

# POWER TOOLS FOR HEALTH

How Magnetic Field Therapy [MFT]  
Will Change Your Life

William Pawluk, MD, MSc

# POWER TOOLS FOR HEALTH

How Pulsed Magnetic Fields (PEMFs) Help You



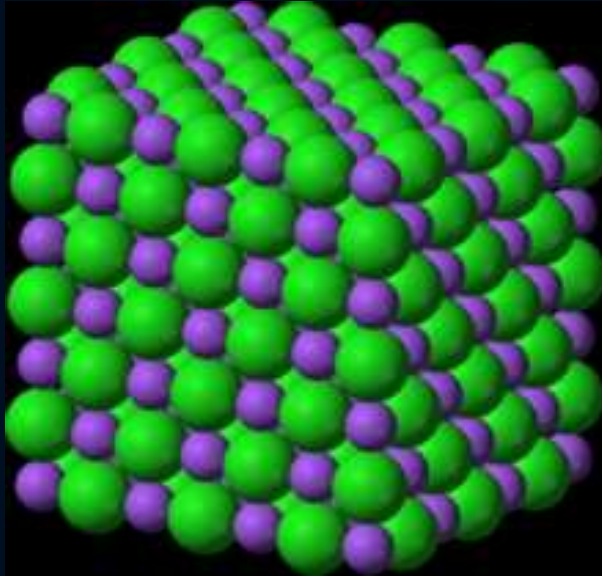
William Pawluk, MD, MSc & Caitlin J Layne

## outline of the video

- my journey
- what magnetic fields are
- how they work
- problems they treat
- the electromagnetic [PEMF] devices available
- how they can be used



Sacred Mirrors: The Visionary Art of Alex Grey by Alex Grey



The crystal structure of sodium chloride, NaCl, a typical ionic compound.

The purple spheres represent sodium cations, Na<sup>+</sup>, and the green spheres represent chloride anions, Cl<sup>-</sup>.

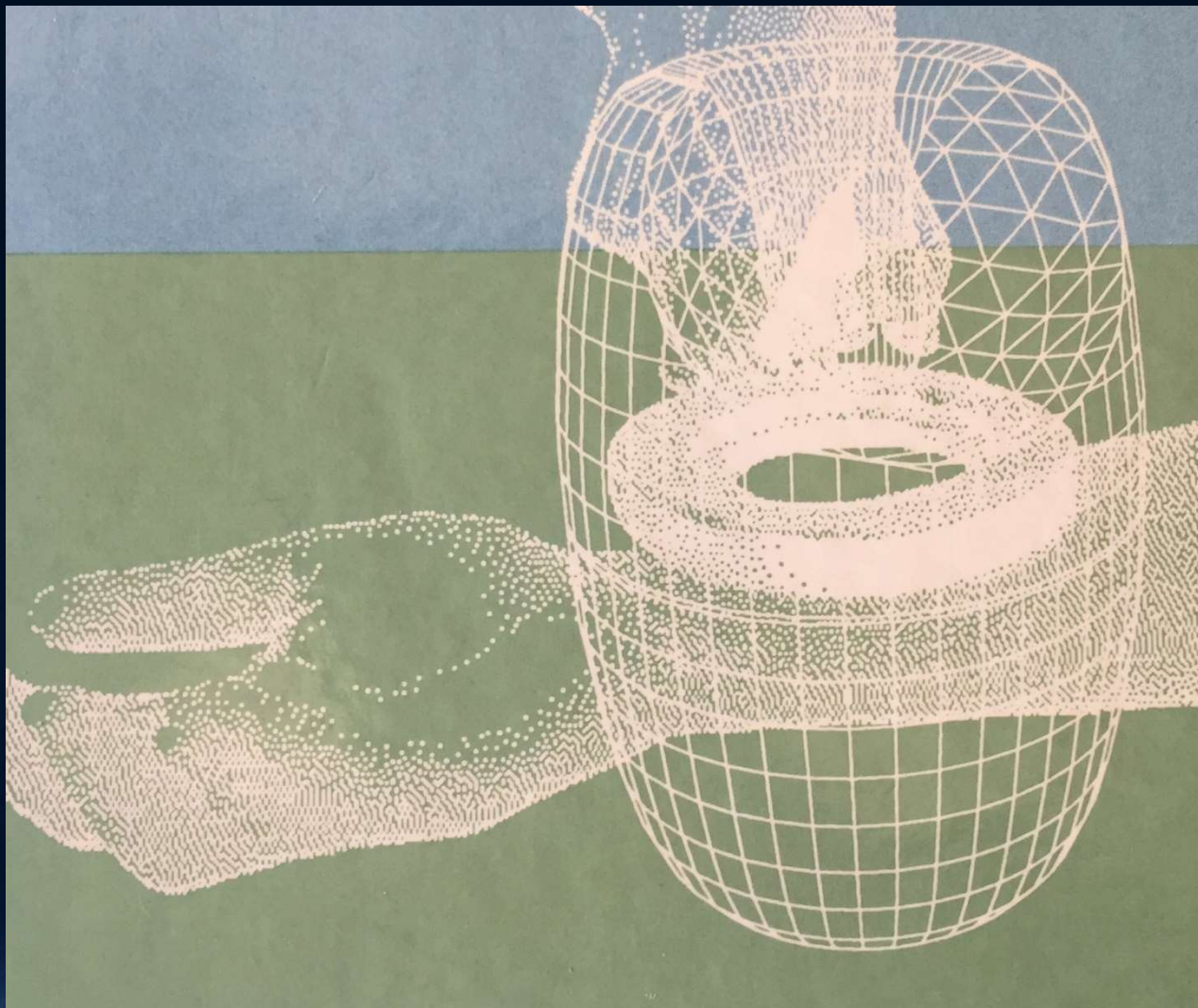
<https://en.wikipedia.org/wiki/Sodium>

There are:

- about 100 trillion cells in the body
- over 2000 chemical actions in every cell of the body per second.

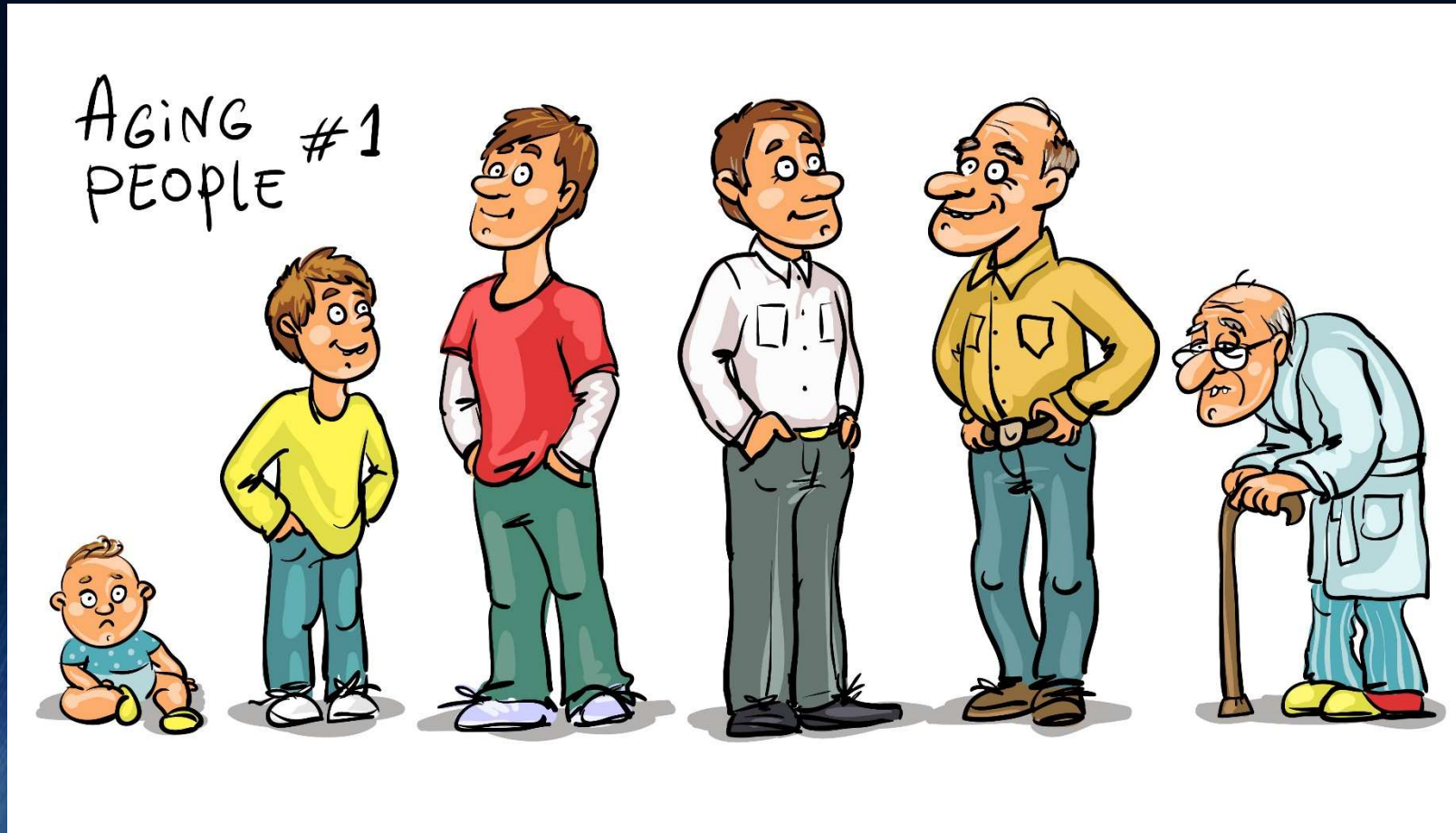
Most of these are on autopilot.





