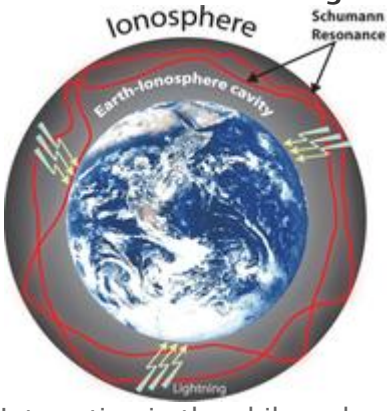
Earth Based Pulsed Magnetic Fields - The Fifth Element



Interesting in the philosophy of the elements, there is a fifth element called the Ether or Aether. In the chinese system it is a bit different, but the Greek, Hindu and other traditions, the fifth element is Ether/Aether. In the Greek mystery schools this fifth element was only taught to the Initiates, while the common people were only told of the four elements.

While the Ether was declared by science (Michelson–Morley_experiment) to be non-existent and Einstein admitted the it was one of his greatest mistakes (related to his cosmological constant), in modern unification theories, the Ether is returning as the mysterious dark energy pervading most of space and propelling all the galaxies away from one another.

So again, perhaps the ancients understood something well ahead of their time.

It may be a stretch to speculate, but in our discussion the fifth element of health here on earth is the frequencies and energies of the earth, namely the Schumann resonant frequencies, and the frequencies of the Earth's magnetic field.

Yuri Gagarins 1:48 Minutes (1st proof we need the Earth's Pulsed Electromagnetic Energy

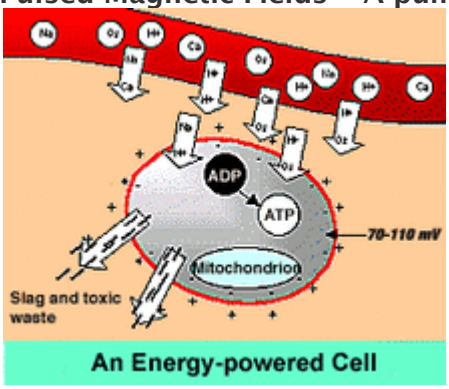
In Yuri Gagarin's historic flight into space, he was an instant icon for all of history as the first man to travel around the earth in orbit.

But in only 1 hour and 48 minutes, Yuri Gagarin returned from space with bone loss, depressed metabolism, depression, muscle weakness and overall sickness. In fact he died at a young age.

It was discovered that he was missing an essential element needed for human survival, electromagnetic energy of the earth. Zero field studies and many experiments on earth have proven that we need the earth's magnetic energy to survive. We take it for granted just like a fish in water takes for granted it needs water to live. This is because no matter where you go on earth, you will always get some amount of earth magnetic energy (unless you go into space or go inside a chamber that blocks the earth's fields.

Since this first flight in space, every subsequent space launch has included Schumann generators that mimic the Earth's energy.

Pulsed Magnetic Fields - A pump for your cells



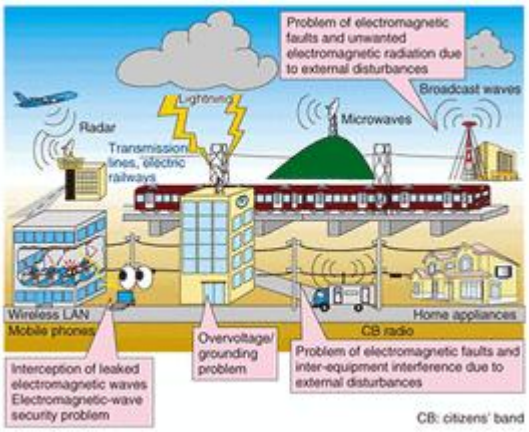
It turns out that pulsed magnetic frequencies act like a whole body battery recharger by pumping and priming your cells.

The 70 trillion cells in your body are like little wet cell batteries that operate ideally at a voltage of around 70 millivolts. The cell membrane acts like a one-way rectifier that converts the earth's magnetic pulse into electrical potential energy, which "charge's your cells".

This energy drives cell metabolism and helps to enhance oxygenation, ATP production and overall absorption of nutrition and essential elements into the cell and removal of wastes out of the cell.

Without this energy, the cell voltage weakens and disease and illness sets in.

If We Live on Earth, Why Do We Need Electromagnetic Therapy Devices?



This is a very common question. Why is it that we need pulsed magnetic therapy, if we can just go outside and walk barefoot in Nature?

That's a Good Question!

Here is the TWO-FOLD problem we have today which can be summarized as Not Enough of the GOOD and too much of the BAD frequencies.

First, we are not getting enough of the GOOD earth based magnetic energy. This has two parts to it; the first part is that our Earth's magnetic field has been declining over the last 500 years (probably longer) and it is HALF of what it was just 300 years ago. And on top of that, the average American spends 90% of his or her day inside ISOLATED and partially

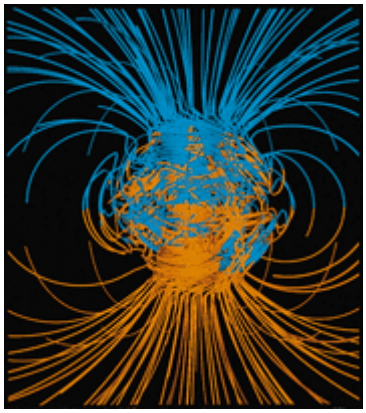
shielded from these healthy frequencies. Add to that all the concrete and steel, rubber soled shoes, rubber tires, isolated mattresses, etc.

In Japan, fibromyalgia is referred to as Magnetic Deficiency Syndrome. So many modern lifestyle problems can be partially linked to not getting enough healthy earth magnetism.

The second part is TOO Much of the BAD. We are simply getting bombarded by dirty electricity or electrosmog everywhere we go. Computers, wi-fi, cell phones, handset phones, microwaves, hairdryers, cell phone towers, etc, etc.

THE SOLUTION: Supplement your body and life with a earth-based pulsed magnetic therapy device.

