Wnt5a, and beta-catenin), and bone-healing (bone morphogenetic protein [BMP]-2, osteocalcin, alkaline phosphatase, dickkopf-related protein 1 [DKK-1], and insulin-like growth factor [IGF]-1).

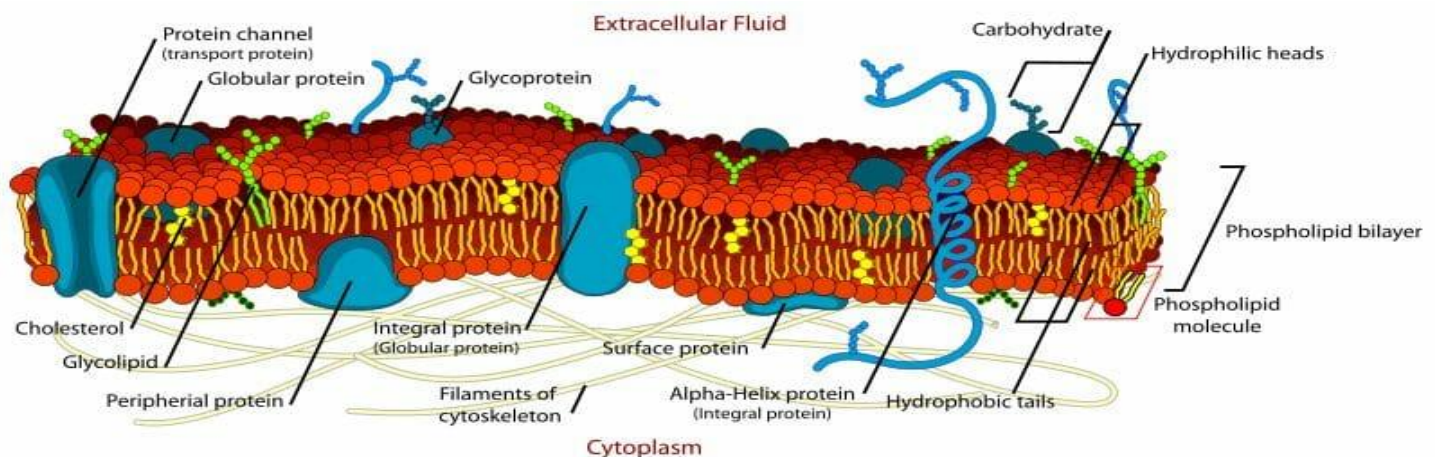
The effects of ESWT with new functional proteins induced by ESWT promoting a chondroprotective effect, neovascularization, anti-inflammation, anti-apoptosis, and tissue and nerve regeneration. Furthermore, ESWT stimulates a shift in the macrophage phenotype from M1 to M2 and increases T-cell proliferation in the effect of immunomodulation. ESWT activates the TLR3 signaling pathway to modulate inflammation by controlling the expression of interleukin (IL)-6 and IL-10 as well as improves the treatment of ischemic muscle

The ESWT long term benefit is the fact that the patient's own resident stem cells have been activated within 45 minutes after treatment. The true healing will come later when those stem cell have been produced and migrated to the treated area 8-10 weeks later. Again, the patient's own stem cells are activated to come out of this dormant state and are called into action within hours of treatment. This eventually results in a 200%-300% improvement in permanent blood supply 10-12 weeks later.

There are a number of profound benefits from using focused, low intensity lithotripsy:

- therapeutic energy zone is vastly larger in all dimensions than that of focused designs, causing greater efficiency of treatments...and you need less treatments!
- unlike the radial pulse units, shockwaves do not create or rely on micro traumas, instead it non-traumatically causes cells to shed membrane micro vessels, which signals a healing cascade and communicates on a cellular basis. You don't need to put numbing cream on 20 minutes before treatment.
- focused shockwaves are scientifically validated through peer reviewed studies. It immediately shuts down the inflammatory response at the treatment site. This has been linked to modulation of various signaling molecules including toll-like R3, nitric oxide, ATP, micro vessels and exosomes. Results are typically immediate and creates sustained relief from chronic pain. Improved blood flow: this has been linked to the release of VEGF and other key growth factors and cytokines as well as a boost in ATP, leading to the neo angiogenesis at the treatment site, typically resulting in accelerated and sustained regenerative effects.
- shockwave technology is scientifically validated to recruit and activate endogenous mesenchymal stem cells.
- shockwave therapy elicits biofeedback by which origins of pain can be precisely identified, serving an invaluable role in treatment effectiveness and efficiency.

Spinal cord injury (SCI) is a devastating condition with poor prognosis and very limited treatment options. Most injured patients are severely restricted in their daily activities. ESWT has shown to have potent regenerative properties for bone fractures, wounds, and ischemic myocardium via activation of the innate immune receptors called Toll Like Receptors, specifically the TLR3 or Toll Like Receptor-3. ESWT improved motor function and decreased lesion size in spinal cord injuries (SCI). Research suggests that the TLR3 signally is involved in neuroprotective and spinal cord repair and suggest that TLR3 stimulation via ESWT can be a potent treatment option for these serious conditions.



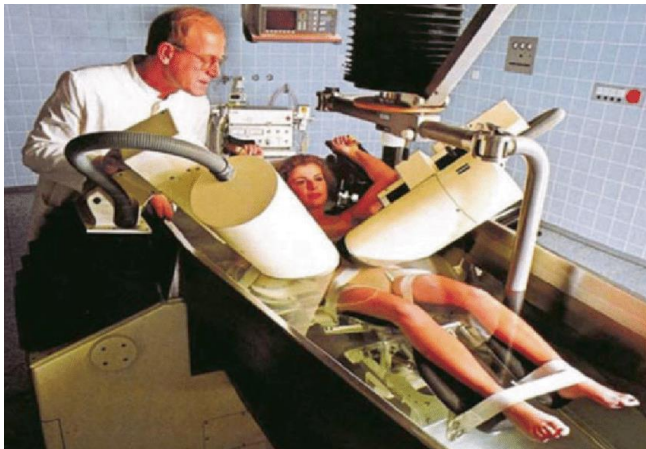
D'Agostino et al described in a comprehensive review in more detail that fSW has been described in experimental studies to reduce expression of several metalloproteinases (enzymes capable of degrading the collagen) and inflammatory interleukins and, in turn, to upregulate gene expression of typical tendon markers (such as scleraxis) and anti-inflammatory cytokines (e.g., interleukin-10).

fSW in animal experiments was shown to promote healing of “collagenase - Achilles tendinitis,” by inducing transforming growth factor beta 1 and insulin-like growth factor I. Histological observations demonstrated that fESWT resolved swelling and edema as well as inflammatory cell infiltration in affected tendons. Furthermore, at the bone level, after fSW exposure, there has been described early expression of angiogenesis-related growth factors, including endothelial nitric oxide synthase, vascular endothelial growth factor, and proliferating cell nuclear antigen, therefore producing new vessel in-growth with improved blood supply as well as increasing cell proliferation. fSW have been shown to be able to **enhance regeneration** of damaged tissue by leading to migration, homing, and differentiation of human stem cells.

Energy Flux Density (EFD) According to researcher, Rompe, the energy level needed to make changes in most soft tissue conditions is 0.08 mj/mm2 EFD(Energy Flux Density). The German Softwave OrthoGold in unfocused or less focused and, has lower energy output, and under dosing. The Swiss Storz/ Chattanooga has higher energy and more focused to create mechanotransduction for stem cell stimulation.

fESWT is commonly used in the management of musculoskeletal disorders, and there is increasing evidence for its clinical effectiveness. Pain relief, destruction of calcifications, and the described mechanotransduction-initiated tissue regeneration and further remodeling processes seem to be the most important working mechanisms.

Original Hospital Lithotripsy Machine for Kidney Stones 1980's (Left)



The modern Hospital Lithotripsy units are very large, powerful and very expensive.- \$500,000 (Right)

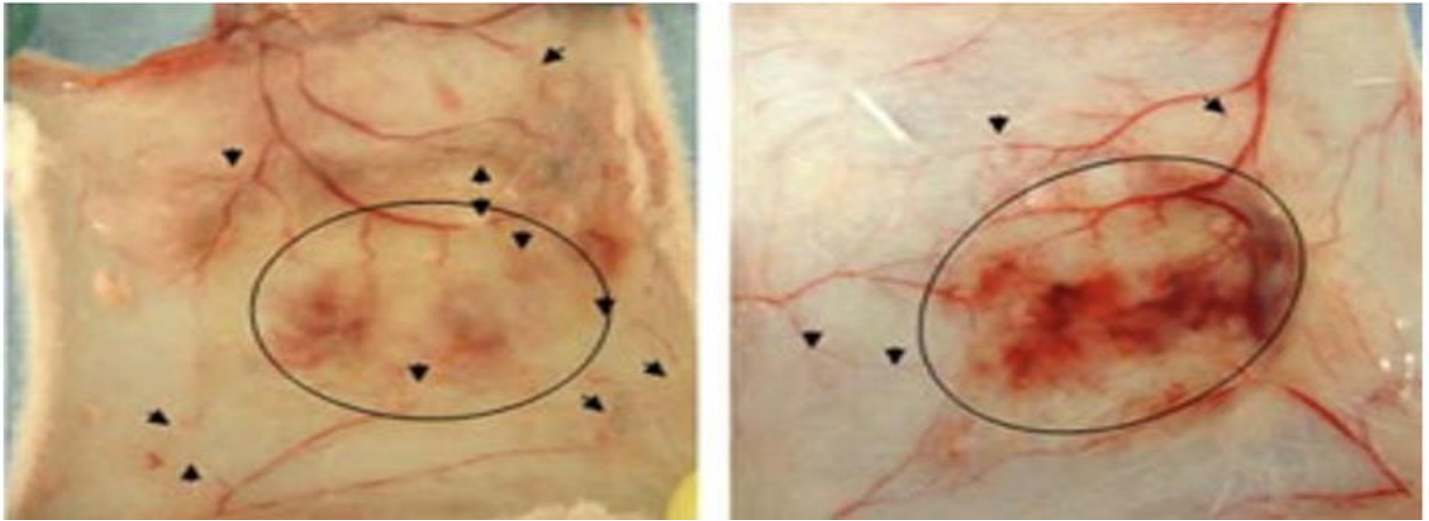
Over the last four decades Shockwave Machine Technology has Made Significant Advancements



Shockwave changes seen at the cellular level to initiate healing

Changes seen at the cellular level to initiate healing.

Electrohydraulic Shockwave shown to INCREASE in small, medium & large blood vessel growth by 300% within 12 weeks of tx.

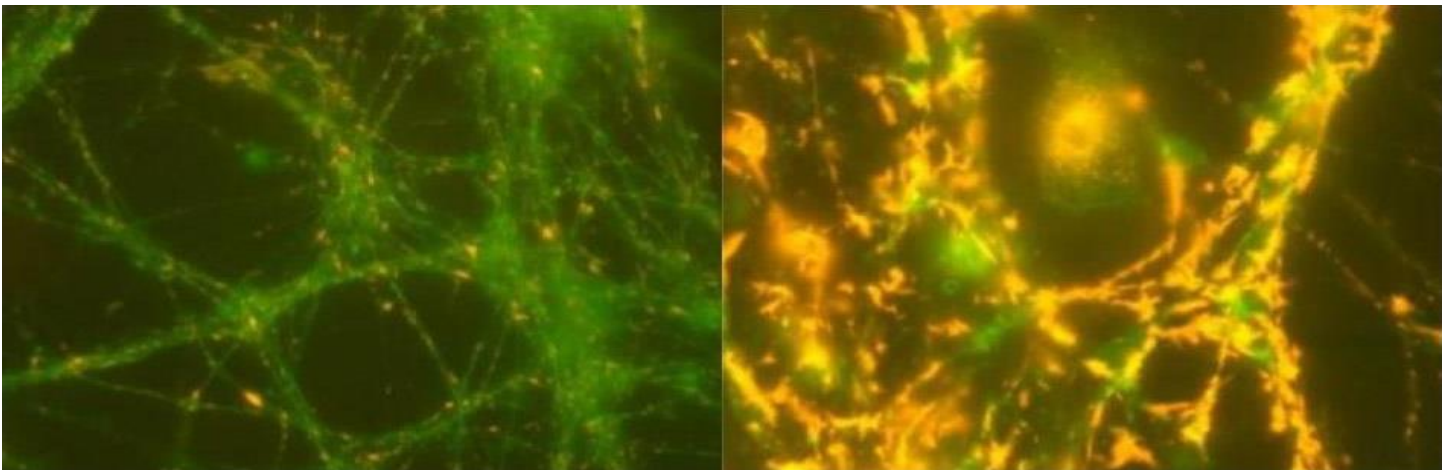


Angiogenesis (New Blood Vessel Growth) changes Before and After Shockwave

Cellular changes

Fluorescent stained **MITOCHONDRIA**

Before & After true focused Shockwave



Keys for Clinical Success with ShockWave

- Proper Patient Selection- do a Scout or Scan treatment
- Set Patient Expectations
- Complete the entire 6-10 treatment schedule
- Recommend Supportive Care after to maintain progress on an aging body
- Allow Tissues Time to Heal, and provide supportive therapies, rehab, nutrition, etc.
- Over time, the body will send **Mesenchymal Cells** to the area to repair damaged tissue after treatment
- **Maximum Tissue Healing expected at 8-12 weeks**
- **For Best Tissue Healing, Combine Shockwave with PEMF**

❖ **CONTRAINDICATIONS for ESWT include:**

- ❖ Treatment over air-filled tissue (lung, gut)
- ❖ Pregnancy
- ❖ Over Cancer
- ❖ Presence of local tumor or infection
- ❖ Less than six weeks since local corticosteroid injection
- ❖ Age less than 18 (except for patients diagnosed with Osgood-Schlatter disease)
- ❖ Treatment of pre-ruptured tendons
- ❖ Blood-clotting disorders, including local thrombosis

The INTERNATIONAL SOCIETY OF MEDICAL SHOCKWAVE TREATMENT describes the characteristics of Radial & True or focused Shockwaves below.