*From Magnetic Stimulation in Clinical Neurophysiology Mark Hallett, Sudhansu Chokroverty.  
Elsevier Health Sciences, 2005*

## Stages of Aging







Who am I?

My Journey



University of Alberta, School of Medicine



McMaster University Medical Center

## University Medical Faculty Positions



107,000 people hospitalized/yr  
for nonsteroidal anti-inflammatory drug  
(NSAID)-related  
gastrointestinal (GI) complications

>16,500 NSAID-related deaths/yr among  
arthritis patients alone

**Recent considerations in nonsteroidal anti-inflammatory drug gastropathy. Singh  
S. Am J Med. 1998 Jul 27;105(1B):31S-38S.**



## Electro-acupuncture



## magnetic acupuncture





**Magnetic Fields**

- Basic Principles
- EM Spectrum
- Static Magnets
- Time-varied Magnets
- Geomagnetic
- Biomagnetic**
- Polarity
- Artificial
- Biologic Actions
- Medical Uses
- Absence Of Fields
- Protection
- The Future

**Ask Dr. Pawluk**

- Q&A Library
- Consultations

**Health Topics**

- Weekly Topic
- Diseases & Conditions
- Women, Men, Lifestyle

**Reviews**

- Books
- Products/Devices
- Other

**Research**

- Weekly Finds
- Archives

**Magnetic Fields**

**Basic Principles**

- Types
- Definitions
- Terms
- Formula
- Field Pictures
- Basic Physics
- Measurements
- Electrical vs Magnetic
- Graphics

(Picture)

**EM Spectrum**

- Parts
- Definitions
- Graphic Of Edges

**Static Magnets**

- Principles
- North vs South
- Domains
- Magnetization
- Types Of Magnets
- Designs
- Frequencies

**Time-varied Magnets**

- F-bands
- Types
- Wave Shapes
- Rise Times
- Decay
- Trains
- Db/dt
- Static

**Geomagnetic**

- Parts
- Definitions
- Graphic Of Edges
- Graphic Of Edges

**Biomagnetic**

- F-bands
- Types
- Wave Shapes
- Rise Times
- Decay
- Trains
- Db/dt
- Static

**Polarity**

- Principles
- North vs South

**Artificial**

- F-bands
- Types
- Wave Shapes
- Rise Times
- Decay

**Medical Uses**

- F-bands
- Types
- Wave Shapes
- Rise Times
- Decay
- Trains

**Biological Actions**

- F-bands
- Types
- Wave Shapes
- Rise Times
- Decay
- Trains
- Db/dt
- Static
- F-bands
- Types
- Wave Shapes
- Rise Times
- Decay
- Trains
- Db/dt
- Static
- F-bands
- Types
- Wave Shapes
- Rise Times
- Decay
- Trains
- Db/dt
- Static

**Protection**

- F-bands
- Types
- Wave Shapes





an unhappy Doctor

not happy until a  
problem could be solved

—

that meant needing to  
find  
out-of-the-box,  
uncommon solutions —  
that meant constant  
learning.

## Training in multiple holistic therapies

- acupuncture
- homeopathy
- bodywork
- hypnosis
- nutrition
- crystal therapy
- sound therapy
- color therapy
- microcurrent
- other energy medicine techniques

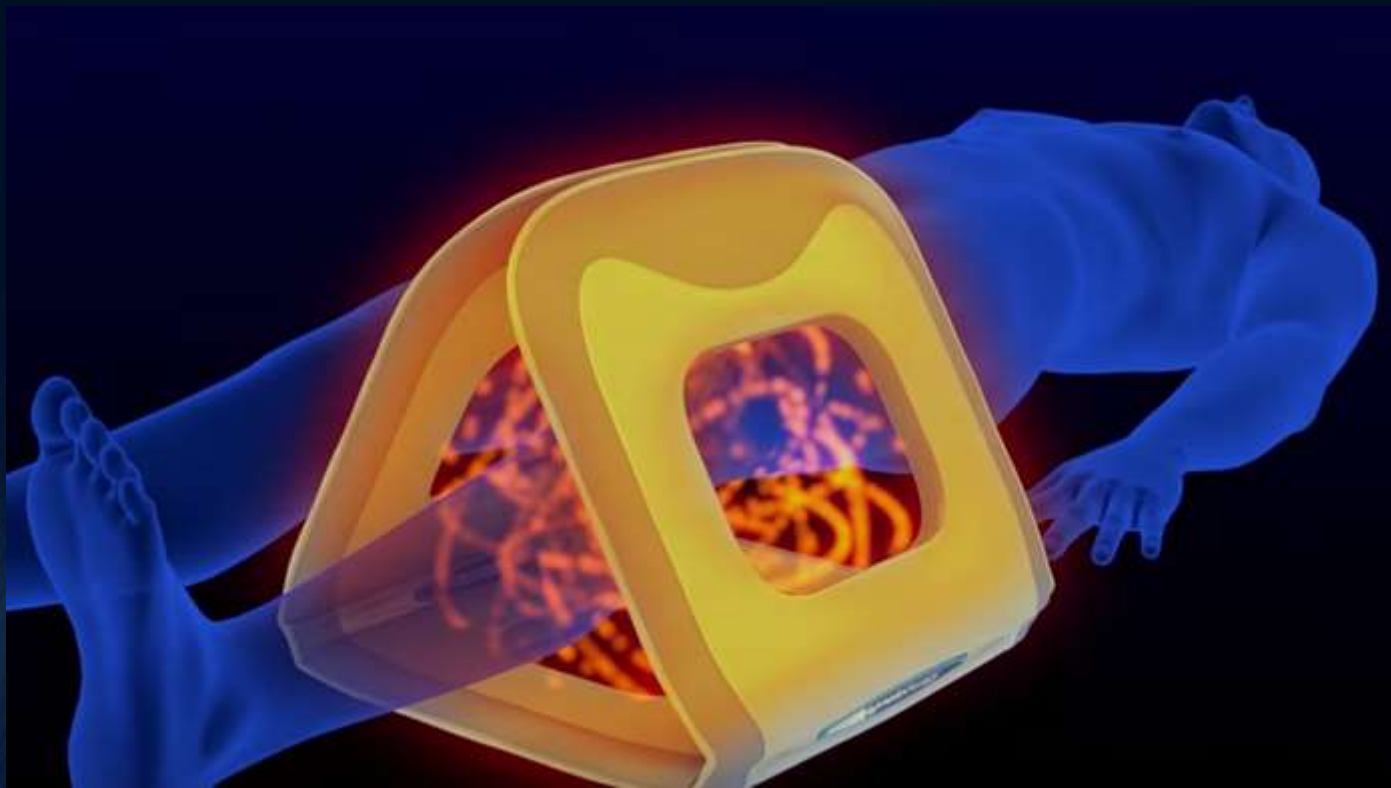
# Why magnetic field therapy?