The Earth's Natural Intensity (or Strength of the Earth's Field)



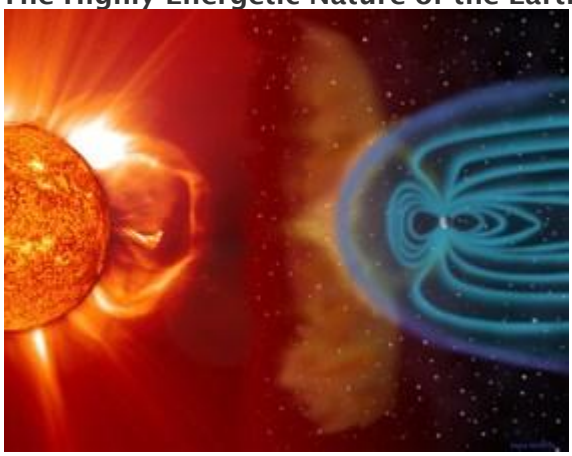
Using the premise that the Earth gives us exactly what need in just the right amounts, we will look at four different aspects of the Earth's magnetic field and the naturally occurring Earth-based pulsed electromagnetic fields. We will begin by talking about intensity.

The intensity of the Earth's magnetic field is simply the strength of this field measured in gauss or tesla (two main units of magnetic field strength).

Think of a strong magnet versus a weak magnet. The stronger magnet has a stronger magnetic intensity. Certain high grade neodynium magnets can have intensities over 12,000 gauss. Electromagnetics can be made even stronger.

It turns out that the intensity of the Earth's magnetic field is relatively weak being .33 gauss at the equator and about .66 gauss at the poles. This translates to 33 microtesla at the equators and 66 microtesla at the poles. (1 Tesla = 10,000 gauss or 1 gauss = .0001 Tesla).

The Highly Energetic Nature of the Earth



The solar wind is a relentless storm of energy radiated from the sun into space and eventually beating on the Earth at speeds of 200-700 km/sec. This pulsating flow of energy creates tremendous electric and magnetic fields through space.

Also on earth there are approximately 100 lightning strikes a sec which equals over 8 million strikes each day!

Magnetic fields extend infinitely into space but become weaker as an inverse square to the distance from their source. The earth's magnetic field, which extends thousands of miles into space, is called the magnetosphere.

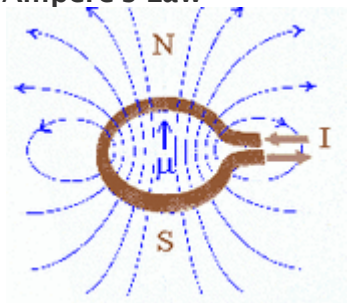
The field is similar to that of a bar magnet but this similarity is not really correct. The magnetic field of a bar magnet, or any other type of permanent magnet, is created by the synchronized spins of electrons and nuclei within the atoms. The Earth's core, however, is hotter than 1000 K, at which the orientations of spins within iron become chaotic. This causes the iron deposits to lose their magnetic field. Therefore the Earth's magnetic field is caused not by magnetized iron deposits, but mostly by electric currents in the liquid outer core. This happens because the liquid outer core has a plethora of free electrons that form a current due to the pulsating magnetic fields of the sun (via Faradays Law). This is how power is created at the power plant. A changing magnetic field (generator) produces a electric current.

This electric current produced in the outer core then in turn creates a magnetic field by ampere's law (see below).

This is the Dynamo Theory and it explains how the earth's magnetic field is sustained.

Another feature that distinguishes the Earth magnetically from a bar magnet is its magnetosphere. At large distances from the planet, this dominates the surface magnetic field. Electric currents induced in the ionosphere also generate magnetic fields.

Ampere's Law



The IMPORTANT point of explaining this is that the earth's magnetic field is produced by electrical currents which by Ampere's law produces a magnetic field.

This is a very important reason why pulsed magnetic therapy mats are more effective than static magnetic mattress pads. All the pulsed magnetic therapy mats on the market use electrical currents NOT static magnetics, just like the earth.

To better understand how currents create magnetic fields check out the link below. Don't worry about all the equations, just notice the pictures. See how a current produces a magnetic field using the right hand rule and how magnetic iron filings align around the field. Also notice how a current loop produces a north-south dipole similar to a bar magnetic. This is how the pulsed magnetic therapy devices on the market work. The use one or several bundles of conducting loops that create a north-south dipole.

http://electron9.phys.utk.edu/phys136d/modules/m7/Ampere.htm

So What is the Best Intensity?

If you have been following along, the answer is clear... The best intensity is ideally what the Earth gives us which would be under 100 uT (microtesla). In fact, the best researched companies that make pulsed electromagnetic field therapy devices all stick to using under 100 uT because not only is it safest, but it seems to work better as well.

And to properly duplicate nature, it should be clear that static magnets are not the answer either as we have explained that the Earth's magnetic field is not static at all.

So if we seek to understand and copy nature, we should look for pulsating therapy devices with intensities under 100 uT (approximately).

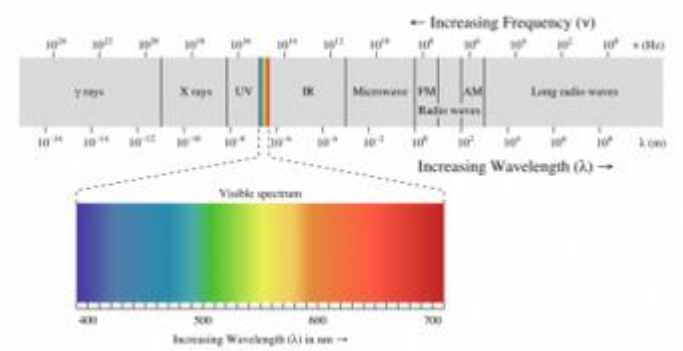
And buyer beware, because there are several magnetic pulse therapy devices that use unnaturally high intensities that can cause harm in the long run.

The World Health Organization considers a continuous magnetic field of 100 micro-Tesla (1 Gauss) at 50Hz as safe.

Further the limit of strength for induced electromagnetic fields according to DIN (German industry norm) is 400 uT. There are no known risks with use of systems of low electromagnetic fields, but stay away from units going above 400 uT.

Again, it's best to stick with Nature and even the government agencies recognize this.