Radial Pressure Wave (RPW)

- > Travels 22 MPH – No True Shockwave Produced, Penetrates 1.5 inches
- > “Ordinary” sound wave with pressure up to 30 Mpa and much higher rise times of about 3us
- > Good for Superficial Muscle, Tendon, Ligament, Bone injuries

True or Focused Shockwave (fESWT or fSW)

- > Travels 3350 MPH creating a True Shockwave, Penetrates 4.7 inches
- > A single pulse with a wide frequency range (from approximately 150 kHz up to 100 MHz),
- > High Pressure amplitude (up to 150 Mpa) and Low tensile wave (up to -25 Mpa)
- > Small pulse width and short rise time of up to a few hundred nanoseconds.
- > Best for Superficial & Deep Tendon, Ligament, Bone, Cartilage, Disc, Joint injuries and **STEM CELL ACTIVATION**

The different focused Extracorporeal Shockwave Therapy (fESWT) machines require an Energy Generator and an Energy Focuser.

True Focused Shockwaves are generated by Three different types of energy sources

1. Piezoelectric - The piezoelectric principle is based on a high-voltage discharge across a pattern of piezoelectric crystals. Each element expands, generating a pressure pulse that spreads toward the focal region, of the arrangement. The placement of the crystals and the shape of the sphere focus the shockwave into the tissue

2. Electrohydraulic - The electrohydraulic principle is that in which the shockwaves are generated by a spark plug submerged in fluid. The shockwaves spread in a medium (water) and are then focused in one place by a parabolic mirror or reflector. There are two types of electrohydraulic shockwaves, less focused or unfocused electrohydraulic shockwaves (uESWT) and true focused electrohydraulic shockwaves (fESWT).

3. Electromagnetic - Electromagnetic shockwaves are generated by an electric current that passes through a coil. This produces a magnetic field, which produces a shockwave via the conductive membrane in surrounding water. Acoustic lenses are used to focus the shockwave into the tissue.

***They all have a slightly different feel because of the Physics of how the shockwave is generated.
* We must move past the aggressive sales marketing of each company and consider the science, facts and cost when deciding what machine is best.***

*** CAUTION** Be Aware of the many Cheap, Poor Quality, low priced Knock-offs or Copies of the Extensively Research well-established brands, many made in China are now entering the U.S. Market. **NOT RECOMMENDED**

The Types of ESWT / TRUE Shockwave

Piezo-Electric Shockwave

Zimmer (pending approval for USA sales)

Medical Grade German Design & Technology

Not Available in USA, No info Available yet



PiezoWave

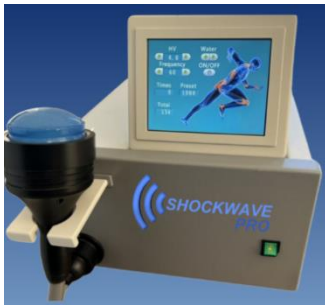
Less Research, More Costly Maintenance, Very Small Focal area



Electro-Hydraulic Shockwave (Knock-Offs)

Shockwave Pro \$30,000

Knock off Made in China, vepoor quality, overpriced



HydroWave \$70,000



StemWave Knock off of Software Made in Turkey \$65,000

Requires \$400 Spark Plug Change monthly,
Maintenance Cost Add up Quickly \$4800/ year



Caution, Every few months, a new knock-off or copy enters the USA market.
They may be cheaper, but most are inferior quality with no research.

Electro-Hydraulic Shockwave

SoftWave Ortho-Gold **Medical Grade German Design & Technology**

Models Vary \$60,500 - \$89,000

Pros: Great for initial - temporary pain reduction and Dermatological conditions
High Quality Professional, Medical Grade German Manufacturing

Cons: Aggressive Sales & Marketing Campaign to Chiropractors
Higher Initial Price, **Very Expensive Probe Refurbishment**, every 100,000 - 350,000 Pulses
or every 6-12 weeks, Costly Treatment to clinic
Very Loud sound, FDA Required Hearing Protection needed
Less focused Energy may result in Less Mechanotransduction & Less Stem Cell Activation



Electro-Magnetic Shockwave

Having used all of the above, MY RECOMMENDATIONS are based on my clinical experiences and also of the U.S. Navy Sports Medicine Recommendation. Storz/ Chattanooga has the Highest Quality, Swiss Designed, Best Initial Price, Best Probe Life & Cost, Quiet Sound of Shockwaves, Lowest Maintenance Cost, highest targeted focused energy & used in University and Clinical research.

Storz is the Original Lithotripsy / Shockwave manufacturer with the Highest Quality, Medical Grade Swiss Design & Technology, used in most all university and clinical research.

My First Choice #1

Chattanooga Intellect Focused \$50,100 est

Made in Switzerland by Storz, serviced in USA by Chattanooga

My #2 Choice

Storz Duolith SD1 \$59,000-\$62,000

Made in Switzerland limited USA support

***Best Medical Grade Swiss Quality, Quietest Sound, Long Probe Life of 2 Million Pulses or 10-12 months**



These Important Factors must be considered when recommending & purchasing a Focused Shockwave

Manufacturer History in Business
Medical Grade Materials
FDA Approval
Medical & Clinical Research
Product Support
Product Training

Initial Cost to Purchase
Probe Life / Revision Cost
Cost Per Treatment
Treatment Area Focal Size
Machine Sound Decibels
Energy Flux Density / Power at Depth

Rather than follow the sales and marketing from others, Please contact me to review these factors in more detail before you commit to this large purchase.

I have used & worked with these Manufacturers Reps & Trainers, please reach out if interested in any of these brands, please contact me, LBASCHDC@gmail.com

Adding Focused Shockwave will change the way you practice.

Beware: Every few months, a new knock-off or copycat of the superior European quality, medical grade professional shockwave equipment enters the USA market. While some may be cheaper due to manufacturing in China, Taiwan or other countries, most manufacturers have limited medical background, little to no history, no clinical studies, not used in research and inferior quality with limited support.

Non-Invasive Tissue Regeneration is Now Possible without Needle Injection

1st Plant the Seeds

Use shockwaves to stimulate the migration of Mesenchymal Stem Cells (MSC) & Growth Factors to the Injured area, like planting the seeds. This can be used as an adjunctive therapy to Stem Cell or PRP Injections or as an alternative to injection when used in conjunction with high power PEMF therapy.

2nd Fertilize

Over the next 8-12 weeks, these MSC and Growth factors will migrate to the injured tissues to lay down new cells and generate healthy new tissue. We MUST provide these tissues with proper stimulation to ensure the best outcomes. Much like planting a seed in the ground. These seeds require good dirt, sunlight energy, fertilizer, and water.

We need to add PEMF therapy to provide the best cellular environment to stimulate and maximize MSC & Growth Factors in the development of new tissue. I also recommend Electrically Charged Hydrogen Alkaline water.

Please Contact me for more details on High Power PEMF, LED, Hydrogen Water



Shockwave is True Cellular Regenerative Medicine

Over the last 25 years, this Technology has evolved in SPORTS MEDICINE & REGENERATIVE MEDICINE

Progressive clinics now use SW combine with other therapies such as Stem Cell Injections, PRP Injections, PEMF, Laser, LED to successfully treat a broad range of musculoskeletal disorders to include:

- Overwhelming Research & Evidence for MSK conditions
- Stimulate Stem Cells (MSC) & Numerous Growth Factors
- Bone Healing disorders
- Degenerative Tendon conditions
- Muscle Injuries
- Skin Lesions /Cosmetic Healing / Pelvic / Bladder Control / ED And much more.
- Used in Germany / Austria in ER for Acute Spine Trauma
- Used in Germany /Austria Open Heart Surgery
- Has been used to Increased Testosterone
- SW has 501K Class I FDA Clearance for reduction of Pain and improvement of circulation.

The great news is this new SHOCKWAVE can be used in most any condition with very little discomfort and even more therapeutic benefits. Help your patients heal faster, more completely.

Having used many brands of PEMF and Radial & Focused ShockWave in clinic, I can give you honest professional opinions and help you select the best unit for your personal or clinical needs and budget.

One clinic patient per month will cover the lease payment, so this is an easy fit for any clinic.

Note: IRS Section 179 may allow business owners to deduct the full purchase price of qualifying equipment and software that was purchased or financed during the tax year, rather than depreciating it over the asset's useful life.

Since I have used many of these brands in clinic, I now work directly with many of these manufacturers managers and sales reps.

***If you are looking to purchase, Don't just buy from a sales rep.
Invest and learn from an experienced clinician & colleague while supporting others in our profession.***

Please feel free to contact me. Thank you

Dr. Larry Basch, D.C. 858-945-8118 LBASCHDC@gmail.com

Suggested Shockwave Research Publications

- Ultrasonographic Evaluation of Low Energy Extracorporeal Pulse- Activated Therapy (EPAT) for Chronic Plantar Fasciitis** By: Robert Gordon, MD; Charles Wong, BHSc; Eric J. Crawford, BHSc Toronto, Canada
- The Role of Extracorporeal Shockwave Treatment in Musculoskeletal Disorders**
Daniel Moya, MD, Silvia Ram' on, MD, Ph.D., Wolfgang Schaden, MD, Ching-Jen Wang, MD, Leonardo Guilloff, MD, Jai-Hong Cheng, MD
- The American Journal of Sports Medicine – Shockwave Therapy for Patients with Lateral Epicondylitis of the Elbow** By: Ching-Jen Wang, M.S. & Han-Shiang Chen, M.D.
- The American Journal of Sports Medicine – Extracorporeal Shockwave for Chronic Patellar Tendinopathy**
By: Ching-Jen Wang M.D., Jih-Yang Ko M.D., Yi-Sheng Chan M.D., Lin-Hsiu Weng M.D. and Shan-Lin Hsu M.D.
- The American Journal of Sports Medicine – Eccentric Loading, Shockwave Treatment, or a Wait-and-See Policy for Tendinopathy of the Main Body of Tendo Achilles**
By: Jan D. Rompe, M.D., Bernhard Nafe, M.D., John P. Furia, M.D. Ph.D., and Nicola Maffulli, M.D., Ph.D., F.R.C.S.(Orth)
- The American Journal of Orthopedics – Safety and Efficacy of ESWT for Chronic Lateral Epicondylitis**
By: John P. Furia, M.D.
- Techniques in Foot and Ankle Surgery – Shockwave Therapy for Treatment of Foot and Ankle Conditions**
By: Alastair Younger, MB, ChB, FRCSC
- Shockwave Therapy for the Treatment of Chronic Proximal Hamstring Tendinopathy in Professional Athletes**
By: Angelo Cacchio, Jan D. Rompe, John P. Furia, Piero Susi, Valter Santilli and Fosco De Paulis
- Shockwave Therapy Compared with Intramedullary Screw Fixation for Nonunion of Proximal Fifth Metatarsal Metaphyseal-Diaphyseal Fractures**
By: John P. Furia, MD, Paul J. Juliano, MD, Allison M. Wade, MD, Wolfgang Schaden, MD, and Rainer Mittermayr, MD
- Repetitive Low-Energy Shockwave Application Without Local Anesthesia is More Efficient Than Repetitive Low-Energy Shockwave Application with Local Anesthesia in the Treatment of Chronic Plantar Fasciitis***
By: Rompe JD, Meurer A, Nafe B, Hofmann A, Gerdesmeyer L.
- Radial Shockwave Therapy in Calcific Tendinitis of the Rotator Cuff** Dr. P. Magosch, ATOS Clinic Heidelberg (Germany)
- Radial Extracorporeal Shockwave Therapy Is Safe & Effective in the Treatment of Chronic Recalcitrant Plantar Fasciitis**
By: Ludger Gerdesmeyer, MD, PhD, Carol Frey, MD, Johannes Vester, PhD, Markus Maier, PhD, Lowell Weil Jr, DPM, Lowell Weil Sr, DPM, Martin Russlies, PhD, John Stienstra, DPM, Barry Scurran, DP, Keith Fedder, MD, Peter Diehl, MD, Heinz Lohrer, MD, Mark Henne, MD, and Hans Gollwitzer, MD
- Physical Therapy – Effectiveness of Radial Shockwave Therapy for Calcific Tendinitis of the Shoulder: Single-Blind, Randomized Clinical Study**
By: Angelo Cacchio, Marco Paoloni, Antonio Barile, Romildo Don, Fosco de Paulis, Vittorio Calvisi, Alberto Ranavolo, Massimo Frascarelli, Valter Santilli, Giorgio Spacca
- Low-Energy Extracorporeal Shockwave Therapy as a Treatment for Medial Tibial Stress Syndrome**
By: Jan D. Rompe, Angelo Cacchio, John P. Furia and Nicola Maffulli
- Extracorporeal Shockwave Therapy Compared with Surgery for Hypertrophic Long-Bone Nonunions**
By: Angelo Cacchio, Lucio Giordano, Olivo Colafarina, Jan D. Rompe, Emanuela Tavernese, Francesco Ioppolo, Stefano Flamini, Giorgio Spacca and Valter Santilli
- Efficacy of Extracorporeal Shockwave Therapy in Frozen Shoulder**
By: Badak Vahdatpour, Parisa Taheri, Abolghasem Zare Zade and Saeed Moradian
- Efficacy of Extracorporeal Shockwave Therapy for Knee Osteoarthritis: a Randomized Controlled Trial**
By: Zhe Zhao, MD, Rufang Jing, MD, Zhan Shi, Ph.D., Bin Zhao, MD, Quan Ai, MM, and Gengyan Xing, MD
- Current Concepts of Shockwave Therapy in Stress Fractures**
By: Carlos Leal, Cristina D'Agostino, Santiago Gomez Garcia, Arnold Fernandez
- Clinically Relevant Effectiveness of Focused Extracorporeal Shockwave Therapy in the Treatment of Chronic Plantar Fasciitis. A Randomized, Controlled Multicenter Study**
By: Hans Gollwitzer, MD, Amol Saxena, DPM, Lawrence A. DiDomenico, DPM, Louis Galli, DPM, Richard T. Bouche, DPM, David S. Caminear, DPM, Brian Fullem, DPM, Johannes C. Vester, Carsten Horn, MD, Ingo J. Banke, MD, Rainer Burkart, MD, and Ludger Gerdesmeyer, MD
- Antibacterial Effects of Extracorporeal Shockwaves***
By: Gerdesmeyer L, von Eiff C, Horn C, Henne M, Roessner M, Diehl P, Gollwitzer H. Klinik und Poliklinik fur Orthopadie und Sportorthopadie der Technischen Universitat Munchen, Munchen, Germany

Non-Invasive Natural Healing with Directed Energy™

Chapter 3

An Introduction to PEMF

Pulsed Electro-Magnetic Frequency - PEMF



Dr. Larry Basch, D.C., CCSP, CCEP, ICSC

Certified Sports, Extremity, International & Military Sports Chiropractor

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www.RechargePulseWave.com

First, A Few HealthCare Facts:

This paper discusses a novel therapy which is very different from the “traditional medicine” approach to health care. Our goal should always be to seek safe, effective, natural approaches to health care and disease prevention **as the first choice.** Based on theories from some of the greatest minds and scientific pioneers, PEMF evolved. I have incorporated PEMF therapy combined with other various forms of what I call “Directed Energy” such as joint manipulation, shockwave, whole body vibration, myofascial methods and nutrition to assist the body’s innate ability to heal naturally. As a Doctor of Chiropractic, my profession is considered an outsider for maintaining a natural non-invasive approach. But look at some of these facts, side effects and follow the money of medicine in the USA!