## Disc, static or permanent magnets





## Pulsed Magnetic Field (PEMF)



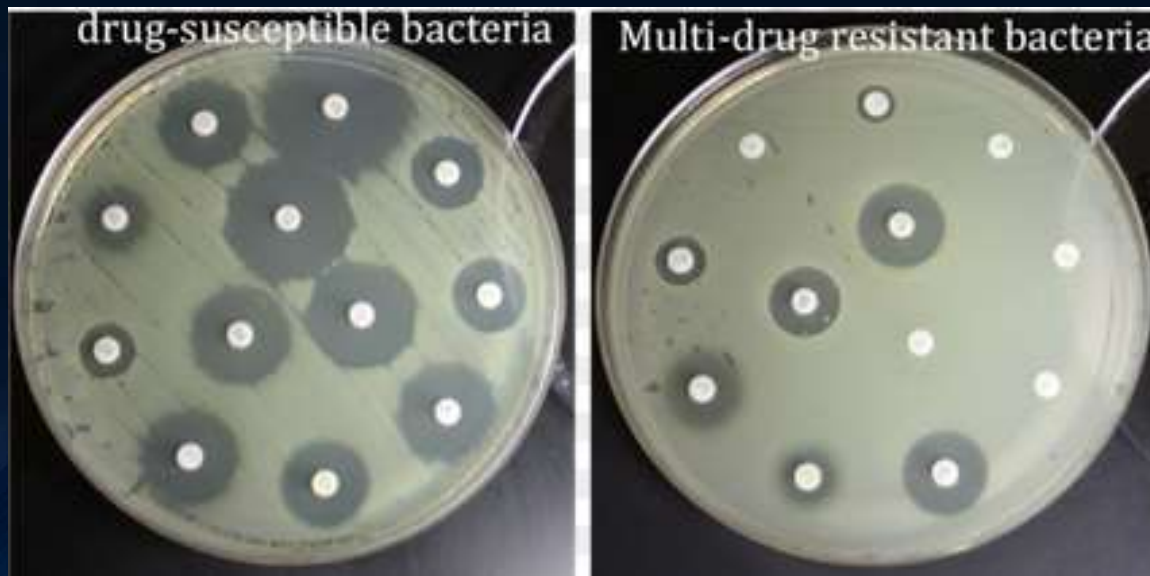
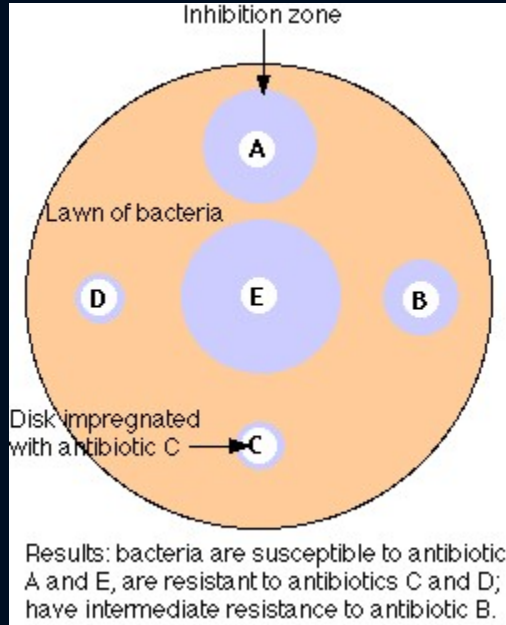
<https://www.youtube.com/watch?v=HU7sd84gcaE>

## What magnetic field therapy could do

- healed wounds
- cleared rashes
- sped recovery of infections
- reduced swelling and bruising
- improved circulation
- helped arthritis and muscle spasms
- and much more ...

drugs and procedures

- nutrition
- herbs
- vitamins
- supplements
- lifestyle
- exercise
- rest and sleep
- positive attitude
- friends and family
- creativity
- MFT







Leaving healing to chance





- MFT heals infections by
- increasing circulation
  - more oxygen
  - reducing inflammation
  - reducing edema
  - more tissue energy
  - immune support
  - stimulating repair of the damaged cells
  - reducing pain



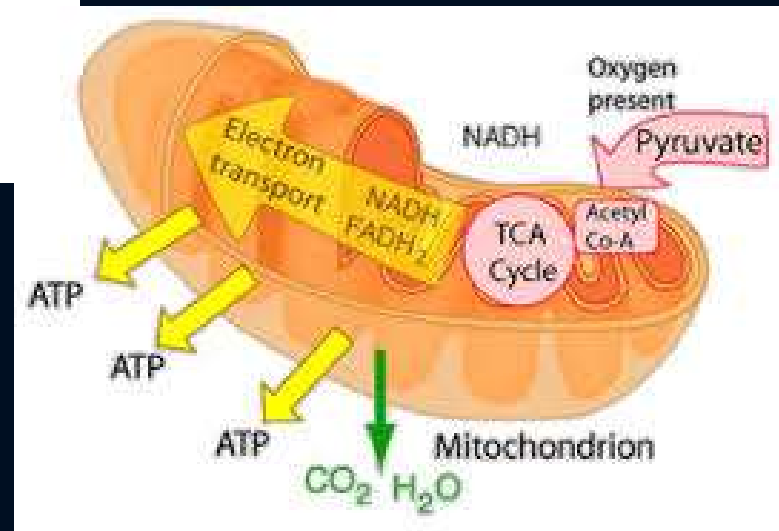
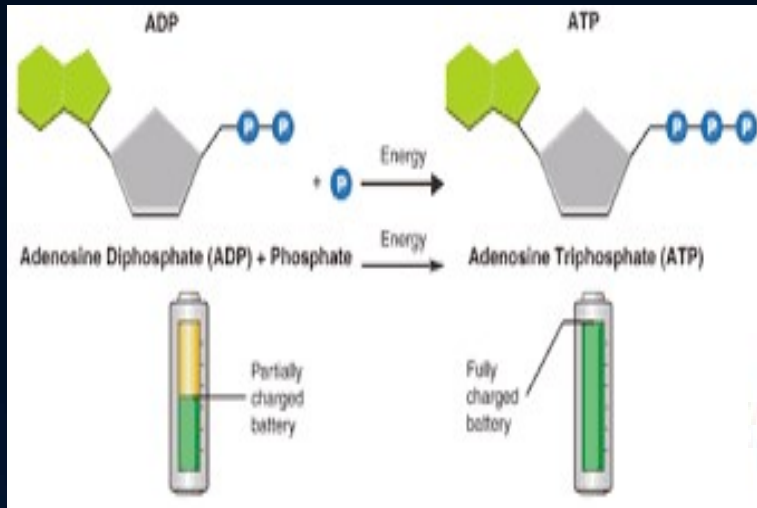
## leaving healing to chance

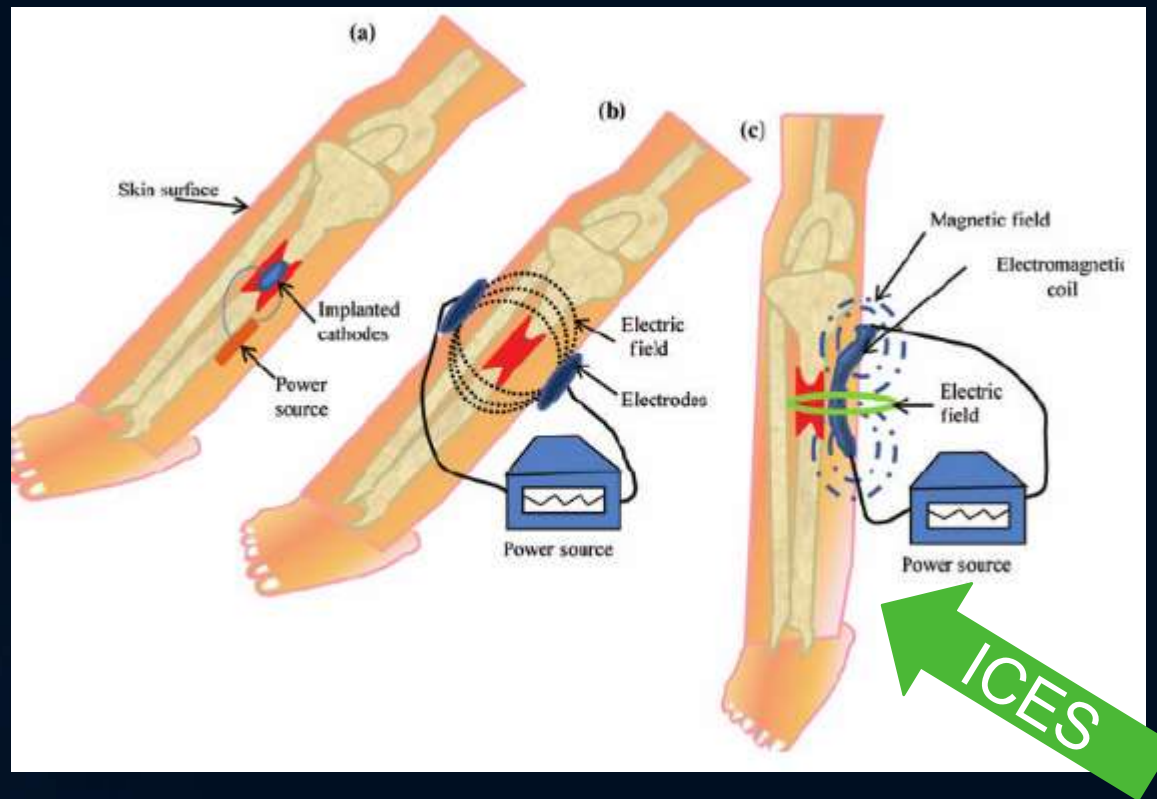
- infections
- heart attack
- fracture
- concussion
- surgery
- wounds
- etc