Introduction to Frequency (The Key To Understanding Earth Energy)



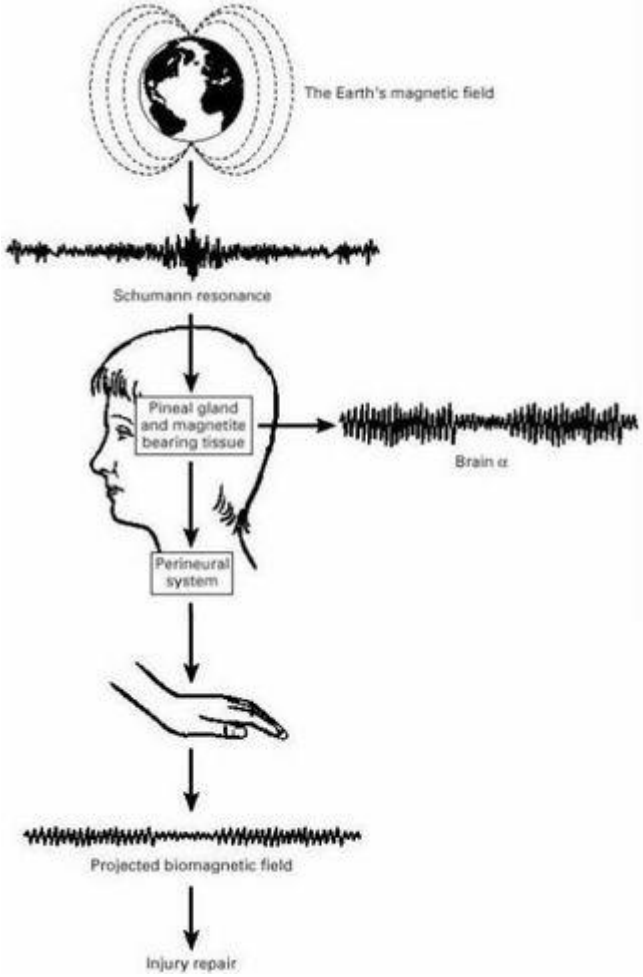
Frequency is very simply a measure of revolutions or cycles per second and is usually measured in Hertz (Hz). As a simple example, consider the second hand on your watch. It completes one revolution or cycle every 60 seconds. What is the frequency (pop quiz)? ANS: 1/60 Hz (which is one cycle every 60 seconds).

The Sun is a source of a most of the electromagnetic rays we experience on a daily basis, which is mostly from the infrared through the visible to the ultraviolet end of the spectrum. The earth itself emits a predominantly infrared wave due to its hot core and also partly a re-radiation of the suns energy it absorbs.

But what I want to discuss is the fundamental frequencies of the earth's magnetic field and ionosphere. These are the life giving frequencies that are essential for life and they are distinctly different and more fundamental to life then then other common electromagnetic frequencies (light, infrared, ultraviolet, etc).

We will also explore further studies Adey and Zimmerman that confirm that the Earth's natural resonant frequencies are the most healing and actually essential for the human organism.

The Body - Mind - Earth Connection (0 - 30 Hz)



We hear a lot of talk about the Body - Mind connection and while it is definitely true, it is missing ONE very essential component... THE EARTH!

If you can understand this section, you will understand exactly why we need pulsed magnetic intensities matching the earth with a frequency range of 0 - 30 Hz.

0 -30 Hz is the magic range and there is both scientific evidence and elegant beauty as to why your body needs this frequency range, especially the 7 - 8 Hz range (Schumann resonance).

The chart to the left summarizes the Body - Mind - Earth Connection.

First the earth emanates primarily this frequency range through both the Schumann resonance and its higher harmonics and also the frequency of the Earth's magnetic field and its higher harmonics.

Next our brain and central nervous system are tuned to this frequency range as evidenced by the medically established EEG brain state frequencies from low delta to high Beta.

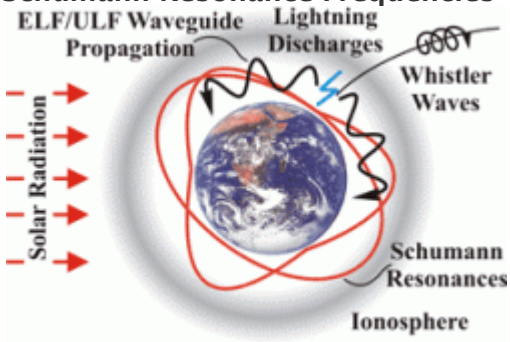
Next Sisken and Walker proved that the tissues in our body resonate primarily to this frequency range and Adey and Bawin showed that the actual biological window of our cells resonates to this range and NOT outside of it.

Finally and perhaps most incredible is the research of Dr. Zimmerman, co-pioneer of the SQUID technology developed for measuring very weak magnetic fields. He found that energy

healers actually EMIT these frequencies and this was confirmed by Japanese researcher Seto on Chi Kung practitioners.

Thus we have the frequencies of life 0 -30 Hz. Let's take a little closer look at this...

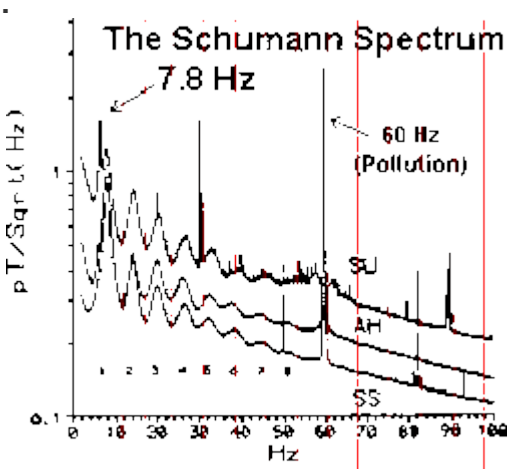
Schumann Resonance Frequencies



Just as a tuning fork has resonant frequencies for sound, so the planet earth and the ionosphere surrounding it has resonance frequencies for electromagnetic radiation called the Schumann Resonances. Basically the ionosphere with the Earth's surface creates a spherical wave-guide that surrounds the earth. Low frequency electromagnetic waves bounce around this waveguide, which is how radio signals can be transmitted around the globe.

The fundamental frequency of this spherical cavity of the earth is 7.83 hertz, which, like a tuning fork, is the earth's fundamental "note".

These frequencies are excited mainly by lightning strikes but can also be induced by solar flares.



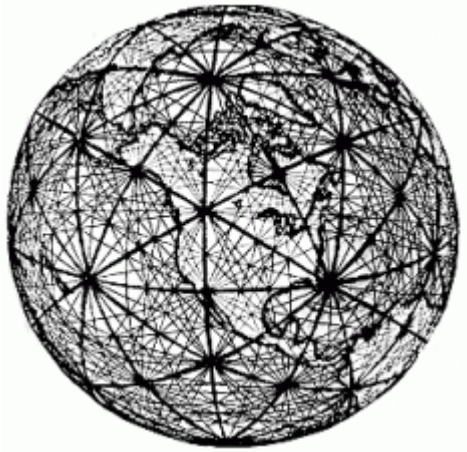
The Human brain also has natural frequencies for electromagnetic radiation. It turns out the Earth's Schumann resonances are "in tune" with the brain's Alpha and Theta states (relaxation and deep relaxation). Neurobiology researchers O'Keefe and Nadel further showed that the hippocampus of the brain is tuned to 7.83 Hz.