Modern medicine has made many miraculous discoveries and treatments. However, our current health care model has been dominated and controlled by the powerful American Medical Association (AMA), Lobbyist and the Pharmaceutical companies, all who spend millions of dollars annually (AMA spent \$18 million in 2016)³ in the education, promotion, and advertisement for the use of drugs to treat most all human ailments. These two groups contribute tens of millions of dollars each year to lobby the politicians to pass legislation in favor of medicine and drug companies (From 1998 to 2014, Big Pharma spent nearly \$2.9 billion on lobbying expenses, more than any other industry. The industry also doled out more than \$15 million in campaign contributions from 2013-14.)⁴ Big Pharma spends **19 times** more money on *ADVERTISING* than they do on *RESEARCH* of the drugs they want us to consume! Therefore, anything questioning the standard American Medical & pharmaceutical approach to health is viewed as alternative, often questioned as a threat to the control of the AMA, Big Pharma & Insurance companies.

Yet, Low Back Pain is now the No. 1 disability in the world¹. A 2016 study from John Hopkins University, published in the prestigious British Medical Journal confirms that **Medical Errors in the U.S. are now the THIRD Leading cause of Death in the USA.**²

The Centers for Disease Control and Prevention recently classified prescription **drug abuse** in the United States an **epidemic**. The U.S. is home to about **4.5 % of the world’s population**, yet **we consume 56% of all the medications in the world AND 80% of the world’s pain medication**. Yet we are ranked 37th in the world in overall health. Nonsteroidal anti-inflammatory drug (NSAID) use in the U.S. increased 41% from 2005 to 2010.⁹ It has been estimated conservatively that **16,500 NSAID-related deaths** occur among patients with rheumatoid arthritis or osteoarthritis every year in the United States.¹⁰ Ninety-one Americans die every day from an opioid overdose.¹¹

This paper will discuss a relatively new therapeutic modality called **Pulsed Electro-Magnetic Field or PEMF**. A therapy that is **Safe, Pain Free, Non-Pharmacological, Non-Invasive** and effective because it works on the cellular and molecular level with no side effects!

I also incorporate expert Joint Manipulation, Shockwave therapy, Whole Body Vibration, Laser, Nutrition, Oxygen, and Electrically Charged, Micro-Clustered Hydrogen Alkaline Water.

Contact me for more details

Shouldn’t this type of therapy be our first choice?

Our U.S. HealthCare System is Broken



Sorry folks, there is **NO MAJIC PILL**



Forget the Drugs, Needle or Surgery



Repair - Restore - ReCharge

with

***Non-Invasive Natural Healing with Directed Energies
PEMF, ShockWave, Whole Body Vibration & More***

***Safe, Non-Invasive, Non-Surgical Treatment of
Muscle, Soft Tissue, Skin Conditions, Joint, Bone, Neurological Conditions and more!***

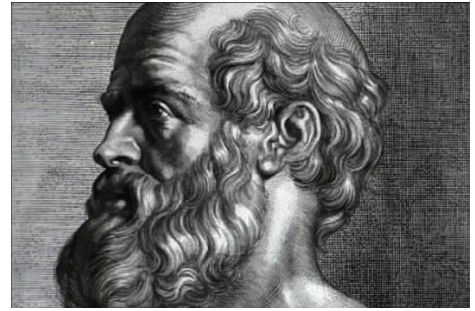
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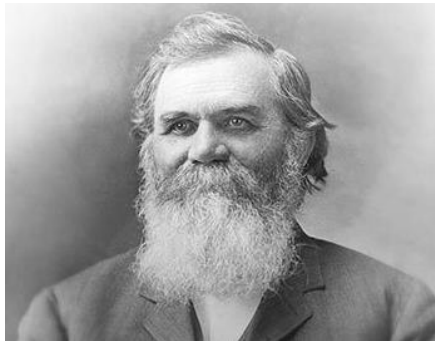
Important Notice: This document does not provide any healthcare or medical advice. It is intended for educational informational purposes only. It is not intended to be a substitute for advice provided by a doctor or other qualified healthcare professional. It is not meant to diagnosis or suggest treatment. Never ignore professional medical advice in seeking treatment because of something you have read in this document. If you think you may have a medical emergency, immediately call your doctor or dial 911.

Way Ahead of their Time, Thinking Outside the Box

The pioneering Greek physician Hippocrates, known as “The Father of Western Medicine”, said “Look well to the spine for the cause of disease”.



Hippocrates

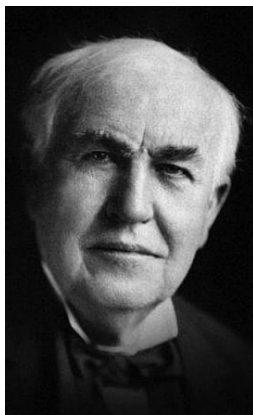
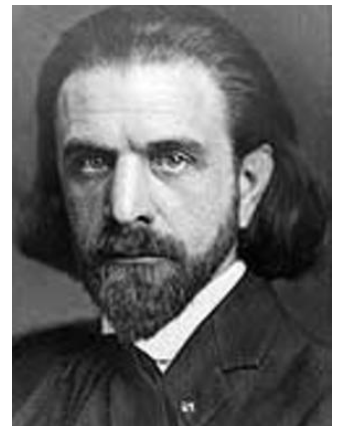


There is a vast difference between treating effects and adjusting the cause.

*D.D. Palmer, D.C.
Founder of Chiropractic*

Medicine is the study of disease and what causes man to die.
Chiropractic is the study of health and what causes man to live.

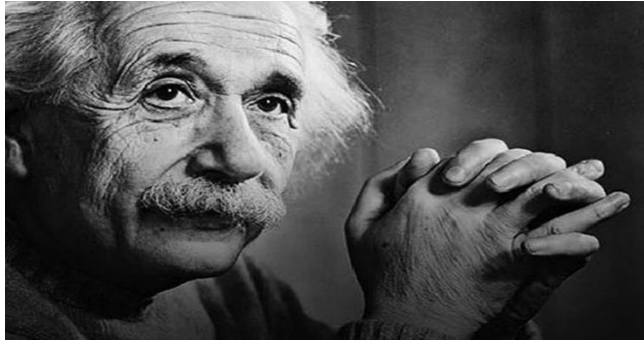
B.J. Palmer, D.C.



“The doctor of the future will give no medication but will interest his patients in the care of the human frame, diet and in the cause and prevention of disease”

Thomas Edison

Way Ahead of their Time, Thinking Outside the Box

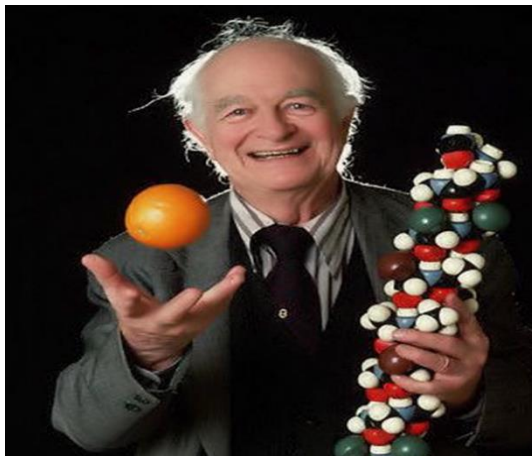
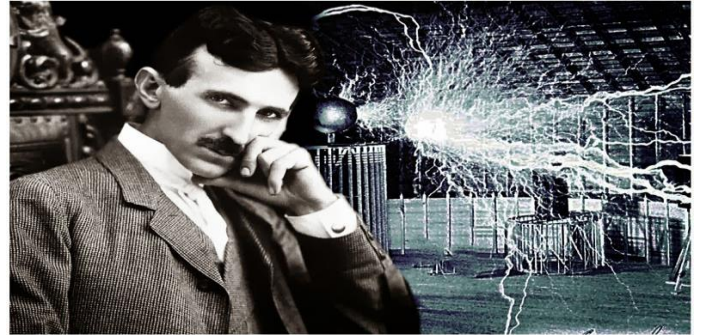


The future of Medicine will be the Medicine of Frequencies.

Albert Einstein

If you want to find the secrets of the Universe, think in terms of Energy, Frequency and Vibration

Nikola Tesla



All Cellular Activity can only take place thanks to Electrical Impulse. PEMF is a benefit for mankind, from the infant to the geriatric, and it will lead to a change in the paradigm of Medicine.”

Linus Pauling, PhD x2

2-Time Nobel Prize Winner

In the 1930's YALE MEDICAL UNIVERSITY published **93 Papers** on BIOLOGICAL ELECTRICITY

He discovered that the DEPLETION OF ELECTRICAL ENERGY FIELD of an organ preceded the onset of general “UNWELLNESS” AND EVENTUALLY DISEASE. But If that energy is restored, the disease does not manifest! *This Amazing research was forgotten due to WW II.*

Professor Harold Burr



So What is PEMF?

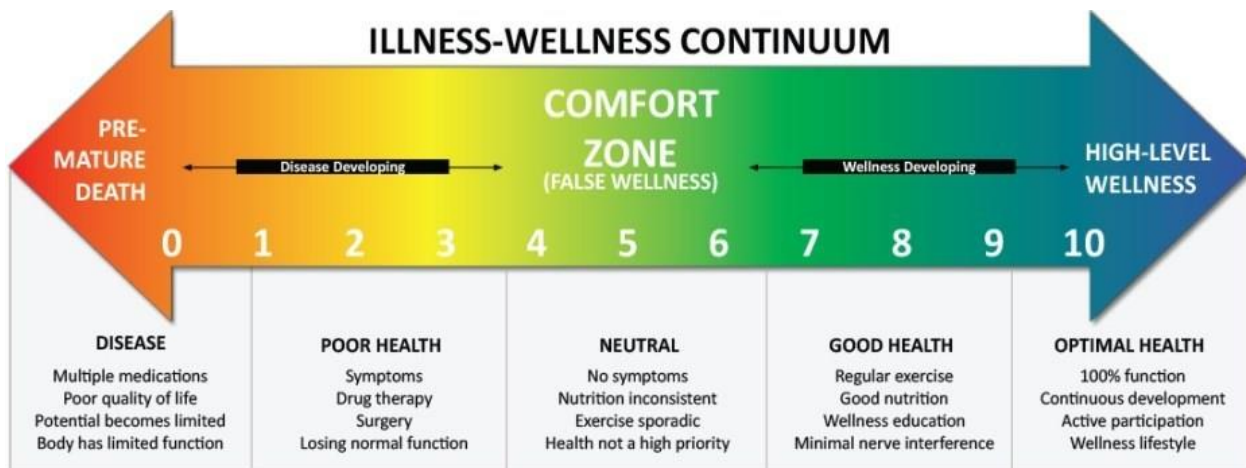
PEMF stands for **Pulsed Electro-Magnetic Field**, a soothing and Electro-Magnetic therapeutic modality that can help people across a wide spectrum of health care and wellness to stimulate their cells for enhanced cell function, pain reduction, improved cell wellness and energize all aspects of their lives.

I use Pulsed Electro-Magnetic Field Therapy as a part of my “Directed Energy”™ treatment approach to relax muscles, increase range of motion, reduce pain, and assist the body towards improved cell function to achieve safe, non-invasive, natural healing and recovery. Larry Basch, D.C.

The principles of PEMF were first described by Nikoli Tesla in 1898. In modern health care, we have numerous therapies which use slightly different types of energy which is directed into the body to affect changes in tissues. We use our hands to direct energy into tissues via manipulation, massage, myofascial therapy. When PEMF energy is delivered into the body, I call this a form of *Directed Energy*™ which is affecting significant electrical changes on a cellular level at the cell membranes, including the nervous system, and even down to the molecular level. This increases cellular oxygenation and nutrient exchange, increases micro-circulation, reduces pain, thereby enhancing the body’s natural healing and regenerative processes.

Researchers have known for years that disruption of the electromagnetic energy in cells causes impaired cell function. PEMF Therapy address the impaired biochemistry and function of the cells, which in turn improves health by delivering beneficial health-enhancing energy to every cell in the body.

If you hold two magnets and try to force them together, you feel the resistance between them, this is a static magnetic field. A pulsing magnetic field is generated by moving a changing electric current through a magnetic coil. This is called an electromagnetic field. Today, researchers have bridged the gap between early pioneering discoveries and modern technology to create a natural alternative for greater cell function, blood circulation & wellness. PEMF can help to mitigate pain, stimulate immune support, improve performance, and enhance organ and brain function as well as so much more.

