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### **Low vs High Intensity PEMF**

#### **History of PEMF**

Pulsed Electromagnetic Field therapy is a technology that has been used internationally for several decades on both humans and animals for healing and improving health in a variety of cases. It has been the subject of research and peer-reviewed papers that have acknowledged its safe and effective use. However, in North America this technology has been regulated and largely restricted to use on animals, and in the United States it is selectively cleared by the FDA for specific medical conditions in humans.

PEMF was approved by the FDA for bone stimulation in 1979, and in 2004 a PEMF system was approved to be used as an adjunct to cervical fusion surgery for patients who are at an increased risk of non-fusion. Additionally, in 2008 high intensity PEMF was approved for patients with depression when pharmaceuticals failed to help. Low intensity PEMF devices have also been cleared for use in the category of massage devices for individuals and practitioners.

#### **Low and High Intensity**

The output potential of a PEMF device is a measurement of the intensity of the magnetic field produced. Low Intensity devices typically produce less than 1,000 Gauss while High Intensity devices produce anywhere from 1,000 to 50,000 Gauss.

PEMF is a unique modality because it takes two intertwined natural forces and applies them to the body on a cellular level. These two forces being electricity, measured in voltage(v), and magnetic induction, measured in Gauss(G or Gs) or Tesla(T). The terms low intensity and high intensity (also referred to as low and high voltage PEMF) are used to characterize PEMF delivery systems based on how much electricity(volts) is generated in order to produce the magnetic field(Gauss).

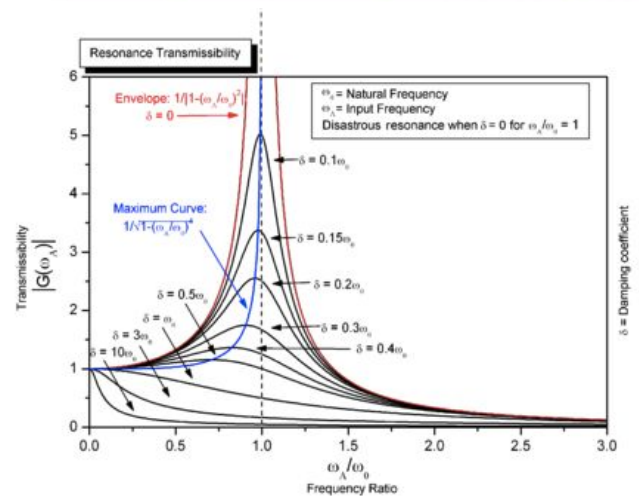
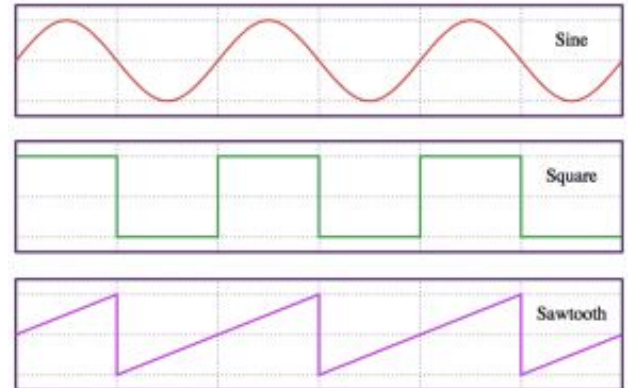
To create a magnetic field powerful enough to be felt by the body requires a high intensity PEMF device engineered to generate a higher voltage than standard 120V outlets provide. This is usually done with a capacitor sized to house the number of volts desired and discharging it to create the desired Gauss(G) output.

## Delivery of the Magnetic Field

Low and High Intensity devices differ not only by the strength of the magnetic field produced but also in the method by which the field is created and delivered. Low Intensity devices are classified as resonant systems and High Intensity devices are classified as impulse systems. These classifications are based upon the method of delivering the magnetic field through either repeated waveforms or impulses.

Resonant devices are designed to deliver magnetic fields at predetermined specific frequencies that maintain a respective waveform. Typically computer regulated, these devices produce a repeating waveform, occasionally sweeping or changing waveform, but repeatedly producing the same waveform for extended periods of time. Generally, waveforms come in the shape of sine, square, or saw tooth form.