Also, Michael A. Persinger on behalf of NASA found a solution for cosmonauts. The first manned space flights created considerable physiological problems for astronauts, and it was only through the installation of Schumann wave generators (7.83 Hz) that the side effects were remedied.

It's important to note that although the fundamental (and most dominate) frequency of the Schumann resonance is 7.83, there are higher harmonics just like a piano has varying

octaves of "C". These higher octaves also have healing effects because they are in "harmony" with 7.83.

The Frequencies of the Earth's Magnetic Field



Klaus Piontzik in his book "The Lattice Structure of the Earth's Magnetic Fields" lays out a derivation of the fundamental frequency of the earth's magnetic grid.

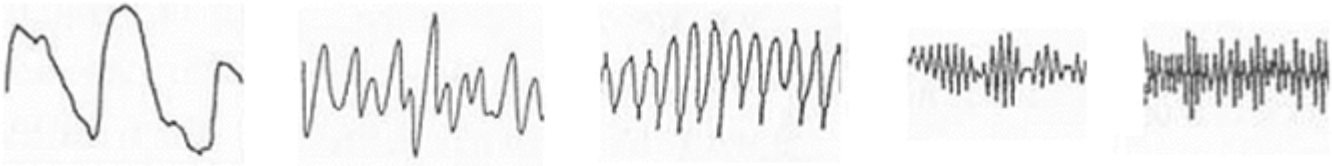
This frequency was found to be 11.79 Hz at the poles and 11.75 Hz at the equator. The difference coming from the fact that the Earth "bulges" at the equator due to centrifugal forces of its rotation.

Interestingly, this fundamental frequency is exactly 3/2 of the Schumann frequency.

So the earths magnetic field itself has a fundamental frequency and that frequency is 11.79 Hz (polar) and 11.75 (equatorial).

And like the Schumann frequency, this frequency also contains higher harmonics.

Brain State Frequencies (~ 0 - 30 Hz)



Big "Delta" waves (1-4 cycles/second) occur when you're in deep, dreamless sleep. Newborns sleep this deep, but few adults do.

"Theta" waves (4-8 cycles/second) occur when you're in dreaming sleep (REM). Theta is the goal when you meditate or use self hypnosis.

"Alpha" waves (8-12 cycles/second) are when you're relaxed like day dreaming or watching tv. Low Alpha is that pre-sleep or almost awake drowsiness.

"Beta" waves (12+ cycles/second) are the awake state. They vary from low beta states to mid range normal functioning to high beta fight or flight and panic attack emotions.

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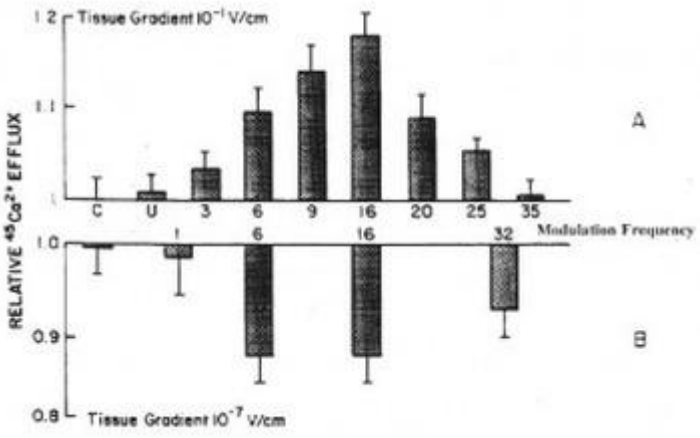
The Adey Window of Biological Frequencies (~ 0 - 30 Hz)



From the mid-70s accounted for WR Adey and SM Bawin experiments with brain tissues of chickens and cats. They irradiated the tissue with modulated VHF fields.

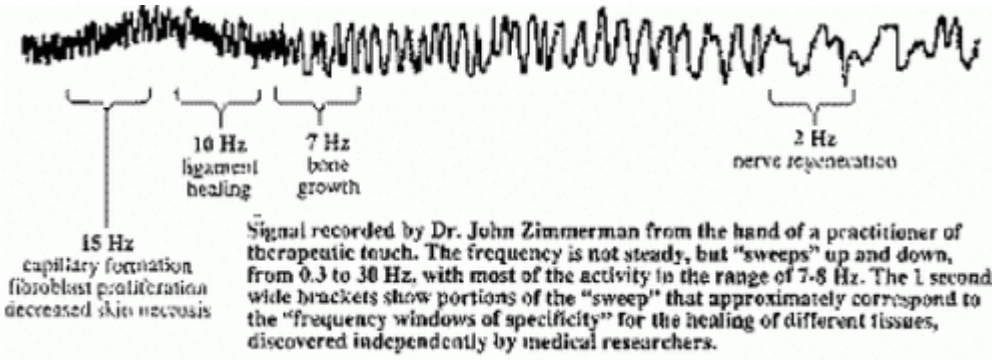
(see "Effects of modulated VHF fields on the central nervous system" in "Ann NY Acad Sci 247" in 1975 by Bawin, Kaczmarek and Adey / "Sensitivity of calcium binding in cerebral tissue to weak environ-mental electric fields oscillating at low frequency" 1976 in "Proc. Natl. Acad. Sci. 73" by Adey and Bawin / "Ionic factors in release of 45Ca2 + from chicken cerebral tissue by electromagnetic fields" in "Proc Natl Acad Sci USA. 75" 1978 by Bawin, Adey and Sabbot / "Models of long-range order in cerebral Macromolecules: Effects of sub-ELF and of modulated VHF and UHF fields" in 1979 with "Radio Sci 14" by Sheppard, Bawin and Adey / "Frequency and power windowing in tissue interactions with weak electromagnetic fields "in 1980 in" Proc. IEEE 68 "by Adey /" Tissue interactions with non-ionizing electromagnetic fields "in 1981" Physiol. Rev. 61 "by Adey /" Effects of weak amplitude-modulated microwave fields on calcium efflux from awake cat cerebral cortex "in Bioelectromagnetics 3" in 1982 by Adey, Bawin and Lawrence)

In their investigation, adey and bawin found a range of frequencies and intensities in which treated cells responded. Outside these areas, however, made no or only minimal response. The experimentally determined frequency will now be described Adey window.

The Adey window corresponds very closely to the fundamental and first couple harmonics of the earth's naturally occurring frequencies.