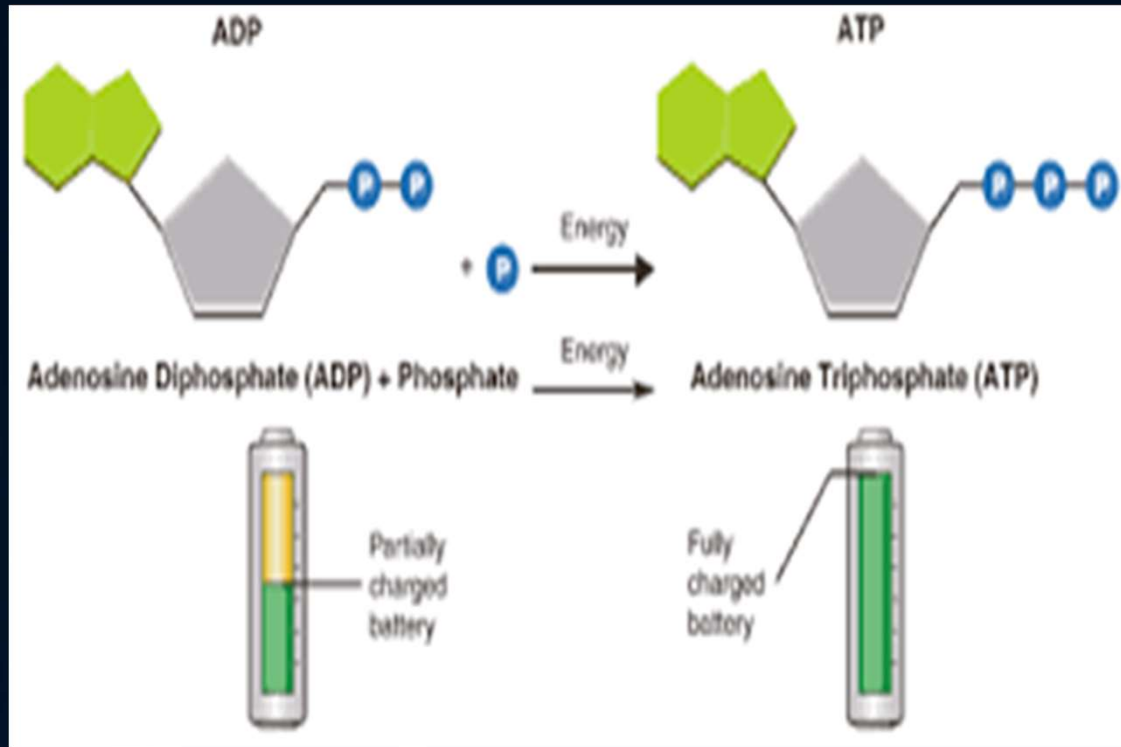


- a) DC – directly applied
- b) capacitively coupled estim (CCES)
- c) inductively coupled estim (ICES)

from: Eplasty. 2011;11:e34. Epub 2011 Jul 26.

Electrical stimulation in bone healing: critical analysis by evaluating levels of evidence.

Griffin M, Bayat A.

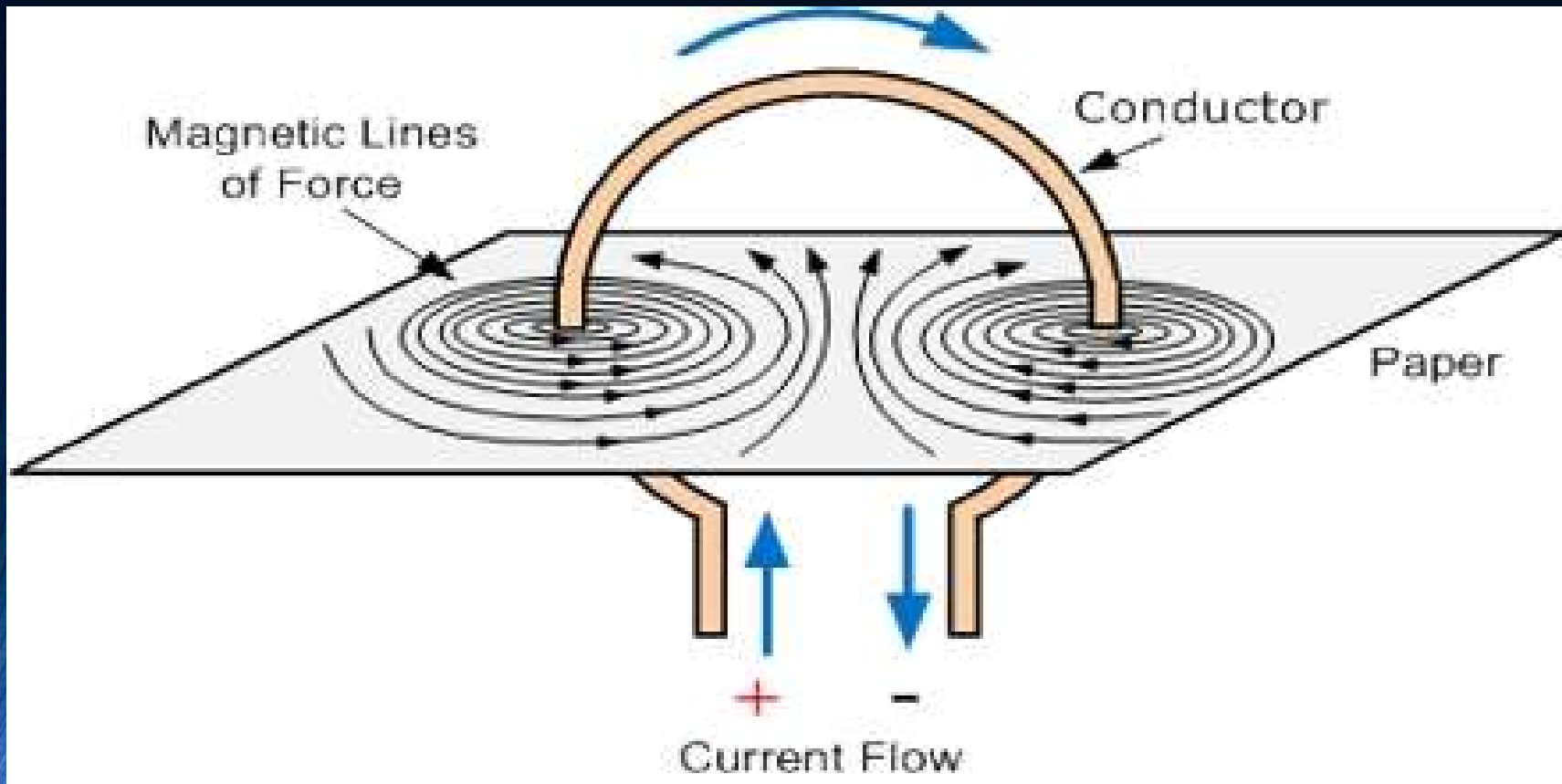




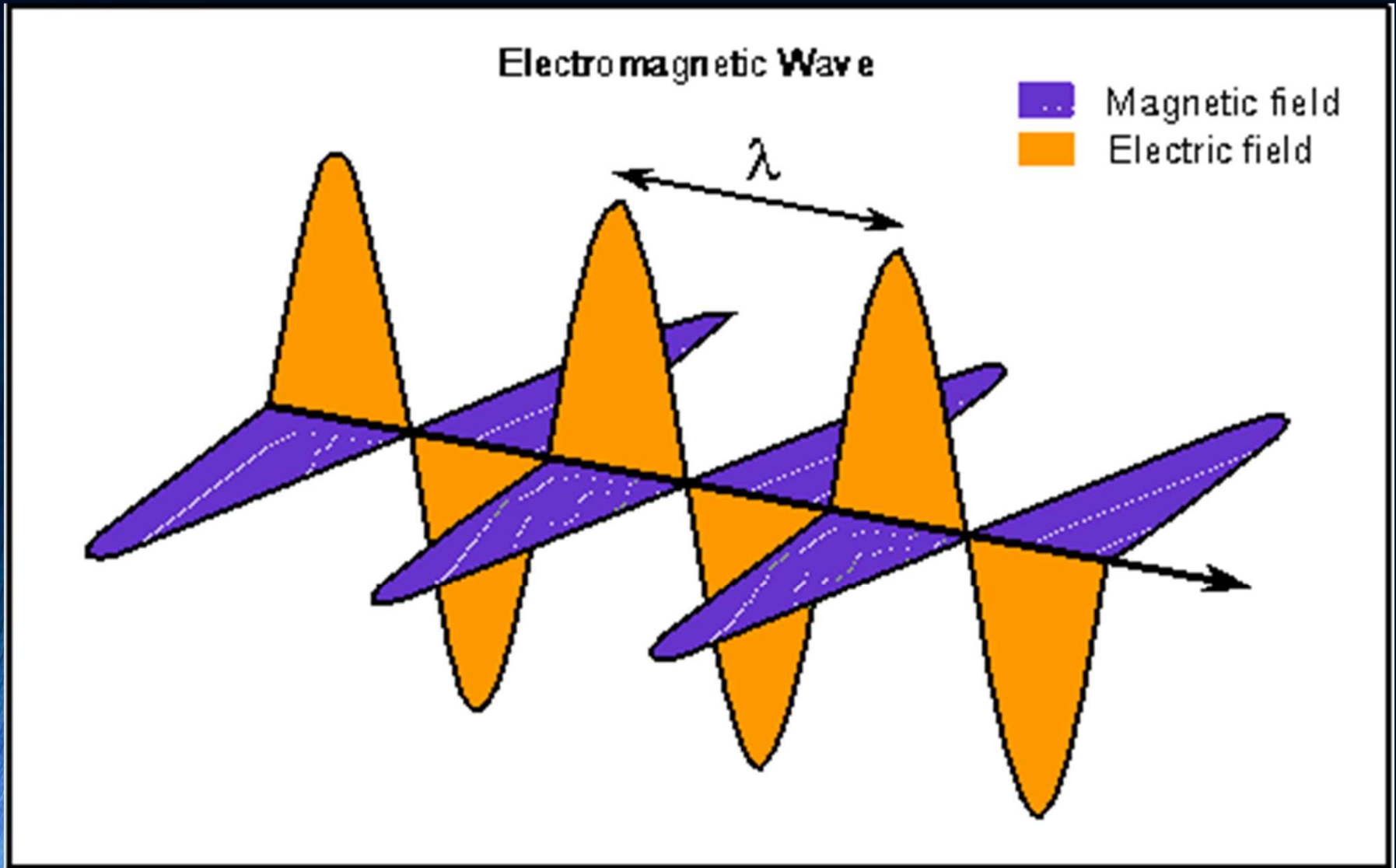




What are electromagnetic fields (PEMFs)?