Impulse devices are powered by a sudden release of energy that induces a magnetic field in the accessory. After the initial impulse, the energy has reached its peak and then decays producing subsequent echo frequencies and waveforms until its power is completely diminished. It is an ON/OFF direct current delivery that rapidly repeats. The initial field produced is much stronger than those from resonant devices but its peak power lasts for a fraction of a second. It is this very fast rise time that gives high intensity PEMF its ability to create energy in and around the cell. Compare this to a bell being struck—the saying goes “cells are like bells”, so the initial impulse hits the cells that then ring out at their own frequency.



## Efficacy of PEMF

The good news is that today there is an abundance of choices in price, strength, capability, componentry, accessories and dependability. Many PEMF devices can contribute to cellular function and have the potential to stimulate beneficial results. Although, in my experience as an athlete and a practitioner, the low intensity systems don't have the power to penetrate far enough to affect cells deeper in the body. To effectively deliver a pulse adequate to stimulate cells deep within the body, higher intensity systems are needed. Often chronic, deep-seeded issues respond better and faster to high intensity systems.

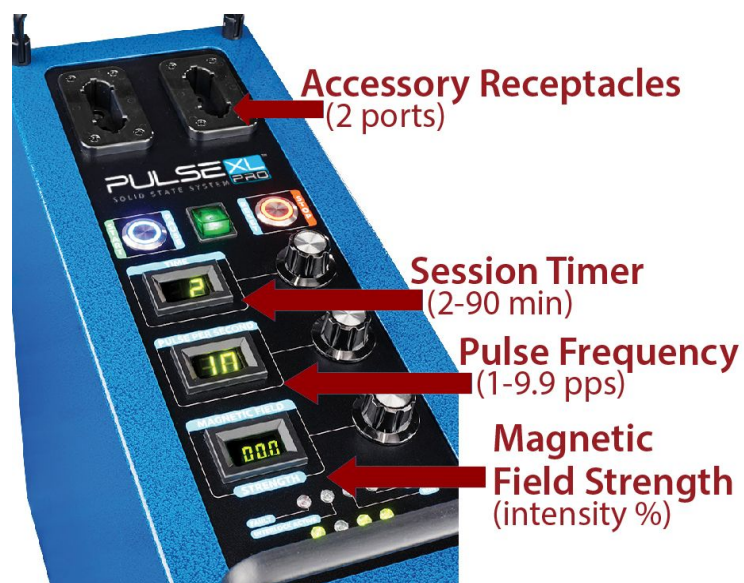
There are some that make the claim that high intensity PEMF is harmful, even though it has been used safely for many years. In my 11 years of experience with it I have never seen any evidence to support that claim. As a matter of fact, an example of safe and effective high

intensity device that has FDA clearance is the Neurostar. This device targets a specific area of the brain and generates up to 15,000 gauss--far above the low intensity threshold. The Neurostar, is approved specifically for patients unresponsive to medication for depression. This high intensity device has produced an abundance of supporting evidence with no adverse side effects.

I have been using high intensity PEMF for years. I am a competitive Masters Swimmer and I compete against former Olympic swimmers. For instance, I have competed in World Games, Pan American Games, and World Championships and have been on the podium in all of them. For someone that started to swim competitively at the age of 55, I have to attribute a great part of my success to the regular use of high intensity PEMF. When I first started training I had my blood work performed and my testosterone levels came back as a healthy 55 year old. I then started using PEMF on my pituitary gland, thyroid gland and testes. After six months I had my testosterone tested again, and the levels came back as a healthy 37 year old.

## Conclusion

PEMF devices of different strengths, delivery systems, and waveforms have been produced in the last 40 years. Whether they are medical devices or for personal wellness, therapeutic PEMF devices deliver ELF (extremely low frequency) and have been used safely worldwide. I choose to use the Pulse Centers XL PRO for its well-designed, high quality generator and unique accessories that can address my whole body or an isolated area. The two-headed accessories allow me to put any part of my body between their magnetic fields so they work together to pull the energy through the area for better penetration. The independent controls for frequency and field strength allow me to customize every session—whether I'm working on a sore muscle group, rehabbing an injury, or rebalancing and strengthening my entire system. I have the ability to set it to a whisper of strength, or strong enough to get deep into a large muscle group on a body builder.



It is my observation that lower intensity systems (up to 1000 gauss) do not have the power to penetrate effectively, and even surface area issues take longer to affect a change. If you are still unsure, investigate a low-to-high system similar to mine. I use the Pulse Centers XL PRO, it allows you to adjust the intensity from ultra-low to high and the pulse frequency independently. This system gives the user control, power and variability- the best of both high and low intensity.

For more information contact Dr. Gary Ryan through his website at [www.GaryRyanPEMF.com](http://www.GaryRyanPEMF.com).