This range (the Adey or "biological window") is roughly 0 - 30 Hz

Frequencies Emitted from Energy Healers and Chi Kung Masters (~ 0 - 30 Hz)



In the early 1980's, Dr. John Zimmerman began a series of important studies on therapeutic touch, using a SQUID magnetometer at the University of Colorado School of Medicine in Denver. Zimmerman discovered that a huge pulsating biomagnetic field emanated from the

hands of a TT practitioner.

The frequency of the pulsations is not steady, but "sweeps" up and down, from 0.3 to 30 Hz (cycles per second), with most of the activity in the range of 7-8 Hz (Figure 2).

The biomagnetic pulsations from the hands are in the same frequency range as brain waves and scientific studies of the frequencies necessary for healing indicate that they naturally sweep back and forth through the full range of therapeutic frequencies, thus being able to stimulate healing in any part of the body.

Confirmation of Zimmerman's findings came in 1992, when Seto and colleagues, in Japan, studied practitioners of various martial arts and other healing methods. The "Qi emission" from the hands is so strong that they can be detected with a simple magnetometer consisting of two coils, of 80,000 turns of wire. Since then, a number of studies of QiGong practitioners have extended these investigations to the sound, light, and thermal fields emitted by healers. What is particularly interesting is that the pulsation frequency varies from moment to moment. Moreover, medical researchers developing pulsating magnetic field therapies are finding that these same frequencies are effective for ' jump starting' healing in a variety of soft and hard tissues, even in patients unhealed for as long as 40 years. Specific frequencies stimulate the growth of nerves, bones, skin, capillaries, and ligaments. Of course Reiki practitioners and their patients have daily experiences of the healing process being "jump started," and academic medicine is now beginning to accept this therapy as logical and beneficial because of these new scientific findings. In Figure 2 we have bracketed portions of the signal that correspond to the frequencies used in medical devices that stimulate the healing of particular tissues. Individual differences in energy projection and detection.

Mystery Solved --- Lower Frequencies on the Earth

Because the Schumann frequency has a fundamental frequency of 7.83 Hz, and the Earth's magnetic field begins at 11.79, I was puzzled how the lower brain states connect to the earth (delta and theta are from 0 - 8 Hz).

The higher frequencies are simple, because both the Schumann and Earth's field frequencies have higher harmonics. And the 1st three harmonics of each are between 7.8 and 30 Hz. S

The 1 Hz frequency of the Delta waves is 7.5 times lower
than the 7.5 Hz natural frequency at the surface of the Earth.
Since the radius of the Earth is about 6,400 km,
the radius for a 1 Hz natural frequency is
about 7.5 x 6,400 = 48,000 km.

Here are some natural frequencies that seem to correspond to the Delta and Theta waves of the Human Brain.

Plasma Sheet (opposite Sun),
inner radius = 60,000 km 0.8 Hz

Magnetopause (toward Sun),
radius = 60,000 km 0.8 Hz

Geosynchronous orbit,
radius = 35,000 km 1.4 Hz

Outer Van Allen electron belt,
outer radius = 25,000 km 2 Hz

Inner Van Allen proton belt,
outer radius = 12,000 km 4 Hz

Inner Van Allen proton belt,
inner radius = 8,400 km 5.7 Hz

As to the following frequencies:

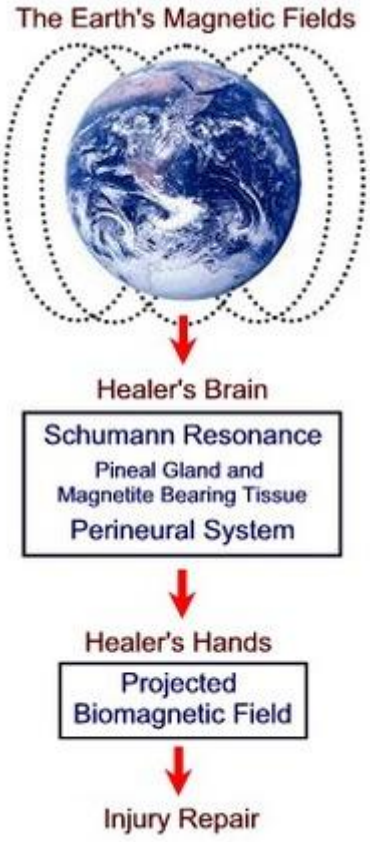
Magnetopause
(opposite Sun), radius = 380,000 km 0.125 Hz

Plasma Sheet
(opposite Sun), outer radius = 380,000 km 0.125 Hz

Moon orbit,
radius = 384,000 km 0.125 Hz

The above shows us that the lower frequencies are also found within Nature.

Conclusion: 0 - 30 Hz, The Frequencies of Life!



O.K., now for the exciting conclusion: Can you guess which frequencies are ideal for the human body and optimal health? If you answer 0 -30 Hz, give yourself a pat on the back.

I hope this makes sense, because it is such an amazing blend of scientific fact and intuitive understanding coupled with sheer and elegant beauty.

This is the Body - Mind - Earth connection and the BEST pulsed magnetic therapy device should use primarily 0 -30 Hz... As we shall see in the reviews, there is really only one such device, though there are a few others that are close.

Just remember that the Earth primarily emits this frequency range, our brains run and operate both day and night in this frequency range and our cells and tissues resonate to these frequencies and most amazingly, we actually emit from our hands these very frequencies.

It amazes me that more magnetic pulser devices do not use this frequency range???

To me the obvious choice is a device that concentrates on these frequencies using the intensities of the earth as well.

But there are still two more points to consider: Timing and waveform...

Pulsed Magnetic Therapy Timing

In this section we will discuss the two aspects of timing, the actual duration of a session using a pulsed magnetic therapy device AND the idea of human biorhythm and getting the proper frequency for the time of day.

Let's start by discussing the duration of a pulsed magnetic therapy session. It's important to realize that more is not better and most of the leading German companies (leaders in this field) recommend just 8 minutes twice daily for maintenance.

Again using the Earth based frequencies at the proper intensities, a little bit goes a long way. Magnetic pulse therapy acts like a whole body battery recharger, charging the voltage and energizing your cells.But just like a battery charger, when the batteries are charged, there is no need to continue charging them. It has been found that 8 minutes two times daily keeps the cells charged for a normal healthy person. If someone has a health challenge, extra time can be added especially with local applicators.

Entrainment

When considering the timing of biological rhythms, the concept of entrainment is important.

Physicists use this term to describe a situation in which two rhythms that have nearly the same frequency become coupled (or connected) to each other so that both end up with the same rhythm.

For example, a number of pendulum clocks mounted on the same wall will eventually entrain, so that all the pendulums swing in perfect synchrony. For this to happen the pendulums must have about the same period. What couples the pendulums are vibrations transmitted through the wall.