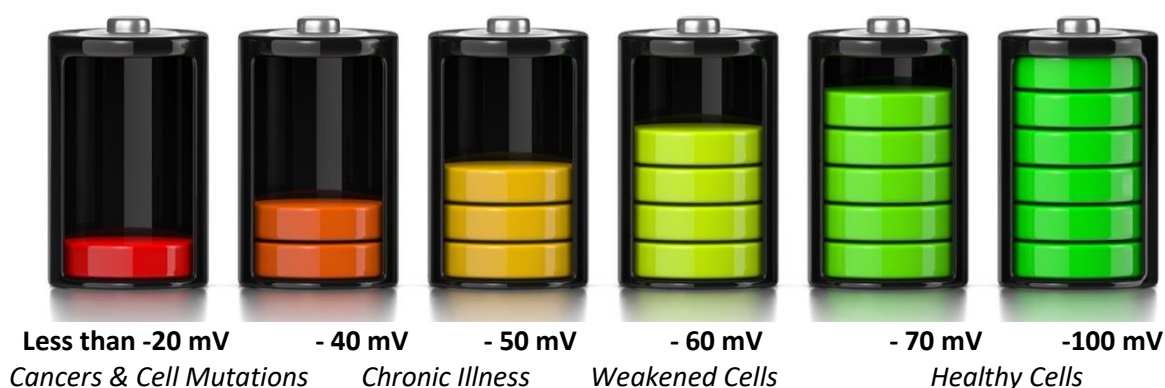


PEMF Therapy is like Re-Charging a drained battery which is not functioning properly.

Nothing happens in the body without an Electro-Magnetic Energy exchange.

All 70 - 100 trillion cells in the body communicate via Electro-Magnetic frequencies.

All Living Cells have an Electrical Charge across the Cell Membrane



PEMF does the Following

Reduce	Accelerate	Improve	Balance
Acute & Chronic Pain	Soft Tissue Repair	Cell Regeneration	Immune Balance
Inflammation	Muscle Relaxation	Blood Circulation	Blood Oxygenation
Muscle Tightness	Bone Regeneration	Energy Production	Intracellular Minerals
Platelet Adhesion	Recovery from Activity	Arthritis Mobility	Endocrine Function

Improves Blood Flow

PEMF has been proven to **IMPROVE MICRO-CIRCULATION BLOOD FLOW** up to **30%**.

PEMF increases **CELL OXYGEN ABSORPTION** up to **200%**.

Improves Brain Function and Focus

PEMF exercise directly stimulates your brain, leaving you feeling energized & focused.

Improves Relaxation and Sleep

Energizing your cells with PEMF can help you relax and sleep soundly. That extra rest can mean less stress, and improved overall health.

Reduces Pain, Maximize Bone and Joint Health

Many people have experienced pain relief through long-term improvements to their bone and joint health. PEMF can lead to a more active and pain-free lifestyle

History of PEMF

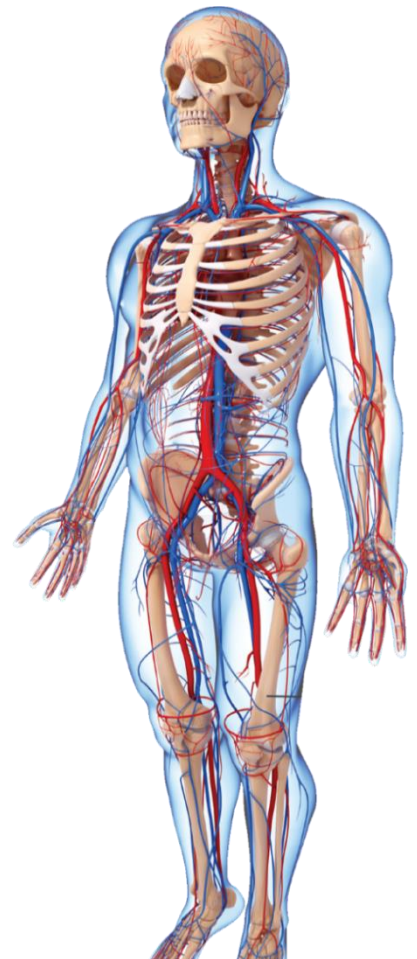
Pulsed Electromagnetic Field Therapy might seem like a new technology in North America, but it has been safely used throughout Europe and other countries for more than 50 years. The science behind PEMF is a well-studied methodology and is based on research of Nikola Tesla over 100 years ago. Electromagnetic field therapy has been in use since the invention of electricity, and positive effects were well established by the mid 1900's. The earliest commercially produced low PEMF devices entered the market in the early 1900's. Although electricity's potential to aid bone healing was reported as early as 1841, it was not until the mid-1950s that scientists seriously studied the subject.

PEMF is a non-invasive, drug free method to create increased micro-circulation, muscle stimulation, and long term pain relief that helps you return to a normal, active lifestyle. It is also used as a wellness and recovery therapy for athletes.

According to research from Harold Burr, PhD at Yale Medical University from as far back as **1932**, it was discovered that the depletion of electrical energy field of an organ preceded the onset of general "unwellness" and eventually disease. If the electrical imbalance is corrected, the disease does not manifest. **Professor Burr published 93 papers on Biological Electricity. Pulsed electromagnetic field is a donating source of energy that helps the weakened cells repair and regenerate and naturally, enhancing the functionality of cells.**

High Power PEMF devices entered the market around 1975, with a focus on the health of bones, muscle, nerves, tendons, ligaments and cartilage. Thousands of studies have proven the benefits of PEMF and it is a widely used therapy for multiple conditions, improved health and enhanced performance of people and animals around the world. PEMF therapy has several FDA approvals and used by a variety of healthcare providers and by athletes in most all professional sports. PEMF is now in the process of being approved for many other uses, including sports injuries. The benefits of PEMF therapy have been demonstrated through more than 2000 University level, double blind, medical studies and thousands of research papers validating the therapeutic benefits of PEMF. (Read thousands of peer-reviewed abstracts on PEMF therapy at www.PubMed.com & www.pemfinfo.com)

PEMF was widely adopted in East and Western Europe but its use was restricted to animals in North America where Veterinarians became the first health professionals to use PEMF therapy, usually to heal broken legs and heal skin wounds in racehorses. PEMF has also demonstrated an ability to increase micro-circulation, increase cellular and tissues regeneration and to quickly reduce pain.



*As **Dr. Magda Havas**, Professor of Environmental & Resource Studies at Trent University states, "PEMF (pulsed electromagnetic field) devices DO NOT treat a specific condition. Instead, they OPTIMIZE the body's natural self-healing and self-regulating function."*

After early space travel in the 1960's, American astronauts returned to earth very sick and with depleted strength and energy. In 2003, NASA's [Johnson Space Center](#) made the study of PEMF a priority for helping astronauts reduce bone loss and muscle atrophy, as well as supplementing the body's natural healing processes while engaged in space exploration. NASA scientists observed a new, previously unreported illness experienced by a number of the first astronauts. This illness came to be known as "space sickness". NASA eventually determined the decreased exposure to the earth's magnetic field was found to be responsible for the astronauts "space sickness". This sickness was due to being cut off from the earth's magnetic charge.

Once NASA equipped space capsules with Pulsating Magnetic Fields, the astronauts no longer faced the same problems with sickness and lack of energy. Since those historic flights, zero field studies, experiments done in chambers made of metal which blocks all magnetic fields of the earth have confirmed that living cells will die within hours if they do not receive the PEMF's of the Earth. That includes human cells. So PEMF's are as much required element of health as food water, oxygen and sleep. In fact, you can live longer without food and water than you can without PEMFs. Some call PEMF the fifth essential element to life.

In 2003 NASA's four year, multi-million-dollar research study concluded:

PEMF therapy is the most effective form of healing for the Repair and Regeneration of human and animal cells. ¹⁸

PEMF has been used in the International Space Program.

Hospitals use PEMF therapy to accelerate the healing of fractures which can be treated even through a plaster cast, since magnetic fields permeate all materials.

PEMF Therapy is a proven safe and very effective for pain management and, chronic conditions. Madigan Army Medical Center, Tacoma, WA, USA conducted a double blind test for migraines with PEMF therapy with positive results of 75% showing decreased headache activity. From clinical experiments, we know that PEMF can reduce pain sensations almost immediately.

It is known that when chronic stress in the endocrine system, especially the adrenal glands, becomes depleted, this leads to reduced endocrine function. This can lead to low energy or Adrenal Fatigue and/or Adrenal Exhaustion, commonly called "burn out". Every cell in our body eventually dies and is replaced with new cells. This is the cycle of life, but proper energy and nutrients are required.

Regular use of PEMF can help you keep this cycle running like it should and maintain your health. The direct effects of PEMF electromagnetic fields are: improved neuron firing, calcium ion movement, membrane potentials, endorphin levels, nitric oxide, dopamine levels, and nerve regeneration. Indirect benefits of magnetic fields on physiologic function are on: circulation, muscle, edema, tissue oxygen, inflammation, healing, prostaglandins, cellular metabolism, and cell energy levels.

All these affects help reduce inflammation and promote healing and is safe, non-invasive and has no side effects. PEMF is a therapy is a viable alternative to drugs for the treatment of pain and inflammation in that is related to a variety of causes such as arthritis, surgery, and wounds. Without the use of drugs, PEMF has proven to improve circulation, increase blood oxygen, relax muscle spasms, enhance muscle tone, and increase range of motion.

We can also think of PEMF as a battery recharger for the human cell. We now know that the voltage of a healthy cell is about -70 millivolts and when we get sick that voltage can drop to as low as -30 millivolts or lower in the cases of cancers. Pulsed electromagnetic fields (PEMF) act like a catalyst and battery recharger for the human cells and these PEMF's are critical for human cell metabolism.

PEMF is used to positively impact energy within the body by directing a non-invasive form of repetitive electromagnetic pulses into the body towards the affected cells, stimulating a healthier response. PEMF re-energizes weakened, aging and damaged cells by inducing electrical charges within the cell helping to restore it to its normal healthy state.

All types of cells respond: muscle cells, blood cells, brain cells, bone cells. Why? The magnetic field "permeates" all cells in the body simultaneously, down to the last molecular level --reaching parts of the body that cannot be influenced efficiently with other methods to enhance ion exchange, cell voltage, normalize circulation, and increase the oxygen utilization of the cell. Acute and even chronic conditions may disappear completely.

We know that most all medication interfere with normal healthy cell function. However, unlike medications, PEMF actually improves cell function, with no side effects.

PEMF is often called cellular exercise since it will "exercise" or pump the human's cells to help the cell membranes more readily take in water, minerals, and nutrients. This will "plump" up the cells with water and healthy nutrients, allowing them to function better and produce energy more efficiently without interfering with normal function.

If cells do not receive the PEMFs of the earth, they die within hours. Human beings, as well as all earthly life forms, are somehow energetically attuned to the weak background magnetic field of the planet. The earth emits a magnetic field, but you may not realize that this magnetic field changes with time and has a very precise frequency and intensity that drives all life on planet earth. Much more than a simple directional guidance for birds, bees and human navigation, this pulsed electromagnetic field of the earth is the catalyst, the very spark of all biochemical reactions occurring in life forms. We as humans need these pulsating magnetic fields not only to be healthy, but actually stay alive!

Because of the earth's weakening magnetic field and the steel and concrete structures we inhabit; we are not getting the full benefit of the earth's electromagnetic field. We are constantly exposed to high frequency electromagnetic pollution today, which weakens cells. This comes from computers, TV's, cordless phones, cell towers and cell phones, and the rollout of 5G presents some serious concerns.

Which would **you** rather be?



A healthy cell is like a fresh picked grape.

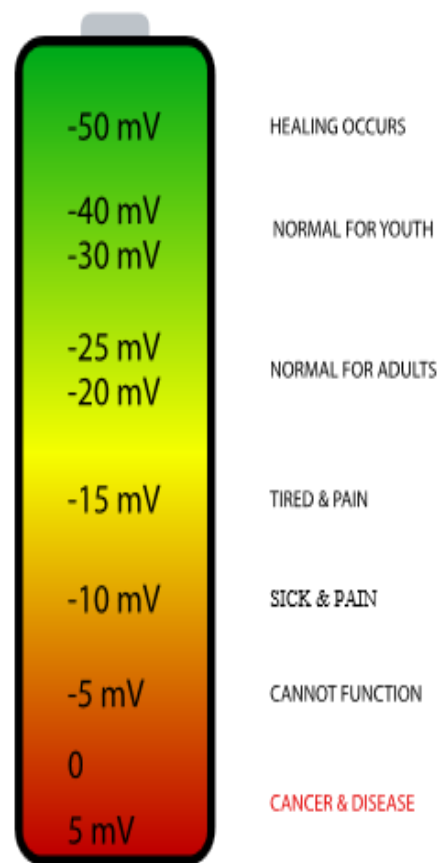
PEMF penetrates into the body to affect the trillions of cells, delivering healthy energy to cell membranes and into the cells organelles. This stimulates cellular metabolism by increasing the flow of electrons and ions across the cell membrane. This effect involves a chain of biochemical reactions within the cells, which then increases the cells intake of oxygen and nutrients across the cellular membrane, while increasing the removal of cellular waste and toxins out of the cell which leads to the improvement of health without side effects. PEMF therapy increases blood micro circulation and nerve activity in and around damaged tissue, which also helps damaged cells heal, naturally.

Perhaps the easiest way to understand PEMF is to think in terms of each cell in your body as if it were a little battery. Like with any battery, sometimes your cells become tired and worn, whether due to age, stress, overuse, or damage, making it more difficult for them to function properly and leading to cellular damage, which is linked to pain, aging and more serious issues affecting cell's DNA.

PEMF therapy has proven beneficial in stimulating cellular metabolism, increased blood and fluids circulation, tissue regeneration and immune system response. PEMF treatment is effective at increasing bone formation and bone density, healing fractures, recovery from wounds and trauma, graft and post-surgical issues, recovery from myocardial and brain ischemia (heart attack and stroke), tendonitis, osteoarthritis, and urinary incontinence, prostate issues, impaired neural function or spasticity from central nervous system diseases such as multiple sclerosis and spinal cord damage.

The restoration of human cell function is what sets this technology apart from all other devices, as it helps your cells function better. PEMF therapy does not treat a specific condition. Instead, it optimizes the body's natural self-healing and self-regulating function. PEMF therapy improves recovery from sports activity, and may improve performance in athletes. PEMF re-energizes the cells leaving you feeling relaxed, energized and with a sense of well-being. PEMF can be a standalone therapy. However, when used in combination with other synergist therapies which can be added to a treatment plan, we can achieve greater pain reduction and restoration of health, safely and naturally.