<http://www.assignmentpoint.com/science/engineering/electromagnetism.html>





PEMFs activate the cells of the body and  
their chemical processes

every cell has about 2000 chemical  
processes per second

PEMFs cause cells to be more awake and fit



# Benefits of PEMFs

## advantages of magnetic field therapy

- safe
- nontoxic-
- non drug
- noninvasive
- natural
- energizing
- tissue restoring
- work deep in the body
- activates many other treatments including supplements
- stimulates body's own capacity for healing
- reusable
- treat yourself at home
- strong enough for professional use too
- supported by scientific evidence

symptoms improved

## symptoms improved

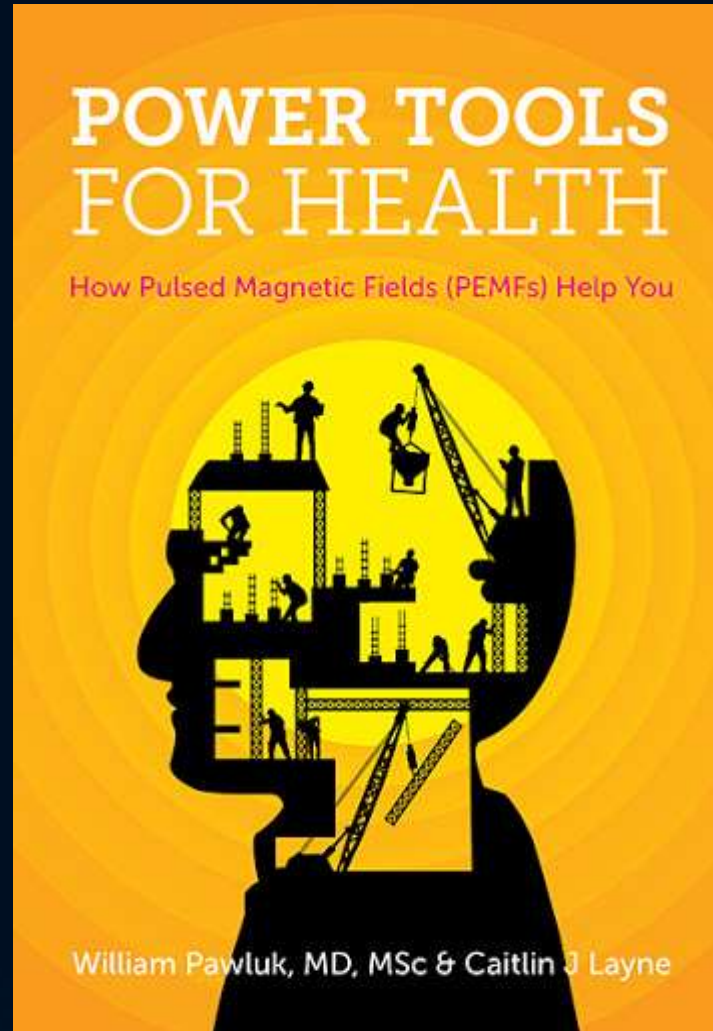
- endocrine – thyroid-related fatigue
- mental and behavioural - anxiety and depression
- nervous system - tremors, cramps, headaches, seizures, brain fog, lack of alertness
- eye – pain, blurry vision
- ear - pain, hearing loss, tinnitus, dizziness
- circulatory system - high blood pressure, chest pain, palpitations

## symptoms improved

- respiratory system – wheezing, coughing, vocal cord changes
- digestive system – abdominal/pelvic pain, heartburn, cramps, bowel habit changes
- skin - itching, rash, pain.
- musculoskeletal system - pain, swelling, bruises, range of motion, wound healing
- genitourinary system - incontinence, ED, infertility, PMS
- injury - help with almost any injury



conditions treated successfully with PEMFs



50 health conditions treated successfully  
with PEMFs

25 mechanisms of action

over 500 scientific references

Addiction

Adhesions, abdominal

Alkaline Balance

Arthritis

Atrial Fibrillation (A-Fib)

Bruising

Cancer

Chemotherapy Complications

Chronic Fatigue Syndrome

Dental Issues

Diabetes

Eczema and Dermatitis

Enuresis, nocturnal

Erectile Dysfunction

Eye Conditions

Cataracts

Glaucoma

Fibromyalgia

Fungal Skin Infections

Heart Conditions

Hepatitis, viral

Intestinal Function

Joint Replacements and

Implanted Prosthetics

Keloids

Liver Regeneration

Lyme Disease

Migraine

Obesity

Osteopenia and

Osteoporosis

Pain Management

Pancreas

Premenstrual Syndrome

(PMS)

Prostate Hyperplasia (BPH)

Psoriasis

Radiation Damage

Scleroderma or Progressive  
Systemic Sclerosis (PSS)

Shingles

Smoking Cessation

Testosterone

Urinary Incontinence and

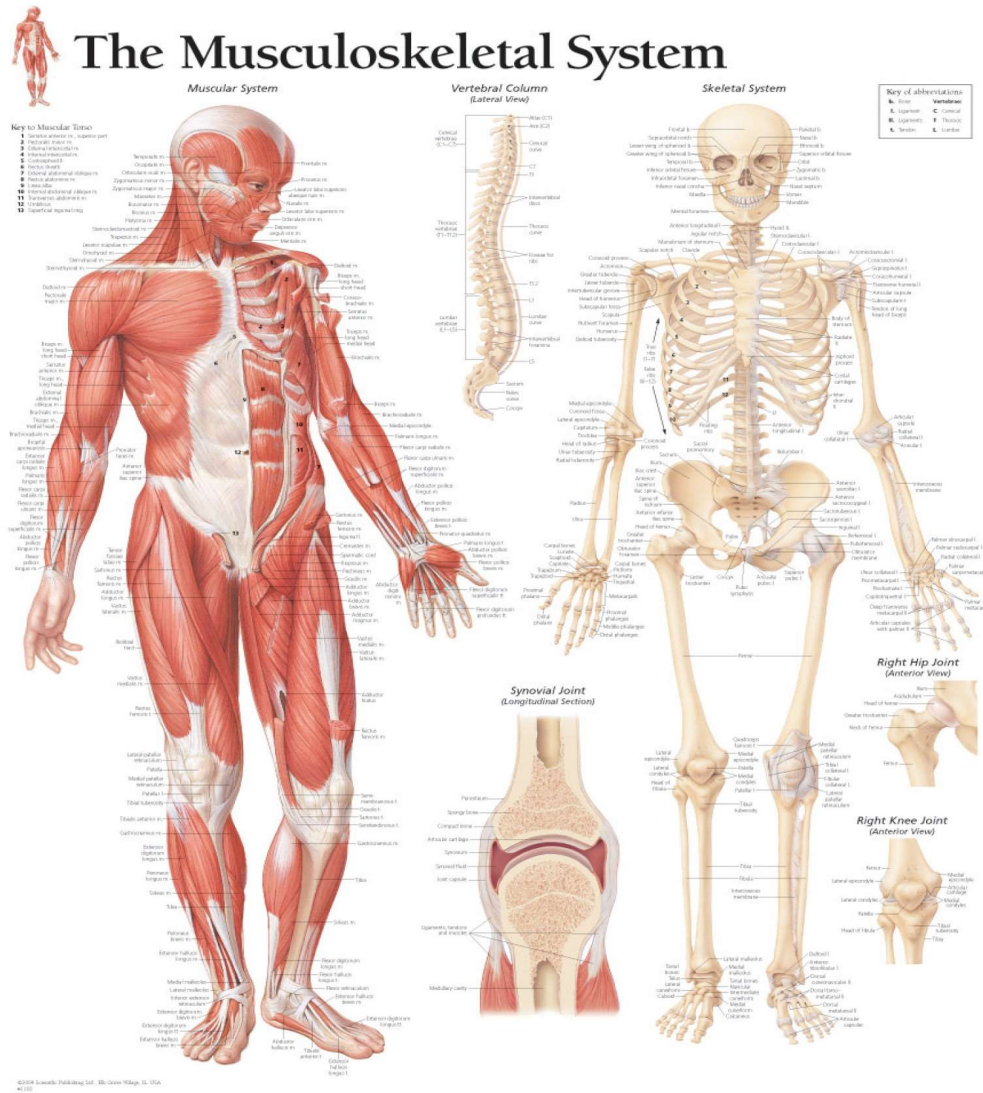
Overactive Bladder

Wounds



## magnetic field therapy

- increases circulation
- reduces inflammation
- reduces pain and swelling
- softens the tissues
- stimulates repair and healing
- improves joint motion



musculoskeletal system is supported and impacted by the

- immune system
- circulatory system
- nervous system
- genetics
- microorganisms
- activity
- nutrition
- etc.