Also, tuning forms that have the same resonant frequency become entrained if just one is struck.

Also there have been studies with female roommates showing their menstrual cycles become synchronized over time.

What we want to look at is the entrainment between our bodies and the environment.

Chronobiology - The Study of Biorhythms

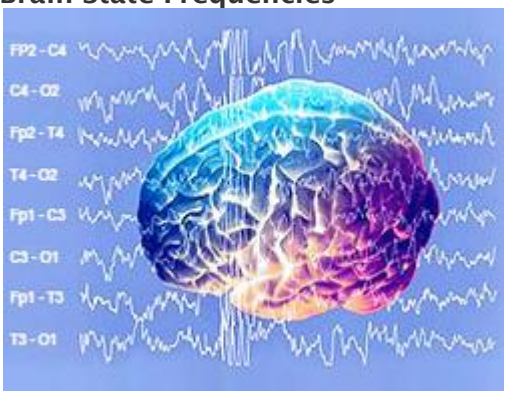
There is a lot of research on circadian rhythms and biorhythms of the human body and a lot of it is coordinated with the cycles of light and darkness and the release of melatonin from the pineal gland. Indeed there is a biological entrainment that takes place based on daily cycles of light and darkness.

Circadian rhythms can also be influenced by other factors such as surrounding temperature, meal times, stress levels, exercise and other daily routines.

Another example is the menstrual cycle being connected to the phases of the moon. So both the sun and moon have an influence on human biorhythm.

But perhaps even more important is the frequencies of the earth and how intimately they are tied to our brain states, nervous system and internal clocks.

Brain State Frequencies



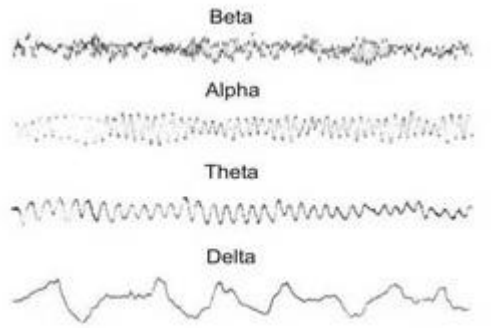
Brain waves are not constant in frequency, but vary from moment to moment. The pacemaker or rhythm section is located deep in the brain, in the thalamus.

It turns out that our core biorhythm related to the brain waves, has both an internal and external stimulus both alternating.

Internally, the thalamus regulates the brainwave frequencies in cycles that last 1.5 to 28 seconds which trigger and entrain the entrain the entire brain. Eventually this ceases because of excess calcium buildup due to the stimulation of the thalamus.

Then a "silent phase" lasting up to 25 seconds takes place where there is NO internal rhythm. This is called the "free run" phase and brain waves are entrained by the surroundings (specifically Schumann waves). Once the thalamus cells restore their calcium levels, the thalamic oscillation begin again.

So the common brain state frequencies from low delta to high beta have both an internal and external mechanism and both are essential to keep the biological rhythms harmonious.



Brainwaves are typically recorded from an EEG (electroencephalograph) using electrodes on the scalp. The frequency of the brainwaves is constantly changing.

Delta activity (1/3 - 4 Hz) occurs during deep sleep and some brain disorders.

Theta activity (4 - 7 Hz) occurs during various stages of sleep and during emotional stresses such as disappointment and frustration.

Alpha brainwaves (8 - 12 Hz) have been associated with relaxation and also a normal healthy state of mind.

Beta brainwaves (13 -30 Hz) are associated with heavy mental activity, stress and tension. Typically you are in this state when you are really busy at work.

So What Should We Look for in a Pulsed Electromagnetic Therapy Device?

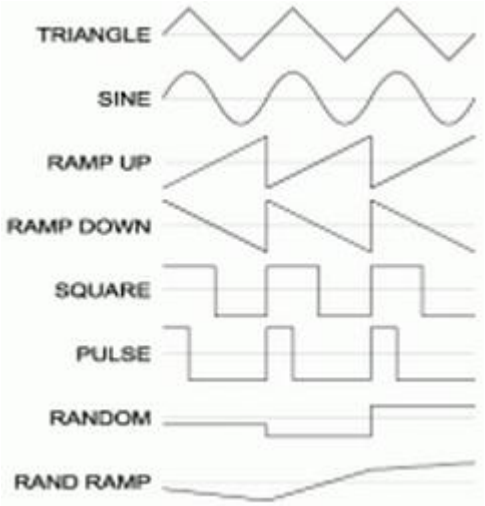
When considering timing, most pulsed magnetic therapy devices allow you to program the time, but not many have a built in biorhythm clock.

Look for a device that gives you the proper frequency for the time of day.

For example, in the morning, you probably want to be awake and alert so a Beta frequency would be appropriate whereas before bedtime you will probably want a theta-delta frequency.

We can use pulsed magnetic fields to entrain the brain to the proper frequency for the time of day, so make sure you find a device that offers this.

Waveforms



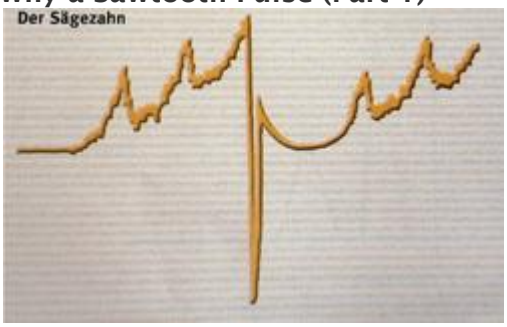
When trying to understand the properties of electromagnetic waves the final consideration is the geometry of the signal or waveform.

We have already discussed the other variables which are intensity, frequency and timing (or phase). The geometry of the signal has a big impact on how effective the signal will be in creating a response in the body.

The waveform is a combination of sines and cosines put together in many ways via fourier analysis to create just about any geometry.

So ALL the PEMF devices are based in sine wave waveforms, though the carrier waves can vary like the images to the left. The question is, which waveform works best.

Why a Sawtooth Pulse (Part 1)



The vibrating cell membrane responds preferentially to vibrations near its own natural frequency (the cell membrane is a Fourier Analyzer). The simplest form of vibration is the sine wave form, the traditional form of a periodically oscillating pendulum. Different geometric waveforms like the saw tooth pulse can be broken down into a multitude of individual sine vibrations by Fourier Analysis, a mathematical method.

A Saw tooth pulse is thus composed of various sine vibrations and has a BROAD FREQUENCY SPECTRUM. The fundamental vibration has the same frequency as the pulse train. The following harmonics are frequencies representing a multiple of the fundamental mode, but as a rule they also have a decreasing amplitude (height).