When cells are toxic, degenerated, or damaged, the cell membrane gets thick and stiff; therefore, the electrical and chemical receptors don't function properly. During a PEMF session when the pulsating field reaches the cells, the cell membranes are exercised and they become more flexible and more vital, like they were when they were younger and healthier. The cells expand, fresh nutrients and oxygen rush into the cells. The cells then contract and push toxins out. As a result, the cells are cleansed and refreshed.



A common cause of confusion regarding Pulsed Electromagnetic Field (PEMF) therapy is that it is associated with the harmful **Electromagnetic Fields (EMFs)** that are present within the environment. However, the pulsed electromagnetic fields differ from the harmful electromagnetic fields in several ways. Continue reading for more information on the main differences between PEMF and EMFs.

Magnetic frequencies help to regulate several processes of the human body. In fact, our bodies even produce their own magnetic fields. However, when artificial and harmful electromagnetic fields enter your body, such as those from cell phone service or power lines, they can disrupt the way your body naturally works, creating an imbalance. This can cause changes to any of the natural systems within your body, from your stress levels to your sleep cycles, to your DNA. This imbalance may also make your body more susceptible to disease.

Beyond the effects of these electromagnetic fields on your body, the differentiating factors, or what actually makes one frequency harmful, and the other beneficial are the exposure time, the wavelength, and the frequency. Harmful electromagnetic fields have been recognized in various research studies to have significantly higher frequencies and lower wavelengths than therapeutic PEMFs. Most PEMF devices use low frequencies and long wavelengths, ranging from 1 to 10,000 Hertz, and do not produce any heating action. In comparison, a microwave, which produces harmful EMFs can use frequencies in the range of 100,000,000 Hertz.

The demand is increasing for effective natural treatment option without harmful side effects of drugs. Diabetic patients have seen reduced pain from neuropathy with PEMF stimulation of nerve cell repairing in a matter of weeks. Athletes and body builders use PEMF to get better focus and performance before an event and immediately after to maximize the speed of recovery of sore muscles, tissues and ligaments.

FDA Approval of PEMF

PEMF therapy has several U.S. FDA approvals as well as Health Canada (HC) and European Medicines Agencies (EMA) Approvals.

- 1979:** FDA approved PEMF therapy for the healing of nonunion **Fractures** & stimulating **Bone Growth**. This has applications for bone degenerating diseases like osteoporosis and boosting the healing of fractures.
- 1987:** FDA approved PEMF as an adjunct therapy for reducing post-operative **Edema** and **Pain**. Edema plagues millions of people in the U.S., and it is specifically an issue for people with diabetes.
- 1998:** FDA approved PEMF Therapy for **Urinary Incontinence** and muscle stimulation.
- 2004:** FDA approved PEMF to be used as an adjunct to **Cervical Fusion Surgery**. Cervical fusion is a permanent change to the spinal anatomy. Often, patients still experience residual pain even after this surgical procedure. PEMF is used to reduce this residual, chronic pain.
- 2008:** FDA approved PEMF for treatment of **Depression** and **Anxiety** for those who have shown to be unresponsive to medication. The applications of this are monumental! Depression and anxiety go hand in hand and are a struggle for millions of Americans. Both are highly responsive to PEMF.
- 2011:** FDA approved PEMF Therapy for treatment of **Brain Cancers**.
- 2015:** FDA reclassified PEMF devices from their existing Class 3 category to a Class 2 status, and most PEMF devices that are sold today in the United States are FDA registered as wellness devices.

Continued research shows remarkable results with wound healing and recovery, reduction of prostate inflammation, urinary incontinence, gout flares, chronic migraines, and the list goes on.

What does PEMF treat?

Theoretically, PEMF manufacturers will make no claim to treat any condition, but rather the goal is to improve cellular function, reduce pain and aid in recovery by affecting the most basic of human physiology, improved cell function.

Most all health conditions can benefit from ***Increased Micro-Circulation, Increased Oxygenation Of Tissues, Increased Electrolyte Uptake*** resulting in improved cellular function and increased cell energy.

PEMF shouldn't be thought of as "treating" conditions, but rather as a modality that optimizes the natural self-healing environment within our body.



What are the benefits of PEMF Therapy?

- ***Improves Depression***
- ***Improves Physical Energy***
- ***Improves Sleep***
- ***Strengthens Immune Function***
- ***Improves Bone Healing & Bone Density***
- ***Reduces Acute & Chronic Pain***
- ***Helps with Muscle Pain & Fibromyalgia***
- ***Improves Osteoarthritis Pain***

- ***Faster Recovery from Injury & surgery***
- ***Increases Blood Circulation***
- ***Increased Oxygenation & Calcium influx***
- ***Improves Cell Function***
- ***Reduced Soreness, muscles & cramping***
- ***Improves Cell Health & Function***
- ***Shows promise in helping with the future of regenerative medicine***

Dr. Terry Tennant, MD, Author of "Healing is Voltage": states
"All Life is Energy, and all energy is electromagnetic. The cells require electricity. When cells drop their electrical charge to a certain level, they become sick. The first signs of illness is usually pain. Chronic disease (pain) is always defined by low electrical charge."

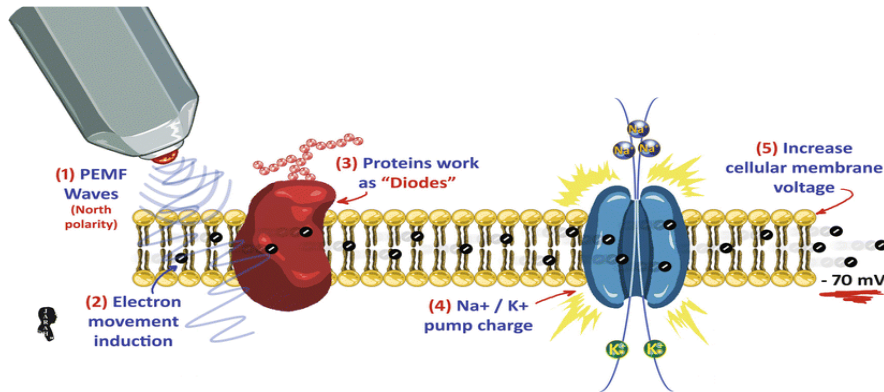
Concluding, ***"With enough voltage and raw materials, the body can heal almost anything."***

Physiological Effects of PEMF Therapy

Depolarization of Cell Membranes

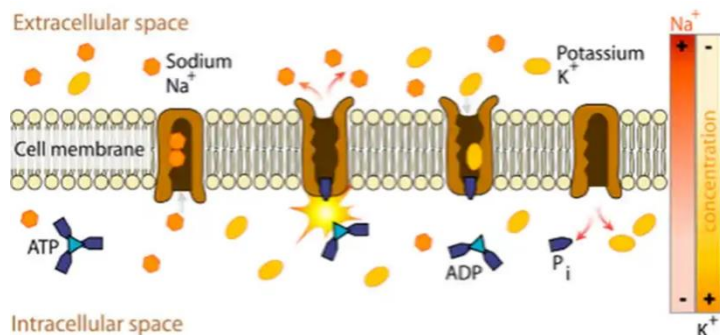
- Increased Cell Membrane Permeability via **Depolarization**
- Temporarily hyperpolarize and depolarize the cellular and intracellular membranes, increasing cellular oxygenation and nutrient uptake increased toxin release from cells.
- Increasing cell membrane permeability means the cells can breathe better; they can take in oxygen easier, and push toxins out more efficiently. This also means nutrients and medicines are more bioavailable.
- Increases the TMP (Trans Membrane Potential) and ion flow across the cell membrane by Stimulating the Na^+/K^+ pump and taking Na^+ out with K^+ into the cell (7)
- Cellular electrical properties such as membrane surface charge & membrane potential can be readily influenced (7)
- Temporarily hyperpolarize and depolarize the membrane thus increasing cellular oxygenation and nutrition. Increased cell membrane permeability allows better oxygen and nutrient uptake by the cells and increased toxins release from the cells (7)

Depolarization Improves Cell & Nerve Function, Increased ATP Production



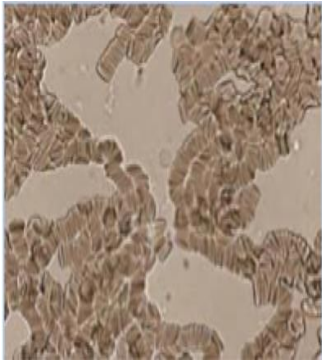
Increased Action Potential (channel opening) Requires Electrical Activity.

The cell membrane itself has a voltage (**transmembrane potential**). The channels in the membrane are opened or closed based on **polarity of the membrane**. When the channels are **closed**, a cell membrane is at its **potential** and when it is open, it is at its **potential**. Once all channels are open, the membrane potential is so great that the polarity of the membrane reverses, and then the channels begin to close. As the entry channels close, exit channels are activated. Once the process is complete, all channels close and the membrane returns to its resting potential. During this process, the electrical potential of the membrane rapidly rises. This allows the channels to open up. As the channels open, ions flow into the cell. This then causes a further rise in the membrane potential, prompting even more channels to open up. This process produces an electric current (and therefore magnetic field) across the cell membrane, and the cycle continues.



Improved Blood Flow

Before PEMF



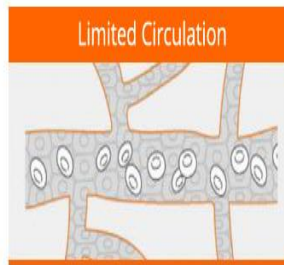
Red Blood cells Clumped together
This is Called Rouloux formation
Poor Blood flow & oxygenation

After PEMF



Reduced Rouloux formation
Much better blood flow
Better flow & oxygenation of tissues

Before PEMF



Limited Circulation

After PEMF



Significantly Improved Circulation

**NASA Study Confirmed this Increased Blood Flow
PEMF Reduces Rouloux formation in capillaries**

Improved Blood Flow and Circulation

- It is indisputable that healthy blood circulation is vital to good health and the most basic functions of PEMF in the body is increased micro circulation. When a cell (such as a red blood cell) is injured or ill, it does not hold its ideal electrical charge. This causes red blood cells to stick together or clump, making circulation slow. When a magnetic field passes through the red cell, the membrane becomes properly charged, allowing the cell to repel itself and keep itself separate from other red cells, thereby increasing circulation. In addition, PEMFs increase various chemicals including nitric oxide within the blood vessel walls that cause the blood vessels to dilate, improving the amount of blood flowing through the vessels and therefore increasing the amount of oxygen delivered to the tissues. Blood is the body's universal means of transport; oxygen, nutrients, chemical messengers (e.g., hormones) and immune cells are all transported through our blood. When our body's cells, tissues and organs are adequately nourished and metabolic waste products are removed, our bodies become healthy and function properly. Many musculoskeletal issues are directly related to diminished circulatory system which can result in dysfunctional metabolic processes.
- PEMF also increases lymphatic flow and drainage.
- Circulation is increased in the area treated with PEMF **immediately**.
- Stimulates blood flow and lymphatic movement and drainage.
- Increased Circulation reduces tissues inflammation
- Increases nutrient & oxygen deliver to tissues & cells.
- Improved Circulation decreases inflammation and Oxidative Stress thus harmful free radical production.
- Immediate increase in vascular flow, enhancing circulation. (9)
- Improved circulation and oxygenation (9)
- Increases circulation by restoring normal Ca^{2+} ion flux and $\text{Na}^{+}/\text{K}^{+}$ balance (10)
- Thirty minutes of treatment induced an increase in microvascular blood flow and tissue oxygenation that persisted for at least 3 hours. (11)

General exhaustion of the body, caused by stress, injury, or chronic disease, will reduce the cell's trans-membrane potential (TMP). If this potential approaches the zero level, the cell dies. A cell uses 50% of its internal energy to maintain this trans-membrane potential. When PEMF is used, it has been shown to increase in the oxygen content of the blood and in turn within the cell, and the trans-membrane potential is said to be normalized. Healthy cells have an internal charge of -70 to -100 mV or millivolts, weakened or injured cells have -30-60mv, cell death or cancer occurs at -20 mv or below.

*** PEMF has been shown to improve Micro-Circulation blood flow up to 30%.**

*** PEMF has been shown to increase Cell Oxygen Absorption by up to 200%.**

Figure 1 Below shows a comparison of blood flow after stimulation of the right foot (red) versus the absence of stimulation to the left foot (blue).

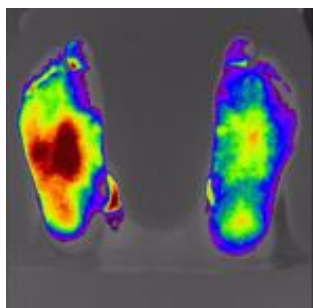
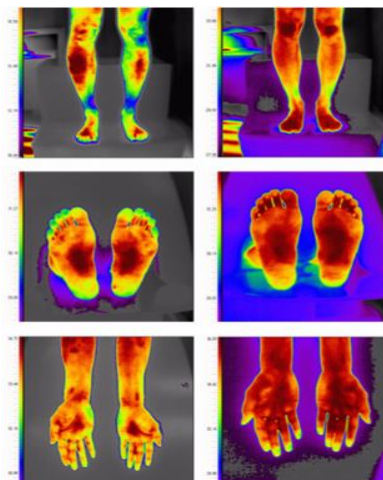


Figure 2 Right

shows before (left) and after (right) images of various body parts stimulated with PEMF. The increase in red color on the right corresponds to the increase in oxygenated blood flow to those body areas after PEMF stimulation.