**Simple  
fracture**

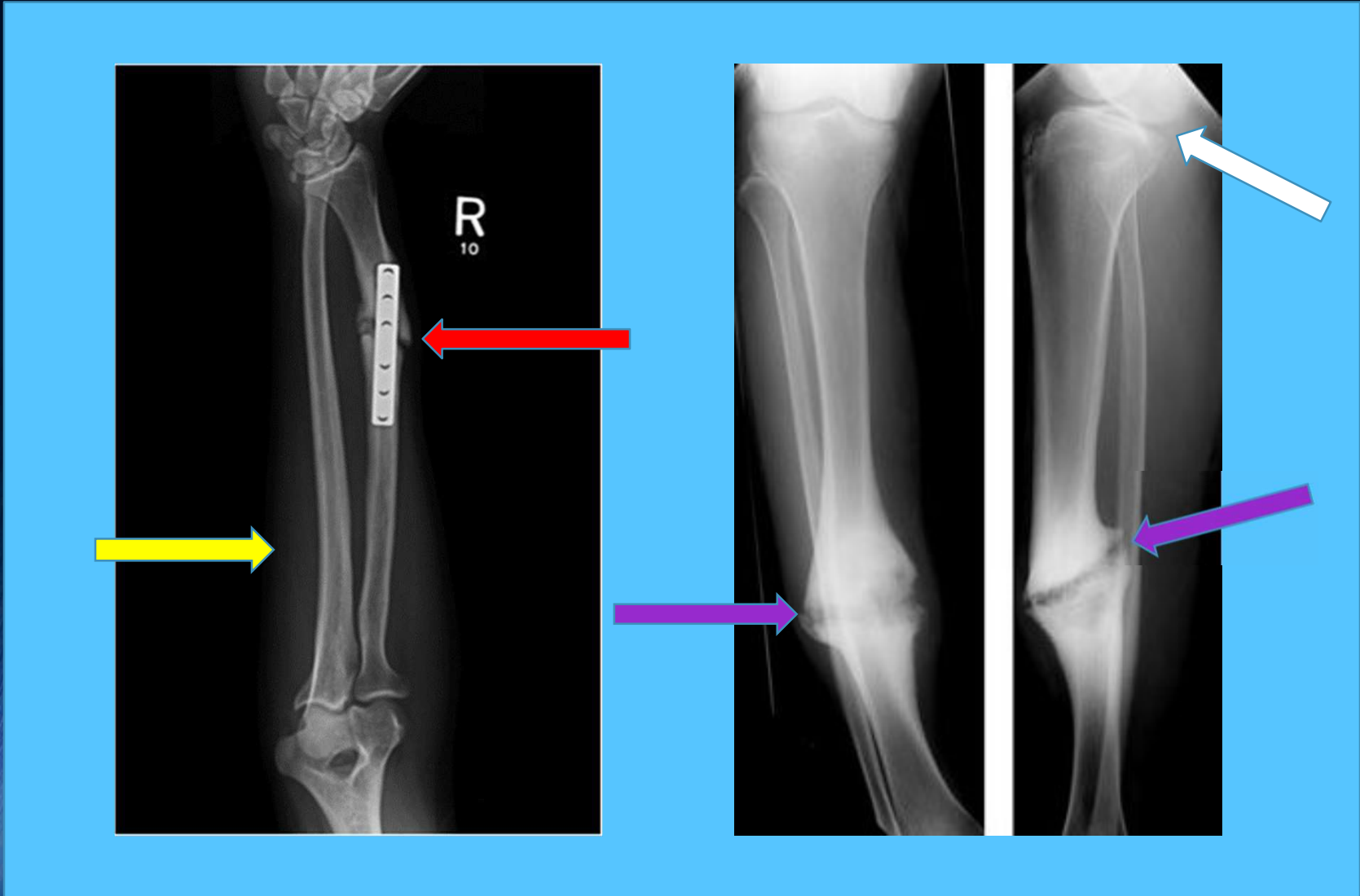


**Comminuted  
fracture**

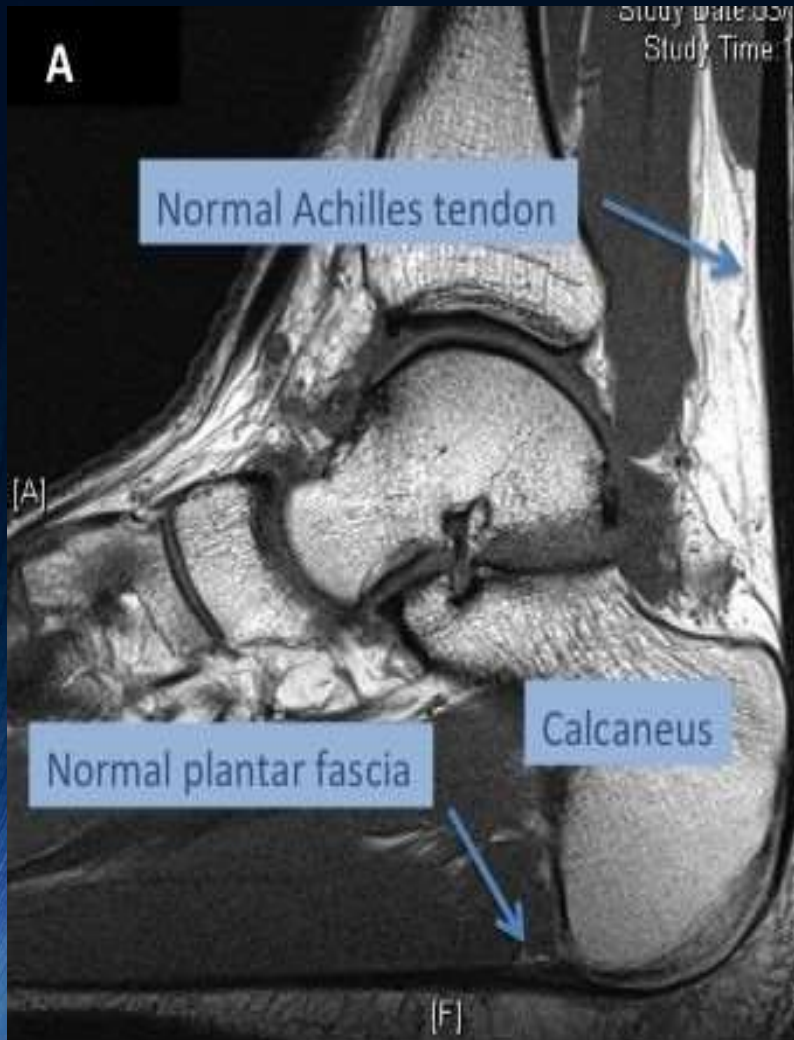


**Open  
fracture**

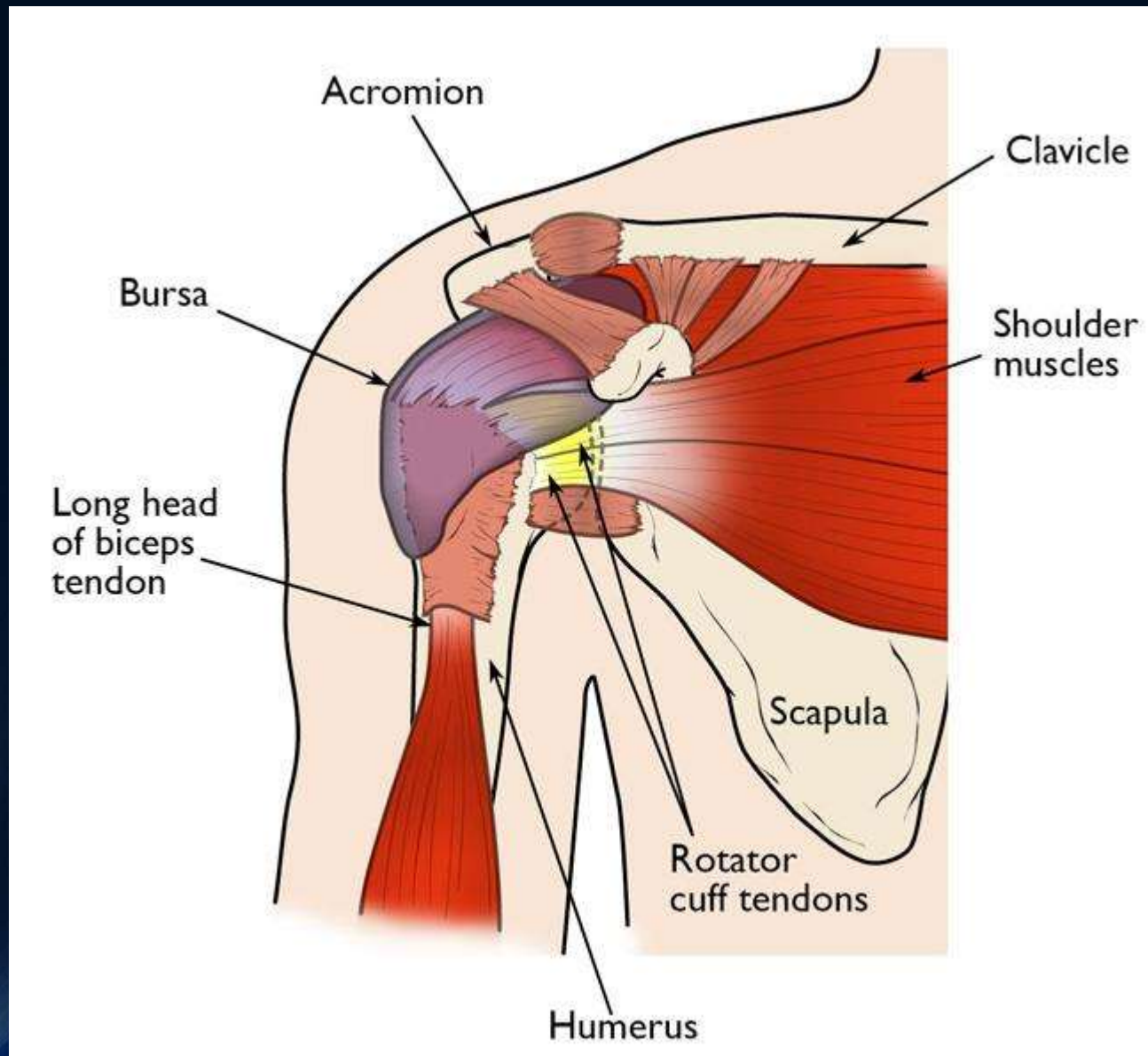