If a structure such as a cell membrane oscillating with a sine wave vibration (= oscillating circuit) is stimulated with a saw tooth pulse, ie., many individual sine waves of different amplitudes, the cell membrane will respond preferentially to a harmonic close to its natural frequency.

The great advantage of the saw tooth pulse in comparison with the individual sine pulse for

the resonant effect lies precisely in this increased supply of oscillations.

Also, because the saw tooth pattern is very spiked, it has been found to produce strong electro-motive forces in the cells and tissues.

Saw tooth-shaped Waves: These electro-magnetic waves reach the body in saw tooth-shaped waves that are ideal for affecting the level of ion transport.

This is the saw tooth wave-shape in its schematic portrayal, in which it was presented for the patent registration. Only in this way of signaling, with the corresponding amplitudes, the desired “transport of ions” will be achieved. The quintessence of the 20 years of magnetic field research is found in this shape, and intensity of the impulse.

Why a Sawtooth Pulse (Part 2)

Your body has approximately 70 trillion cells (that’s more cells than there are stars in our Milky Way Galaxy - 100-300 billion). Not only is each person individual and unique but also your cells are individual and unique having their own resonant frequencies.

A saw tooth waveform, which is composed of various sine wave vibrations, has the broadest frequency and amplitude (see next section)spectrum of ANY of the waveforms available. Here when talking about resonance we are referring to the fact that a saw tooth signal is composed of many sine wave pulses with a broad spectrum of frequencies which allow for greater cellular energization and stimulation through electromagnetic resonance.

The cell membrane can be thought of like an antenna (Actually this is not just an analogy as the cell membrane has electrical properties like an oscillating circuit). And each cell has a different resonant frequency, just like there are different radio stations on your radio.

If you "tune in" to the station, say 101.5 FM you will receive the signal and hear great music. If you dial 101.3, you will not hear anything or if you do it will be static.

A saw tooth is like a radio that will dial to the exact frequency needed. When you stimulate the cell membrane with its resonant frequency, the cell membrane will vibrate, increase its permeability (allowing for greater oxygenation and nutrient absorption) and further produce micro currents and increase the overall cell voltage (remember that PEMF is like a whole body battery recharger BUT you must have the proper resonant frequencies in order to charge the cellular potentials).

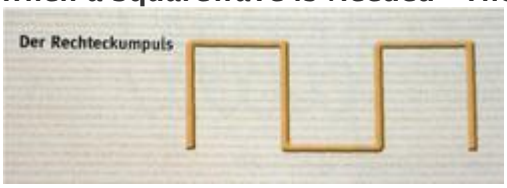
Other waveforms, like the simple sine wave are like having a radio tuner that only dials to whole numbers like 88, 89, ...103, 104, 105.

If you want 101.5 and only have 101 and 102 on your tuner, you will not hear the music... Understand? And without resonance, the cells cannot be energized.

BUYER BEWARE: Some units on the market use simple sine waves and high intensities... THIS WILL NOT WORK AS WELL... Its not about intensity, its about resonance (ie... you could be right next to a radio station antenna -high intensity- but if your radio is not "tuned" to the station, you won't hear anything...)

Conclusion: In the battle of resonance versus intensity, resonance always wins...

When a Squarewave is Needed - The Evidence of the Nasa Study



*CHIEF INVESTIGATOR:*Thomas J. Goodwin, Ph.D. Lynden B Johnson Space Center

*PURPOSE:*This four year study used human donors "to define the most effective electromagnetic fields for enhancing growth and repair in mammalian tissues." To utilize "nerve tissue which has been refractory to efforts to stimulate growth or enhance its repair regardless of the energy used." (all other tissues have demonstrated growth and repair stimulation with appropriate PEMF)

To define a PEMF technology that would "duplicate mature, three dimensional morphology between neuronal cells and feeder (glial) cells, which has not been previously accomplished."

*RESULTS:*The PEMF used in the study "caused accelerated growth rate and better organized morphology over controls", and resulted in "greater cell viability" (85% vs. 65%).

In the gene discovery array (chip technology that surveyed 10,000 human genes), the investigators found up-regulation of 150 genes associated with growth and cell restoration.

T. Goodwin (personal communication) " PEMF shut down each dysregulatory gene we studied".*NASAs CONCLUSION:*

"The up-regulation of these genes is in no manner marginal (1.7-8.4 logs) with gene sites for collagen production and growth the most actively stimulated."

"We have clearly demonstrated the bioelectric/biochemical potentiation of nerve stimulation and restoration in humans as a documented reality".

"The most effective electromagnetic field for repair of trauma was **square wave** with a rapid rate of change (dB/dt) which saw cell growth increased up to 4.0 times."

They further noted that "slowly varying (millisecond pulse, sine wave) or non varying DC (CW lasers, magnets) had little to no effect."

Final Recommendation: "One may use **square wave** EM fields with rapid rate of change for":

> repairing traumatized tissues
> moderating some neurodegenerative diseases
> developing tissues for transplantation

*the first study to clarify technologies and efficacy parameters for tissue growth and restoration

NASA'S CONCLUSIONS - PEMF PROVIDES:

·GREATER CELL VIABILITY

·ACCELERATED CELL GROWTH·BETTER ORGANIZED CELL MORPHOLOGY·UPREGULATION OF GENES RELATED TO COLLAGEN PRODUCTION

*·UPREGULATION OF GENES RELATED TO CELL RESTORATION AND GROWTH·BIOELECTRIC POTENTIATION OF NERVE STIMULATION AND RESTORATION·HIGH-SPEED **SQUARE WAVE** INCREASED CELL GROWTH FOUR-TIMES FASTER*

Conclusion: The Best of Both Worlds

The sawtooth signal is the best for full body recharging and energization.

With the sawtooth, you can deliver bunches of frequencies simultaneously so that all the cells will receive the proper resonate frequency.

Ideally the frequency range should be roughly 0 -30 Hz as we have showed and the predominate frequency should be in alignment with the time of day.

The Square wave is ideal for local application to break up cycles of pain and promote healing and regeneration. This was proven by NASA to be the most effective waveform for this purpose.

There is one device on the market that offers both signals which is the best of both worlds for energizing the cells and helping to heal and regenerate any injured or damaged tissues.

The Top 12 Tips You Need to Know Before Buying a Pulsed Magnetic Therapy Device.

This Buyers Guide guide will show you the top 10 most important features to look for in a Pulsed Magnetic Therapy device.