Nitric Oxide Production Increased

- Nitric Oxide (NO) acts to open up blood vessels and improve circulation.
- Modulates the release of NO from eNOS and potentially affect the entire tissue repair pathway, from pain and edema to angiogenesis, bone and tissue regeneration, and other regenerative action (9)
- Increase the rate of Ca^{2+} binding to CaM, which then catalyzes cNOS (eg., eNOS), producing an immediate (within seconds) production of NO. (9)
- Mechanically stimulates lymphatic drainage and blood flow (9)

Decreased Inflammation

- Inflammation is a primary cause of many chronic conditions. This is often due to an impairment of oxygenation of cells.
- PEMF helps regulate pro-inflammatory cytokines.
- Protect tissue from the high inflammatory cytokine environment (1)
- When left unregulated, chronic inflammation is a major cause of chronic conditions and autoimmune dysfunction. When the cells work harder to absorb oxygen necessary to produce cellular energy, those cells go into oxidative stress. This leads to an over production of free radicals and premature cell death or apoptosis.
- Reduce some of the most well-known pro-inflammatory cytokines such as tumor necrosis factor- α (TNF- α), interleukin (IL)-1 β , IL-6, and IL-8 release (2)
- Increase A2A and A3 adenosine receptor expression, contributing to suppression of pro-inflammatory cytokine release, such as TNF α and IL-1, which are harmful to cartilage homeostasis (4,5)
- Stimulate matrix synthesis and, at the same time, suppress inflammatory cytokines. (6)
- Bring the inflammatory milieu back to homeostasis (7)
- Decrease in TNF- α , a **pro** inflammatory cytokine involved in systemic inflammation, produced mainly by activated macrophages. In activated MSCs, cytokine IL-3 and IL-4 results showed a stabilization of these signaling molecules after cells were exposed to PEMF

PEMF - Enhanced Muscle Function

- PEMF increases cell energy and muscle mass. Optimal muscle energy allows muscle to work harder longer and harder, and recover quickly. Muscles that are contracted or in spasms are better able to relax, reducing tension and pain associated with spasms.

PEMF - Stress Reduction

- Stress is part of life. Normal stress (called eustress) is necessary for survival. Too much stress is very harmful to the body and accelerates aging, increasing the risk for injury and delayed recovery. It is said that stress is responsible for at least 65% of our illness, so stress reduction is necessary for all of us. Magnetic fields have many stress reducing effects, helping our bodies deal with and recover from excessive stress.

PEMF - Reduced Pain and Inflammation

- PEMF has been shown to be effective at reducing acute and chronic pain both short term and long term. This occurs due to changes in the trans-membrane potential of the cells. This increased cellular membrane flexibility allows for an influx of calcium, sodium, potassium and chloride ion exchange across the cell membrane channels. This depolarizes membranes, increasing nerve transmission while reduces pain signals. PEMF also reduces inflammatory chemical compounds similar to that of non-steroidal anti-inflammatory medications, without the liver and kidney side effects. ***Safe Natural Pain Relief.***

PEMF – Accelerates Bone Healing

- PEMF works as a catalyst to increase bone density and improve healing rates. PEMF stimulates bone cells to proliferate, differentiate and mineralize. PEMF has been shown to improve the quality of bone tissue and enhance bone preservation, whether they are damaged by surgery, injury or disease. PEMF increases the calcium binding chemicals within both damaged and healthy bones. This will accelerate healing of fractures as well to improve bone regeneration and increase bone density in fractures and osteopenia – osteoporosis.

Improved Tissue Repair

- Improved Tissue Repair means faster healing and recovery time.
- Regulates immune cell signaling mechanisms to promote tissue regeneration⁸
- Treatment for inflammatory regulation to be used to promote tissue regeneration⁸
- 59% increase in the tensile strength of the treated wound and a 69% increase in the tensile strength of the tendon (9)
- Muscle Relaxation
- Improved Circulation helps to relax muscles and decreases lactic acid buildup.
- Increased flow of ions that promote relaxation such as Calcium (10)
- Reduces the physiological deficits associated with Delayed Onset Muscle Soreness (12)

Improves Mitochondrial Function

- Cells function and create energy more efficiently and are less prone to diseases and malfunction.
- Enhanced brain mitochondrial function by 50-150% across six established measures, being greatest in cognitively important brain areas (13)

Improved Immune Function

- Poor regulation of inflammatory/immune function can allow acute-phase inflammatory response to become chronic, initiating disease and inhibiting tissue regeneration.
- Achieving homeostasis in the face of acute inflammatory/immune challenges in the human body involves maintaining a balance of highly complex biochemical and cellular interactions. When this delicate balance is upset, acute inflammatory and immune responses designed to quickly eliminate a transient threat become chronic, and inflammatory and/or autoimmune disease sets in. PEMF has the potential to regulate this very delicate balance. (8)
- By restoring normal Ca^{2+} ion flux and $\text{Na}^{+}/\text{K}^{+}$ balance, the cell can begin the process of down-regulating inflammatory cytokines (7)

Increase in Antioxidants

- Antioxidants help to stabilize free radicals. Free radicals cause early cell death, and lead to early aging with chronic diseases such as cancer.
- Increase in antioxidant enzymes activity; CAT, SOD (SOD1 and SOD2), and glutathione peroxidase (GPx1 and GPx4) (14)

Reduce Oxidative Stress

- When your cells are not receiving enough Oxygen (inflammation) Oxidative Stress occurs and free radicals are produced.
- Decreased the level of parameters of oxidative stress (14)
- Act on radical production and in medium with oxygen also to radical oxygen species (ROS) (15)
- Protect the liver from oxidative stress injury by decreasing MDA and GSSG level, promoting reduced GSH level, and increasing GSH-Px activity and expression (16)
- Modulate defenses against Reactive Oxygen Species (17)

Improved Cartilage production

- Cartilage allows your joints to move smoother, and act as a cushion at the ends of your bones where they connect to joints.
- Increased the synthesis of the major component of cartilage matrix, known as proteoglycans (18) c Stimulate proliferation of healthy human chondrocytes (19)
- Enhance IGF-1 expression, which participates in chondrocyte metabolism (20) Collagen is increased: 3 weeks of 2 h per day PEMF therapy increased the expression of GAG & Coll II (21)
- Helps to downregulate MMP13 expression of knee joint cartilage (22)
- Increase production of collagen, the major differentiated function of fibroblasts (23)
- Cellular Proliferation and DNA Synthesis
- DNA Synthesis is the most essential part for biological inheritance. Cellular proliferation is the creation of new cells, essential to life.
- Stimulate cellular proliferation and DNA synthesis through opening of voltage-sensitive calcium channels (24)

Apoptosis

- Programmed cell death (apoptosis) occurs naturally, and is a function of the body to guard against malfunctioning cells. However, this can also occur due to free radicals running rampant. When this occurs, necrosis follows if left unchecked, and diseases such as cancer.
- Suppress cartilage degeneration via the inhibition of chondrocyte apoptosis by increasing the expression of anti-apoptotic proteins (20)
- Affects induction of apoptosis (25)
- Decreases the elevated levels of ER chaperons Grp94, PDI and the apoptosis marker CHOP in human liver carcinoma cell lines (28)
- Decrease of measured cell death parameters (early and late apoptosis as well as necrosis) (9)

Stem Cells

- Stem Cells serve as a repair system for the body. c Increase the beneficial effect of chondrogenic differentiation from stem cells (20)
- Important role in promoting the osteogenic differentiation of human bone marrow stem cells (BMSCs) (26)

Neovascularization

- Formation of new blood vessels.
- Significantly increased neovascularization (9)
- Positive and restorative effect on proangiogenic molecules such as VEGF10 Nerve Regeneration
- Regrowth of nerve fibers (axons) is essential to repair and functional recovery of the spinal cord.
- Reduced nerve growth factor-like activity and levels (in doing so), may act on brain derived neurotrophic factor, ciliary neurotrophic factor insulin-like growth, fibroblast growth factor , and glia-derived neurotrophic factor (27)

Conditions Improved With PEMF

Arthritis

- Not only alleviates the pain in the arthritis condition but it also affords chondro-protection, exerts anti-inflammatory action and helps in bone remodeling and this could be developed as a viable alternative for arthritis therapy (30)

Degenerative Joint Disease (DJD)

- Improve clinical scores and function in patients with osteoarthritis of the knee and should be considered as adjuvant therapies in their management (31)
- After 1 month, PEMF induced a significant reduction in VAS pain and WOMAC scores compared with placebo.
- Pain tolerance and physical health improved in PEMF-treated patients. Twenty-six per cent of patients in the PEMF group stopped NSAID/analgesic therapy. No adverse events were detected (32)
- Improve bone and cartilage turnover in an animal model of OA (33)
- Data strongly support the clinical use of PEMFs in OA patients (34)
- Increased the Osteoarthritis chondrocytes (35)
- A two sample Student's t-test comparing change in knee-related pain, stiffness, and physical function for PEMF-treated leg vs control leg showed a significant difference in favor of PEMF therapy (36)

Tendonitis/Carpal Tunnel

- Carpal Tunnel - Reduction in pain, improvement in the electrophysiological studies, and handgrip strength. There are no reported side effects, discomforts, or known health risks (37)
- There was objective improvement in nerve conduction, and subjective improvement on examination and pain scores (38)
- Tendonitis - Enhance Ca(2+) binding in the growth factor cascades involved in tissue healing, achieved a marked increase of tensile strength (9)

Pain Reduction

- Neck Pain - pain severity declined by the end of the first day and continued to decline throughout the seven days of treatment; over the entire week, pain levels were lower than in the sham group (39)
- Safe for domiciliary use and this study suggests that PEMT has a beneficial effect in the management of the acute whiplash injury (75)
- Post Operative Pain : Associated with trends for a reduction in pain, compared to sham treatment(40)
- Effective for pain management in both simple and complex surgeries (41)
- Considerable and statistically significant potential for reducing pain in cases of lumbar radiculopathy and the whiplash syndrome (42)
- Pain had decreased in the active cohort by nearly a factor of three times that for the sham cohort (9)

Oncology/Cancer

- Inhibit cancer growth (43)
- Inhibit angiogenesis in tumor tissues, suppressing tumor vascularization and reducing tumor growth (43)
- Increase in tumor necrosis factor alpha levels that induce an anti-tumoral response (43)
- Slower tumor growth rate if compared with untreated control group44 c Increased Drug Uptake (2 Fold) to Tumor Cells (45)
- Increase effectiveness of treatments for Cancer when PEMF is used at the same time drugs are administered (45)
- Daily PEMF was found to retard angiogenesis and growth of a human breast cancer xenograph causing the tumor CONDITIONS IMPROVED WITH PEMF 15 to develop proportionately larger areas of necrosis and hypoxia and smaller areas of proliferative active cancer cells (46)
- In combination with Gamma Irradiation, there were significantly fewer lung metastatic sites and slower tumor growth than did untreated mice (47)
- Exhibited a potentiation of the antitumor effect of mitomycin (48)

Migraines

- Significant improvement in the days and duration of headaches, work-loss hours and number of medications (49)
- Exposure of the inner thighs to pulsing electromagnetic fields for at least 3 weeks is an effective, short-term intervention for migraine (50)

Stroke

- Protective effect of PEMFs on hypoxia damage in neuron-like cells which suggest a potential therapeutic approach in cerebral ischemic conditions (2)
- Improves motor condition as well as mental efficiency. PEMF significantly boosts the effectiveness of rehabilitation (14)
- Reduced ischemic neuronal damage in the most anterior coronal level by 69% and by 43% in the striatum. Implications for the treatment of acute stroke (54)
- Effective treatment for patients after traumatic or ischemic brain injury 55 and no effects on hormonal and sexual function or any side effects (51)

Diabetic Retinopathy

- Patients were treated over a 6-week period. 76% of the patients had a reduction in the level of numbness and tingling (53)

BPH / Prostate

- Reduce Prostate Volume after 28 days of therapy. Symptoms improved in a short time, with high compliance and no effects on hormonal and sexual function or any side effects (51)
- PEMF and exercise therapy is beneficial in the treatment of BPH (52)

Alzheimers/Dementia

- Long-term exposure to high frequency electromagnetic field treatment not only prevents or reverses cognitive impairment in Alzheimer's transgenic mice, but also improves memory in normal mice. This could have profound value in the disease's prevention and treatment through intervention at the mitochondrial level (56)

Depression

- Improve effectiveness of anti-depressants (57)
- Showed a clinically and statistically significant better outcome than patients treated with sham T-PEMF, with an onset of action within the first weeks of therapy. Effect size on the Hamilton 17-item Depression Rating Scale was 5% confidence interval .21–1.02). (62)
- Treatment-emergent side effects were few and mild (57)

Insomnia

- Seventy percent of the patients given active treatment experienced substantial or even complete relief of their Insomnia complaints (58)

Ununited Fractures

- More successful than noninvasive traditional management and at least as effective as surgical therapies (59)
- Treat patients suffering from delayed fracture healing and nonunions (60)

Chronic Low Back Pain/Non-specific Low Back Pain

- Decreased the level of pain and improved the function in subjects61 c Safe and effective in improving function in patients with non-specific LBP.(62)
- Adding pulsed electromagnetic field to Conventional physical therapy Protocol yields superior clinical improvement in pain, functional disability, and lumbar ROM in patients with non-specific low back pain (63)
- Decrease pain, LBP disability, increase lumbar spine mobility, and improve HRQOL in middle-aged university's employees with nonspecific LBP (64)

Tennis Elbow (Lateral Epicondylitis)

- Pain during exercise and when bending the wrist was significantly reduced. The study results confirmed that pulsed magnetic therapy quickly reduces pain caused by so-called golf or tennis elbow.(65)
- Effective in decreasing pain and improving function in participants with LE. (66)

Osteoporosis

- Prevent bone loss and improve lipid metabolism disorders (67)
- Stimulate osteoblastogenesis, suppress osteoclastogenesis, and influence the activity of bone marrow mesenchymal stem cells (BMSCs) and osteocytes, ultimately leading to retention of bone mass and strength (60)
- May have clinical application in the prevention and treatment of osteoporosis (68)

Rheumatoid Arthritis

- Emerging as a novel and highly promising means of treating chronic inflammation and aberrant immunity that exists in diseases such as RA⁷
- The positive role of pulsed electromagnetic field (PEMF) therapy in rheumatoid arthritis (RA) is known. Varying effects of the therapy in alleviating the different symptomatology indicate that the rheumatoid factor (RF) is more resistant to PEMF

Nonalcoholic Fatty Liver Disease

- Increase antioxidant enzymes activity and alleviate lipid accumulation in fatty liver (16)

Sciatica

- Could be considered as an effective, safe and tolerable treatment for peripheral nerve repair in clinical practice (27)

Bone Remodeling

- Helps in bone remodeling (69)