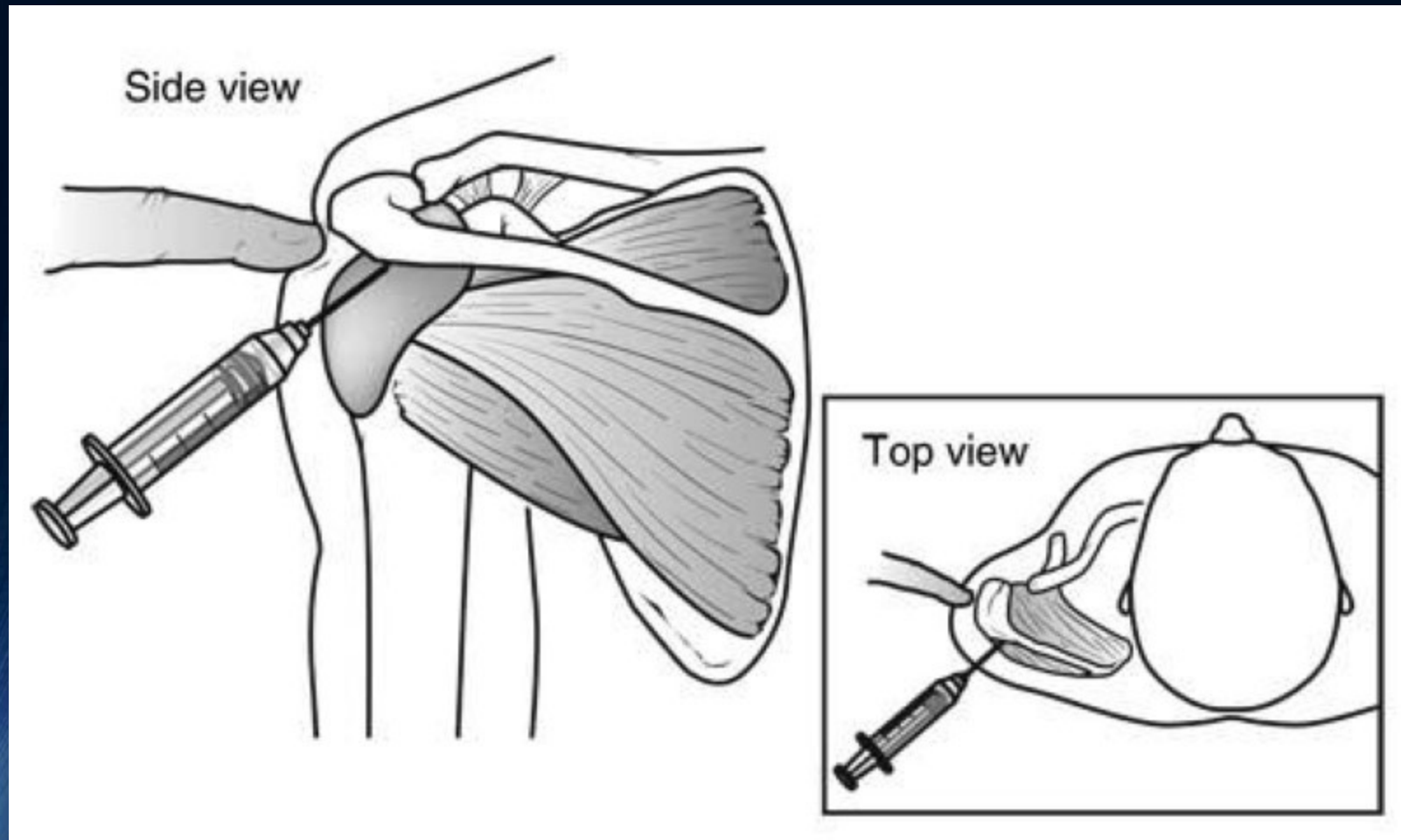








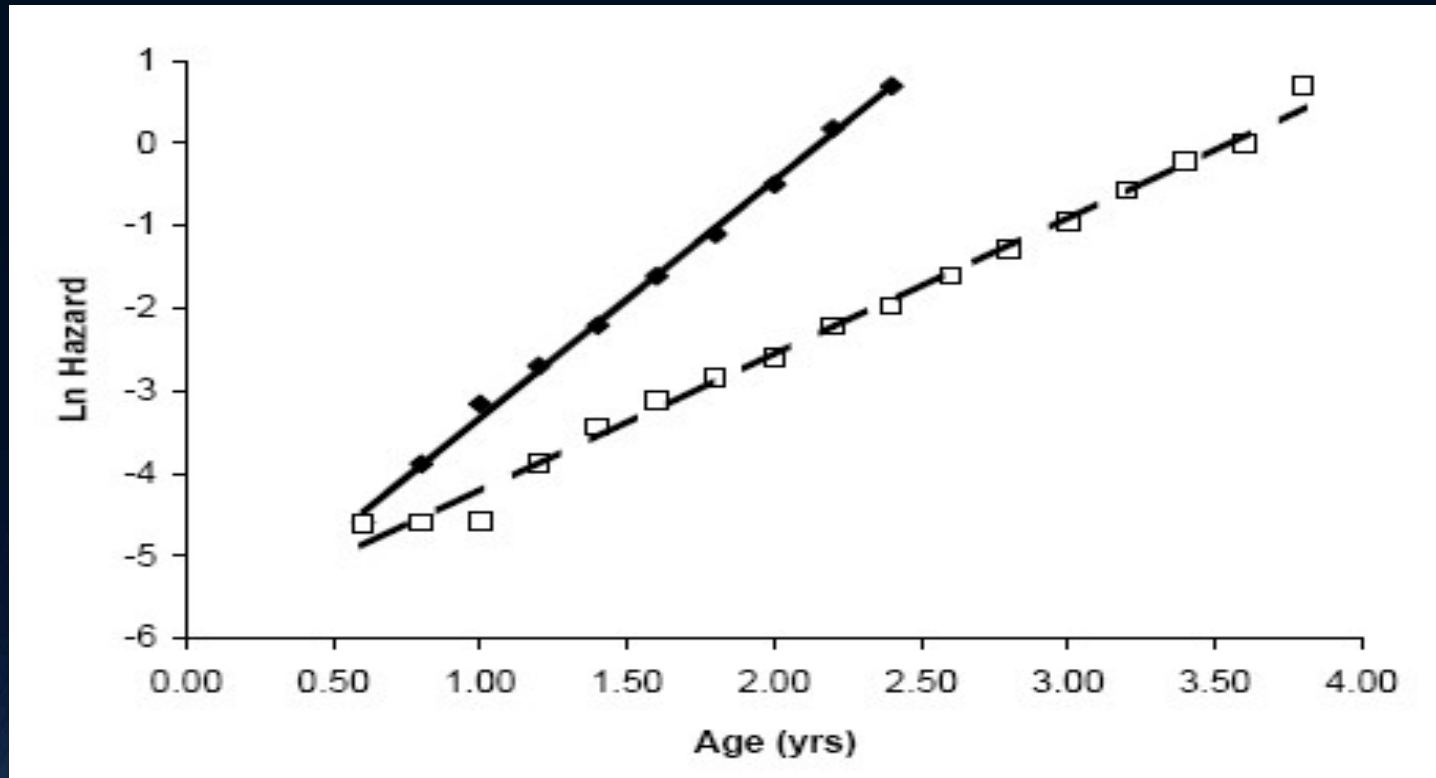




from JF Sarwark, ed: Essentials of Musculoskeletal Care, ed 4. Rosemont, IL, American Academy of Orthopaedic Surgeons, 2010.