The emphasis is on features that are Inspired by Nature and backed by NASA and science.

Ideally, you want a unit that is effective, natural, easy to use, backed by science, gets results and provides great support, education and training.

Tip 1: Earth Based Frequencies?

Make sure to use only PEMF machines that have frequencies that are closely aligned to nature. Ideally this is roughly 0-30 Hz. Nature produces frequencies mainly in this range due to what is called the Schumann Resonance (7.83 Hz is the 1st harmonic).

Additionally Electroencephalogram EEG studies prove that the brain wave patterns are roughly in this range from Delta to High Beta (0-30 Hz). Even more evidence is Supplied by Adey and Bawin who discovered that the biological window of frequencies the cells absorb is again roughly 0-30 Hz.

What that means is higher frequencies will NOT be used by the cells. Finally there is really fascinating evidence from Zimmerman using extremely sensitive magnetic field detectors, that our bodies EMIT roughly 0-30 Hz. Most machines on the market use frequencies that are simply too HIGH.

Tip 2: Built in Biorhythm Clock?

Look for a Device with an Organ Clock or at least a machine that adjusts the frequencies to different times of the day. Circadian rhythm or biorhythm studies have proven that our brains, bodies and even the planetary frequencies change at different times of the day. There are both internal (thalamus) and external (environment) biological clocks that have a profound impact on our wake/sleep cycles and energy/tiredness cycles that occur throughout the day and night.

A simplified explanation is that typically we operate at higher or more energized frequencies in the day (Beta/High Beta Brain Wave) while we are working and active and in the evening and nighttime our brain and nervous system operates at lower frequencies (alpha/relaxation, theta and delta/deep sleep)

For example, you don't want to be put to sleep in the morning or energized before bedtime. What you need is energizing frequencies early in the day and relaxing ones at night. Most machines DON'T offer this option, so ask. Circadian rhythms in the human body are a well researched phenomenon so having a biorhythm clock keeps the body "tuned" to the cycles of the body

Tip 3: Is it Strong Enough, Yet Safe?

The Device Should be strong enough to handle problem areas yet safe enough to be in compliance with U.S and DIN safety standards. The DIN 0848 safety standard says the intensity should never exceed 400uT or 4 Gauss.

Tip 4: Is there a Sensitive Setting for Sensitive Individuals?

It is critical to use only machines with low intensities between 0 and 70 uT (Micro tesla). This is what the Earth provides us and it is what is natural (Earth is Approximately 30-70 uT).

So, you know the old saying, sometimes "Less is More". In Fact, when it comes to PEMF Therapy less can sometimes be essential and more can be harmful. And there is plenty of research to suggest that the lesser field strengths (in the earth's natural range) actually works better in clinical studies. IMPORTANT: If you are chemically sensitive, you will want to find a mat with a picotesla setting (very weak magnetic field).

Tip 5: Is the Intensity Graduated from Head to Feet?

Make sure to get a full body mat with pairs conducting coils for upper , middle and lower body with of decreasing magnetic flux from head towards the feet. What this means is that you want ideally 3 pairs of coils, for the head/neck, hips/torso and legs/feet and one coil for each side of the body. AND, The coils toward the upper body should have a lower intensity (lower intensity = lower magnetic flux = smaller number of turns in coil) and the coils toward the feet should have a greater intensity (magnetic flux). This is very important because the legs and feet can handle a much higher intensity than the head and neck (which are the most sensitive area). When walking on the earth the feet naturally experience a slightly higher intensity especially when in contact with the ground. But even more important for people that are chemically sensitive or electrosensitive is that the head and neck/thyroid can be easily overstimulated and irritated.

WARNING: Avoid the new wire mesh mats (on Bemer 3000 and QRS Quantron). These mesh mats CLAIM to offer a more uniform field (and they do) but at the expense of giving both the feet and head the same intensity. This means you are LIMITED by the intensity the head can handle.

Also another important point from Physics 101 is that a pure magnetic field using a current can only be created from a current loop. The criss cross wire mesh is NOT a current loop and will NOT create a pure magnetic field.

Tip 6: Does the Mat Use a Sawtooth Wave?

You want to find a pulsed magnetic field device that uses a sawtooth waveform. The sawtooth waveform provides the maximum impulse or action potential across the cell membrane which will boost the voltage of the cell.

Also the sawtooth yields the greatest spectrum of frequencies that can be delivered simultaneously.

Again make sure the frequency range is 0-30 Hz.

Tip 7: Do the Applicators Use the Nasa Proven Square-Wave?

Make Sure the Local Applicators use a SQUARE WAVE. Why? Because the square wave is the most effective for breaking up cycles of pain AND also the square wave works best when it comes to healing and regeneration. This information comes DIRECTLY from the NASA study done on PEMF using a square wave.

"We have clearly demonstrated the bioelectric/biochemical potentiation of nerve stimulation and restoration in humans as a documented reality".

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·UPREGULATION OF GENES RELATED TO CELL RESTORATION AND GROWTH·BIOELECTRIC POTENTIATION OF NERVE STIMULATION AND RESTORATION·HIGH-SPEED SQUARE WAVE INCREASED CELL GROWTH FOUR-TIMES FASTER.

Tip 8: Does the Unit Switch Polarity?

Make sure the devices switches polarity every few minutes. This is important because the body will get used to either a constant north or constant south pole polarity. This is one of the main drawbacks (amongst others) why you DON'T want a static magnetic mattress pad or pulsed magnetic therapy devices that do not switch polarity.

Every two minutes is an ideal switch.

Tip 9: Is There an Optional Light and Sound Machine?

Is there an integrated Light and Sound Relaxation System?

This is a nice option especially when the light and sound device uses the same frequencies that are in the mat.

Tip 10: Does it Come Standard with At Least a 3 Year Warranty?

Make sure the unit has a good warranty. I recommend finding a machine with at least a 3 year warranty. These devices are expensive and very sensitive, so you want to make sure you are covered.

Tip 11: Is the Mat Comfortable to Use?

Look for a nice padded mat that is comfortable even on a hard surface. Also the applicators should be convenient and easy to apply.

It is an added bonus if the mat and applicators are easy to clean too...

Tip 12: Is the Device Easy to Use?

Look for a device that is easy to use and operate.

Some pulsed electromagnetic therapy devices require a lot of training to use which can become an obstacle to getting fast and consistent results.

Final Considerations

If you have read this entire website, many of the above tips have already been covered, but this is a summary of the most important things to look for.

Also, make sure you buy from someone with experience and can offer you great support after the sale.

Many companies sell you a device and do not support you well in using it... This is very important.