Analgesic Use

- The net reduction in pain on the VAS was equivalent to a low to moderate dose of opioid analgesic in PEMF-exposed patients. when an opiate such as morphine is used in combination with PEMF, the side effects of the opiate may be reduced (39)
- Analgesic use during the first 24 hours after C-section was 1.9-times lower in the active-PEMF group. The total analgesic use during the seventh postoperative days was 2.1-times lower in the active-PEMF group than in the sham group (70)
- Effective in rapidly reducing use of narcotic medications (41)
- Patient use of postoperative pain medication correspondingly also decreased nearly three times faster (9)

Mobility and Function

- Improved mobility, pain scores, and energy level in fibromyalgia and chronic musculoskeletal pain patients (72)
- Beneficial effects on the pain, exteroceptive sensation, range of motion, and daily functioning of patients (73)

Overactive Bladder Syndrome

- In patients with neurogenic Overactive Bladder Syndrome induced an inhibitory effect on neurogenic detrusor overactivity (74)

Post-Operative Recovery

- Typically used for postoperative pain management with the expectation of a significant reduction in the use of narcotics and/or nonsteroidal anti-inflammatory drugs, earlier hospital discharge, and/or an earlier return to function¹⁴ c Postoperative pain was significantly lower in all the measured periods within the early and the late postoperative periods. Fewer experienced severe postoperative pain within 24 hours postoperatively (70)
- Seven days postoperatively, patients in the active-PEMF group had better wound healing with no exudate, erythema, or edema (70)
- Effective in rapidly reducing post-operative pain. (41)

Non Healing Wounds

- In the treatment of chronic non-healing wounds, the recommended treatment is 30 minutes twice per day until the wound is closed. Closure of chronically open wounds may be seen in 6 to 10 weeks with this treatment. (9)

Herniated Disk

- Potential therapy to protect tissue from the high inflammatory cytokine environment during disc degeneration (71)

Lumbar Fusion

- Fusion succeeded in 97.6% of the PEMF group and in 52.6% of the unstimulated group. The observed agreement between clinical and radiographic outcome was 75%. The use of PEMF stimulation enhances bony bridging in lumbar spinal fusion (44)

PEMF Classification

PEMF is classified as a Class II device, meaning no specific medical claims are made. This also means there is no special license or training required for its purchase or use. It is not intended to diagnosis or treat any specific condition, but rather help to increase natural cell function and energy. PEMF is often called cellular exercise because of the pulsing or pumping of fluids into the cells and muscle contractions often felt. Within PEMF, there is low power or micro-power and high power PEMF.

PEMF Side Effects

There are no side effects to PEMF therapy. PEMF passes thru health tissues. However, some the patients might feel some muscle soreness or tingling due to improved circulation, but this is not a contraindication. It is recommended to increase water intake and if possible add additional minerals.

PEMF Contraindications

DO NOT use PEMF on anyone with **IMPLANTED ELECTRICAL DEVICES** including pacemakers, cochlear implants, intrathecal pumps, etc., cannot use PEMF because the magnetic field can disable or shut the devices off. Persons with active bleeding or hemorrhaging conditions or during heavy menstruation should not use PEMF. PEMFs have not been proven safe for pregnant women. People with organ transplants on immunosuppression or epilepsy should not use PEMF.

But that leaves an extremely large population that can benefit safely from PEMF. The sheer volume of potential patients that are eligible for treatment make this a valued treatment option for a wide variety of the population.



Contraindications to PEMF: **DO NOT use PEMF** if you are *pregnant, have a pacemaker, defibrillator, cochlear hearing device, insulin pumps, actively bleeding or have blood clots or after recent surgery*. Always consult with your healthcare provider.

Caution: Always remove any battery powered or electrical appliances such as cell phone, watch, car keys, credit cards to avoid any possible issues with PEMF energy.

“Based on research that was done at YALE UNIVERSITY, it is apparent that just about Any Pathology in the body is preceded by a **DROP IN CELL ELECTRICAL CHARGE.**

Now we have technology with PEMF that will reach down to the level of the cell that has lost charge and, due to the high intensity of the pulse, bring that pulse back to normal or a more normal situation, which allows it to replicate and produce a more normal cell.”

A common cause of confusion regarding Pulsed Electromagnetic Field (PEMF) therapy is that it is associated with the harmful **Electromagnetic Fields (EMFs)** that are present within the environment. However, the pulsed electromagnetic fields differ from the harmful electromagnetic fields in several ways. Magnetic frequencies help to regulate several processes of the human body. In fact, our bodies even produce their own magnetic fields. However, when artificial and harmful electromagnetic fields enter your body, such as those from cell phone service or power lines, they can disrupt the way your body naturally works, creating an imbalance. This can cause changes to any of the natural systems within your body, from your stress levels to your sleep cycles, to your DNA. This imbalance may also make your body more susceptible to disease.

Beyond the effects of these electromagnetic fields on your body, the differentiating factors, or what actually makes one frequency harmful, and the other beneficial are the exposure time, the wavelength, and the frequency. Harmful electromagnetic fields have been recognized in various research studies to have significantly higher frequencies and lower wavelengths than therapeutic PEMFs. Most PEMF devices use low frequencies and long wavelengths, ranging from 1 to 10,000 Hertz, and do not produce any heating action. In comparison, a microwave, which produces harmful EMFs can use frequencies in the range of 100,000,000 Hertz.

The demand is increasing for effective natural treatment option without harmful side effects of drugs. Diabetic patients have seen reduced pain from neuropathy with PEMF stimulation of nerve cell repairing in a matter of weeks. Athletes and body builders use PEMF to get better focus and performance before an event and immediately after to maximize the speed of recovery of sore muscles, tissues and ligaments.

PEMF is a non-invasive, drug free method to create increased micro-circulation, muscle stimulation, and long term pain relief that helps you return to a normal, active lifestyle.

It is also used as a wellness and recovery therapy for athletes.

RESEARCH - 10,000 Research papers & 2000 Published Studies

Below is just a sampling of some of the many published studies found in PubMed on PEMF - <http://www.pubmed.gov>

Ankle Sprains - Military Medicine PMID: 8441490

Acutely sprained ankles represent a frequent and common injury among active duty troops in training, and are a significant source of morbidity with respect to days lost to training. In a randomized, prospective, double blind study of 50 grade I and II (no gross instability) sprained ankles, a statistically significant decrease in edema was noted following one treatment with pulsed electromagnetic field (PEMF) therapy. The application of this modality in acutely sprained ankles could result in significant decreases in time lost to military training.

Back Pain - Neuro Rehabilitation PMID: 12016348 - Back pain and the whiplash syndrome are very common conditions involving tremendous costs and extensive medical effort. A quick and effective reduction of symptoms, especially pain, is required. Magnetic fields appear to have a considerable and statistically significant potential for reducing pain in cases of lumbar radiculopathy and the whiplash syndrome.

Low Back Pain - Research PMID: 16749411 - This randomized, double-blind, placebo-controlled clinical trial studied the effectiveness of pulsed electromagnetic therapy (PEMT) in patients with chronic lower back pain. PEMT produced significant pain reduction throughout the observation period compared with baseline values. The percentage change in the NRS score from baseline was significantly greater in the PEMT group than the placebo group at all three time-points measured. The mean revised Oswestry disability percentage after 4 weeks was significantly improved from the baseline value in the PEMT group, whereas there were no significant differences in the placebo group. In conclusion, PEMT reduced pain and disability and appears to be a potentially useful therapeutic tool for the conservative management of chronic lower back pain.

Low Back Pain - Journal of International Pain Practice PMID: 17714104 - We evaluate the efficacy and safety of therapeutic electromagnetic fields (PEMF) on chronic low back pain. Secondary objectives included the investigation of the effects of PEMF on psychometric measures. Both groups improved over time. Although groups were similar during the treatment period, treated subjects (PEMF of 15 mT) improved significantly over sham treatment during the 2-week follow-up period (20.5% reduction in pain); there were no reported serious adverse events. This study demonstrates that PEMF may be an effective and safe modality for the treatment of chronic low back pain disorders.

Bone Healing - BMC Musculoskel. Disord. 2013 PMID: 23331333 Fracture patients treated with an early application of PEMF achieved a **significantly** increased rate of union and an overall reduced suffering time compared with patients that receive PEMF after the 6 months or more of delayed union.

Stimulation Of Bone Formation And Fracture Healing With Pulsed Electromagnetic Fields: Biologic Responses And Clinical Implications - International Journal Of Immunopathology And Pharmacology Vol. 24, no. 1 (S2), 17-20 2011 - **PEMF exerts its beneficial effect on fracture biology** through an impressive wealth of mechanisms and pathways.

Bone Density - The Journal of Bone and Mineral Research PMID: 2195843

The data suggest that properly applied PEMFs, if scaled for whole-body use, PEMF may have clinical application in the prevention and treatment of osteoporosis.

Cartilage - Knee Surgery, Sports Traumatology, Arthroscopy PMID: 17333120

Severe joint inflammation following trauma, arthroscopic surgery or infection can damage articular cartilage, thus every effort should be made to protect cartilage from the catabolic effects of pro-inflammatory cytokines and stimulate cartilage anabolic activities. Previous pre-clinical studies have shown that pulsed electromagnetic fields (PEMFs) can protect articular cartilage from the catabolic effects of pro-inflammatory cytokines, and prevent its degeneration. The percentage of patients who used NSAIDs was 26% in the active group and 75% in the control group. At 3 years follow-up, the number of patients who completely recovered was higher in the active group compared to the control group. Treatment with I-ONE aided patient recovery after arthroscopic surgery, reduced the use of NSAIDs, and also had a positive long-term effect.

Chronic Pain - Pain Research & Management PMID: 16770449

Specific pulsed electromagnetic fields (PEMFs) have been shown to induce analgesia (anti-nociception) in healthy human volunteers. These findings provide some initial support for the use of PEMF exposure in reducing pain in chronic pain populations and warrants continued investigation into the use of PEMF exposure for short-term pain relief.

Knee Pain - Alternative Therapies in Health and Medicine PMID: 11565402

Low-amplitude, extremely low frequency magnetic fields are safe and effective for treating patients with chronic knee pain due to osteoarthritis. Reduction in pain after a treatment session was significantly greater in the magnetic field-on group (46%) compared to the magnetic field-off group (8%).

Knee Arthritis - Wiener Klinische Wochenschrift PMID: 12602111

In patients with symptomatic osteoarthritis of the knee, PMF treatment can reduce impairment in activities of daily life and improve knee function.

Erectile Dysfunction - Vopr Kurortol Fizioter Lech Fiz Kult PMID: 17882824

Combined treatment with local negative pressure and pulsating magnetic field conducted in 116 patients with erectile dysfunction aged 20-60 years produced optimal treatment results. Recovery and improvement of the erectile function were achieved in 85.7% patients given local vacuum magneto-therapy.

Erectile Dysfunction - Lik Sprava PMID: 8819933

An effect was studied of appliances for magneto-therapy on sexual function of 105 men presenting with sexual problems. A total of 96 patients were examined according to a general program, to study placebo-effect. The magnetic field beneficial effect was recordable in 70-80 % of the patients, that of placebo in 33 % men. It is suggested that augmentation of sexual activity is associated with an increase in cavernous blood flow.

Myofascial Pain - Clinical Neurophysiology PMID: 12559244

The repetitive magnetic stimulation (rMS) group showed a significant improvement in VAS, NPDVAS, algometry, as well as in the characteristics of the therapy device after conclusion of treatment. Improvements in the ROM were also present in rotation and contralateral bending. This improvement persisted after 1 month. On the other hand, the placebo group did not show any significant improvement in the tests considered. The results of this study show that peripheral repetitive magnetic stimulation (rMS) may have positive short- and medium-term therapeutic effects on myofascial pain.

Neck Pain - Annales de Readaptation et de Medicine Physique PMID: 17229483

Patients' with chronic neck pain preferences were for pulsed electromagnetic field (PEMF). At 6 months, in the PEMF group, 33 patients were improved, 5 not improved and 4 lost to follow-up. In the spa therapy group, 24 patients were improved, 14 not improved and 6 lost to follow-up, for significantly greater improvement in the PEMF than spa therapy group ($p=0.02$). Significant improvement was seen in both groups in terms of pain score, Copenhagen scale score and score on some dimensions of the MOS SF-36 survey. PEMF seems to be superior to standard spa therapy group without massage in control of neck pain. The difference between groups, although perhaps biased, seems to suggest the importance of our conclusions.

Neuralgia - International Association for the Study of Pain PMID: 12927617

Pulsed radiofrequency treatment has been described as a minimal invasive alternative to radio-frequency thermocoagulation for the management of chronic pain syndromes. We present here our first five high-risk patients with idiopathic trigeminal neuralgia who were treated with pulsed radiofrequency after multidisciplinary assessment; with a mean follow-up of 19.2 months (range 10-26). These patients were at high risk due to age, co-morbidities or previous interventional and surgical treatments. An excellent long-term effect was achieved in three of the five patients, a partial effect in one patient and a short-term effect in one patient. No neurological side effects or complications were reported.

Osteoarthritis - Journal of Rheumatology PMID: 8478852

An average improvement of 23-61% occurred in the clinical variables observed with active treatment, while 2 to 18% improvement was observed in these variables in placebo treated control patients. No toxicity was observed. The decreased pain and improved functional performance of treated patients suggests that this configuration of PEMF has potential as an effective method of improving symptoms in patients with OA. This method warrants further clinical investigation.

Osteoarthritis - Knee/Cervical Spine - Journal of Rheumatology PMID: 7837158

We conducted a randomized, double blind clinical trial to determine the effectiveness of pulsed electromagnetic fields (PEMF) in the treatment of osteoarthritis (OA) of the knee and cervical spine. Matched pair tests showed extremely significant changes from baseline for treated patients in both knee and cervical spine studies at the end of treatment and the one month follow up observations, whereas the changes in the placebo patients showed lesser degrees of significance at the end of treatment. PEMF has therapeutic benefit in painful OA of the knee or cervical spine.

Pain - Pain Medicine PMID: 18777606

PEMF exposure in refractory CTS provides statistically significant short- and long-term pain reduction and mild improvement in objective neuronal functions. Neuromodulation appears to influence nociceptive-C and large A-fiber functions, probably through ion/ligand binding.

Rotator Cuff Tendonitis - The Lancet PMID: 6143039

The value of pulsed electromagnetic fields (PEMF) for the treatment of persistent rotator cuff tendonitis was tested in a double-blind controlled study in 29 patients whose symptoms were refractory to steroid injection and other conventional conservative measures. At the end of the study 19 (65%) of the 29 patients were symptom-less and 5 others much improved. PEMF therapy may thus be useful in the treatment of severe and persistent rotator cuff and possibly other chronic tendon lesions.

Tinnitus - Clinical Otolaryngology and Allied Sciences PMID: 8877185

At the end of one week of treatment, each patient noted whether their tinnitus had completely disappeared, was improved, unchanged or made worse by the treatment. 45% of the patients who completed the trial were improved by the active device, but only 9% by placebo). We suggest that electromagnetic stimulation may be an effective treatment in some tinnitus sufferers.

Wounds - Volpr Onkol PMID: 11147428 - Journal of Plastic and Reconstructive Surgery PMID: 19008935

Treatment for wounds included two modalities: standard medication and alternating or pulsating magnetic field. Magnetic therapy proved highly effective: wound healing was 3-3.5 times faster while duration of treatment was 2-3 times shorter than in standard procedure. Clinically-verified partial adhesion-related intestinal obstruction was eliminated by magnetic procedure in 18 children after combined treatment for lymphosarcoma involving the ileum.

Wounds - PEMF was used as an adjunct to basic wound care of 3 large, long-standing (6 years) stage III and IV pressure ulcers that were unresponsive to conventional therapy. The ulcer on the right foot healed within 4 weeks, the left heel ulcer reduced in size by 95% at 7 months, and the large sacral ulcer healed to closure in 11 months. Conclusion: Pulsed radio frequency energy treatment with basic wound care, if administered early in the course of pressure ulcer therapy, might avoid the lengthy hospitalizations and repeated surgical procedures necessary for treatment of uncontrolled ulcers, reducing the overall cost of treatment and improving the quality of life for chronically ill or injured patients.

PEMF Equipment Used

As of 2020, there were 47 different manufacturers of PEMF in the world. Most all are very low or micro-power PEMF mats or rings, some are multi-level marketing. Since the power is so low, the low energy does not penetrate the body very deeply and you typically do not feel much while using these low powered units. Even with daily use, it may take a long time to feel noticeable changes in pain or range of motion for some people. All PEMF works, but in a clinical setting, power and flexibility is vital to success. **As a Sports Chiropractor, I want and need to see RESULTS and FAST and so do my patients!**

There are only a few US manufacturers of High Power PEMF. Once you experience the high power PEMF, you will notice profound effects **IMMEDIATELY**. The higher power produces energy strong enough to affect deeply into the body and provide pain relief very quickly and shorter treatment times are needed. However, there is such a thing as too much power, some Equine units are too strong for humans. Based on my experiences, the power balance & Dual Pulse technology & quality are the key.

POWER = DEPTH OF PENETRATION
HIGH POWER = SHORTER TREATMENT TIME
HIGH POWER = GREAT TISSUE SATURATION

High Power PEMF provides for deeper tissue penetration and more cellular membrane depolarization. This provides for more complete Blood circulation and tissue Oxygenation for better, noticeable results in only minutes. High Power PEMF reaches deep inside your body to exercise your cells. It causes them to expand and contract, as if one was working out at the gym. As your cells expand and contract through boosted voltage, they are able to expel toxins, absorb nutrients, grow, and reproduce more successfully than weak, low-voltage cells. Over time, these strong cells will create more strong cells!

How to Choose a PEMF Machine for Clinic Use?

There are many low power PEMF machines on the market priced from \$1500-\$7000, but low power is more of a home use, wellness device. With these very low power (0.3-0.8 gauss) you do not feel anything at all while using it and it may take days to weeks to notice any type of improvement. However, with High Power PEMF, (5000 – 30,000 gauss) you feel the powerful electro-magnetic energy immediately and see results in minutes!

Remember: POWER = PENETRATION.

Because of my position in the busy military Sports clinics, I have spoken to, or meet with the PEMF manufacturers, owners, CEO's, National Sales managers, distributors, PEMF trainers and sales reps. As a result, I have had the opportunity to try, demo and use (for an extended period of time) several brands of both low power and high power PEMF in my busy military clinic. Based on my experience & clinic trials of several different brands of PEMF machines while working in the busiest U.S. Navy Sports Medicine clinic where I treat US Marines, I believe I have found the best clinical brands of PEMF.

What to Look for When Purchasing a PEMF Machine Why Electrical Safety Certifications are Critical

Professionals and End Users in both the human and animal medical/therapy markets inquire about the validity and purpose of Electrical Safety Testing and Certifications on therapeutic devices offered with the purchase of therapeutic devices.

Medical Grade Electrical Safety Certificates are required for all X-Ray machines, Ultrasound devices, surgical tools, defibrillators, drug pumps, insulin pumps, and glucose monitors. Electrical Safety Standards for the Pulsed Electro-Magnetic Field devices are offered in any market, and what you may be buying is no different. It is crucial that all stakeholders involved in the manufacture and use of RFI-prone (also called radio-frequency interference) medical devices take all necessary steps to avoid serious RFI problems that may lead to safety hazards.

PEMF devices are definitively RFI devices. All PEMF device manufacturers are legally required, by the FDA, to design and test their products to ensure conformance with current RFI standards and educate users of their devices about the possible symptoms and safety concerns of potential RFI. All manufacturers must comply with the FDA, FCC and OSHA Regulations and go through the process of obtaining Electrical Safety Certifications through third party testing in accredited laboratories.

Note: Most of the high power PEMF manufacturers DO NOT Comply with this Law.

After using several brands, I only work with and recommend the following high-quality companies who comply with U.S. government safety guidelines.

ReCharge PEMF / Zimmer Medical / Storz / Chattanooga / Softwave

If you wish to purchase any of these brands, please contact me directly .

**Basically, since 2016, I have done the trials & research in
my busy military clinic for you.
Why would you risk buying a brand that is not fully certified?**

All imported therapeutic devices manufactured abroad certainly have to meet these U.S. safety standards to be sold in the U.S.. **Please Be aware of the many cheap China made copies & knock-offs.**

However, a word of caution. Only one of the High-Power PEMF manufacturer in the U.S. meets these required standards.

ReCharge PEMF units are the Only manufacturer in the world with both Low frequency and High frequency working at the same time, know as **"Dual Pulse Frequency"**

****ReCharge PEMF is made in the USA in a certified manufacturing facilities with all the government safety required UL, CE, & ISO certifications, with Product Liability Insurance, and supports ongoing medical research studies using their own equipment. None of the other U.S. manufacturers do this. Why? \$\$\$***

Distributors, resellers, and the medical practices that purchase PEMF devices must assure all consumers that what they are buying and employing for treatments are safe and compliant with applicable regulatory standards and requirements. High powered PEMF devices are used in a variety of medical and wellness environments, for both human and animal use, as well as for consumer home use. Ask your distributor or factory to show evidence that the devices you are buying (or reselling) have properly passed an Electrical Safety Test and have received Certification. Do they support ongoing clinical studies and research?

**A sample list of accredited laboratories are: Element, Intertek, TUV, United Labs, and Qai. At the very least manufacturers and their distributors should provide links to accredited labs where their PEMF devices have either passed or failed Electrical Safety Testing.*

#1 Recommended Medium Power PEMF **Medium Power / Lowest Price / Single Attachment**

PEMF BRAND NAME: **ReCharge PEMF Model #1 Model DoD HDE 5000**

All-Digital (No Spark Chamber, No maintenance)

A lower powered High Power Unit, but our lowest gauss of high power units, lower cost

Power estimate: 400 gauss to 5000 gauss (.5 Tesla)

Two waves running simultaneously (**Dual Pulse Frequency**) and uses only a single attachment.

Digital / Solid State weighs 9 Lbs

Clinical Package Includes:

1 18 x 24 Pad for complete torso PEMF



***Below are Optional PEMF Accessories sold separately for Model 1 DoD HDE 5000 & the other Recharge PEMF machines**

Pelvic Floor / Prostate / Bladder / ED

358-M-SEAT



Brain / Depression / Alzheimer's/ Anti Aging

346-M-HELMET



Butterfly Loop for Extremities Knee/ Ankle / Shoulder/Elbow



#2 Recommended Medium Power PEMF Medium Power / Medium Price / Dual Attachments

PEMF BRAND NAME: *ReCharge PEMF Model #6 Clinical DUAL DoD CB-6*

All-Digital (No Spark Chamber, No maintenance) A High Power Unit, but lower gauss of high power units, lower cost

Power estimate: 400 gauss to 5,220 gauss (.5 Tesla)

Two waves running simultaneously (**Dual Pulse Frequency**) and able to use **two** attachments to run at the same time and can be synchronized to have both attachment pulse at the same rate at the same time. **Digital / Solid State** weighs 9 Lbs

Clinical Package Includes:

- 1 Paddle, 1 butterfly loop, 1 single loop,
- 2 18 x 24 Pads for complete torso PEMF



#3 Recommended Highest Power PEMF High Power / Higher Price / Dual Attachments

PEMF BRAND NAME: *Recharge PEMF Model #10 Portable DUAL Uni*

This is the best unit for my PEMF In Action - Active Rehab Program

The newest technology unit is All-Digital (No Spark Chamber, No maintenance)

* **Each unit has TWO INDEPENDENT PEMF Machines**

Power: 1.5 Tesla / 15,000 gauss, Two machines in one case

allowing two attachments to run at the same time and can be synchronized to have both attachment pulse at the same rate at the same time.

Two Machines in One, a Dual PEMF Machine

High Power / Digital / Solid State and (**Dual Pulse Frequency**)

Portable, weighs **Only 18 Lbs** (13.25" x 16.75" x 7")

My Military Clinical Package Includes:

- 1 Paddle, 1 butterfly loop, 1 single loop,
- 2 18 x 24 Pads for complete torso PEMF



Used by U.S. Marine Corps Special Forces / Recon Training Command

#4 Recommended Highest Power PEMF

Highest Power / Highest Price

PEMF BRAND NAME: High Energy Inductive Therapy (HEIT) Clinical

Model German Design & Manufactured

30,000 Gauss / 3 Tesla (large applicator)

25000 Gauss / 2.5 Tesla (medium applicator)

2 Channels / **Variable Frequency** 1 - 150 Hz

20 Treatment Protocols / Treatment time 1-60 minutes

8" LCD touch screen / Dimensions

542 (L) × 501 (W) × 993 (H) mm

Weight 132 lbs



Today, top Professional Trainers & Athletes in the NFL, NBA, and MLB use PEMF Therapy. After years of trials, I was successful in bringing PEMF into the military. Now the U.S. Navy Sports Medicine and U.S. Marine Corps Special Forces are using High Power **ReCharge PEMF** brand.



Remember, ReCharge PEMF is the only manufacturer with DUAL PULSE TECHNOLOGY ReCharge PEMF is the Only American Made PEMF APPROVED & ALLOWED for Government /DoD/ Military purchase.

Having used many brands of PEMF and ShockWave, I can help you select the best unit for your personal or clinical needs and budget. One clinic patient per month will cover the lease payment, so this is an easy fit for any clinic.

Note: *IRS Section 179 may allow business owners to deduct the full purchase price of qualifying equipment and software that was purchased or financed during the tax year, rather than depreciating it over the asset's useful life.*

If you are looking to purchase, don't buy from a sales rep; invest and learn from an experienced clinician & colleague. I will train you how to use PEMF in Action.

Contact Dr. Larry Basch, D.C. 858-945-8118 LBASCHDC@gmail.com



Dr. Larry Basch, D.C., CCSP, CCEP, ICSC

U.S. Marine Corps Sports Chiropractor / U.S. Naval Sports Medicine (Retired 2025)

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Due to my persistent efforts & over 4 years of trails, the U.S. Navy Sports Medicine Clinic receives the First ever High Power Clinical PEMF units in Dec 2020.

4 years of Trials & Effort to Get Navy Medicine to Purchase 2 PEMF Systems
High Power PEMF units for my Chiropractic Clinic.
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And due to my continued efforts in 2021, the U.S. Marine Corps – Recon Reconnaissance Training Company gets the First ever Portable PEMF unit.



This paper was organized and compiled by

Dr. Larry Basch, D.C., CCSP, CCEP, ICSC U.S. Marine Corps Sports Chiropractor / U.S. Naval Sports Medicine

With over 32 years of clinical experience as a Board-Certified Chiropractor and having worked in 27 different clinics, I have treated tens of thousands of patients from infants to seniors to world champion power lifters, NFL & NBA professional athletes and rock n roll superstars. I am one of only 11 Chiropractors working on a Marine Corps base. In 2009, I was selected to work at the first full-time Chiropractic clinic at the Officers Candidate School, USMC, Quantico, VA. In 2010, I transferred to Twentynine Palms Naval Hospital, USMC, CA. Since 2011, I have been at the Navy Medicine Multi-Discipline Sports Medicine clinic at Camp Pendleton. I am one of only about 4000 Chiropractors to complete the post-graduate program Certified Chiropractic Sports Practitioner (CCSP) and be nationally certified by American Board of Chiropractic Sports Physicians. Additionally, I am a Certified Chiropractic Extremity Practitioner (CCEP) and International Certificate of Sports Chiropractor (ICSC). I have post graduate training from Olympic and Professional Sports Chiropractors. I have advanced certification in the treatment of whiplash injuries, spinal rehab, acupuncture and extensive training in Clinical Nutrition, Soft Tissue Injuries, Sports Injuries & Spinal Rehab, Laser and PEMF therapy as well as past employment as a Clinical Case Manager doing Insurance review for the nation's largest Chiropractic HMO. Since 2021, I provide Chiropractic Continuing Education seminars and lecture on PEMF, Shockwave and Sports Chiropractic to over 1300 doctors annually. I am also a 10 yr Veteran of USMC and Illinois Army National Guard.

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Provided by the Ph in Physics and Former NASA Scientist, PEMF Manufacturer & Expert

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