# cell injury, aging and PEMFs



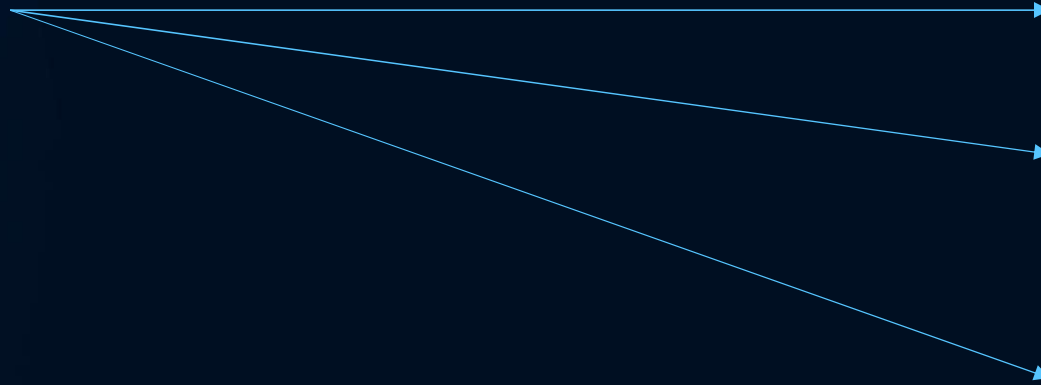


Legend: natural logarithm of mortality curves of two hypothetical two mouse cohorts. Lines represent estimated adult mortality trajectories for controls (straight line) and for a cohort subjected to a given treatment (dashed line).

<http://genomics.senescence.info/software/demographic.html>



*adapted from* <https://www.linkedin.com/pulse/you-slippery-slope-aging-jim-kirwan/>

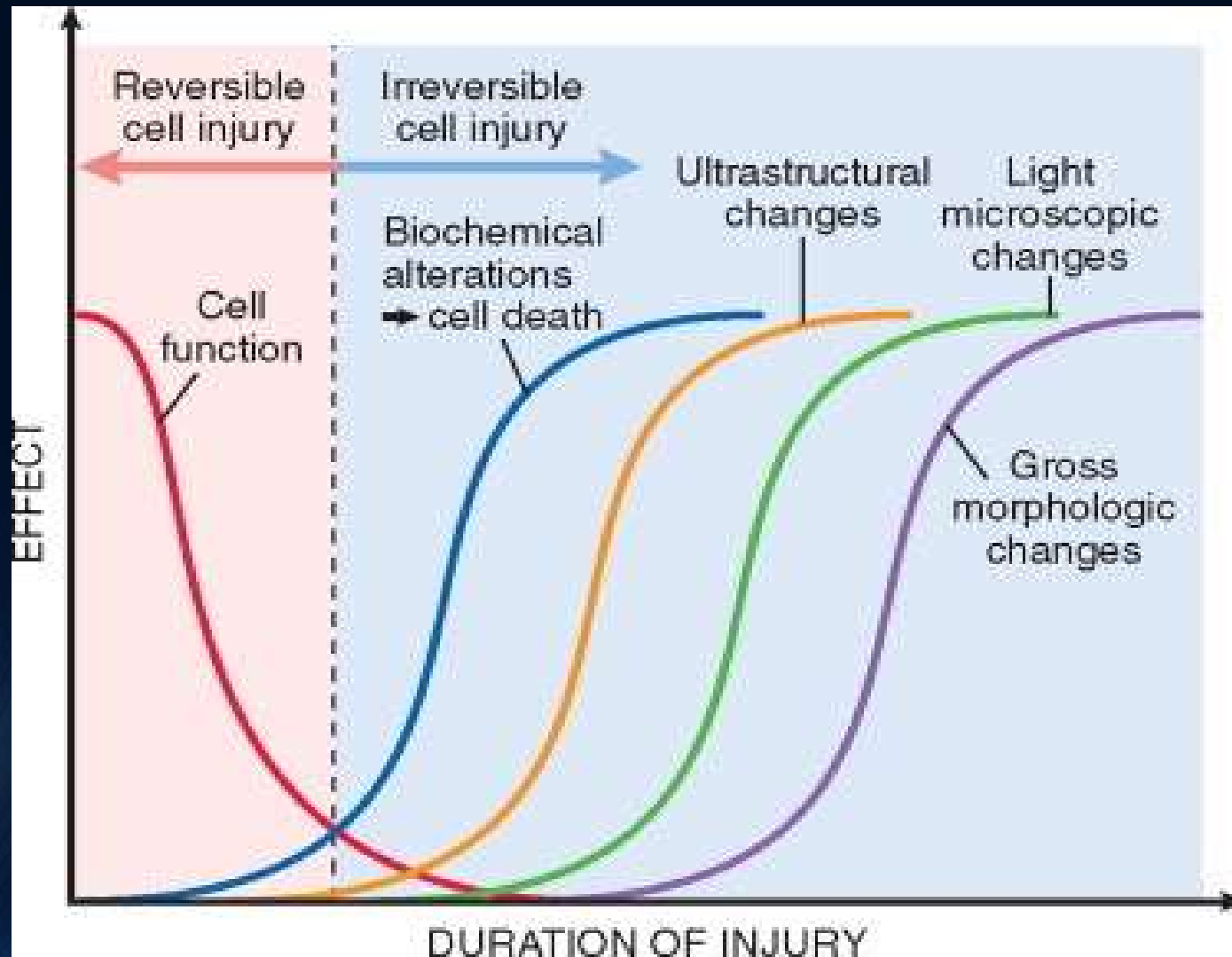


Slopes of functional aging. Starting about age 25 to death.

- Upper slope is rare if not impossible.
- Middle slope is a very good life.
- Bottom slope is more common.

Very few real slopes are straight lines.

How much control do we have over the slope our lives take?



“Pay me now or pay me later. If you pay me later it’s going to be with interest. And, you may not like the interest.”

“You don’t want to come to the party late, because many of your options for enjoyment will have been exhausted.”

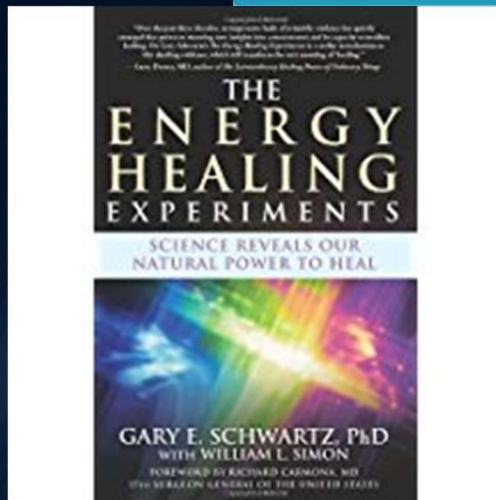
“You can lead a horse to water ... then you start an IV.”



## healing the body



**DrPawluk.com**  
Healing with magnetic fields



- nutritional status of the body
- the natural energy level or vitality
- severity of the problem/s
- how long problems have been present
- emotional and cognitive state
- immune status
- toxicity present
- medication burden remaining in the body
- drug abuse
- chemotherapy
- many other problems





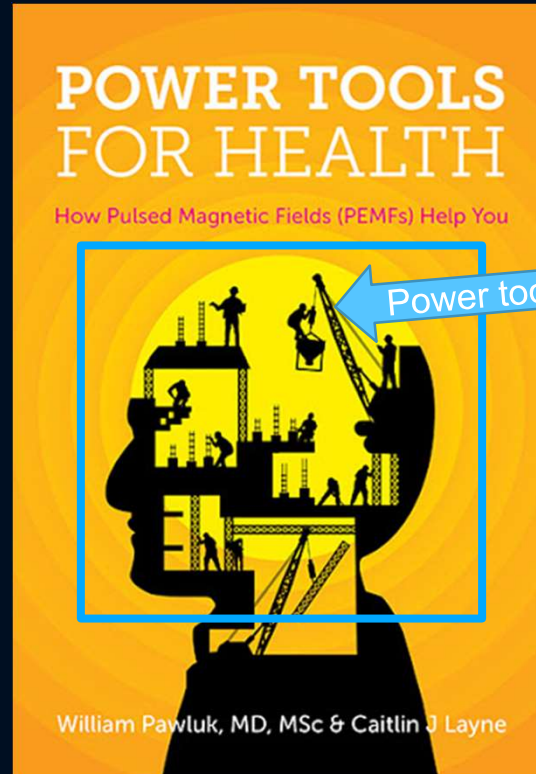




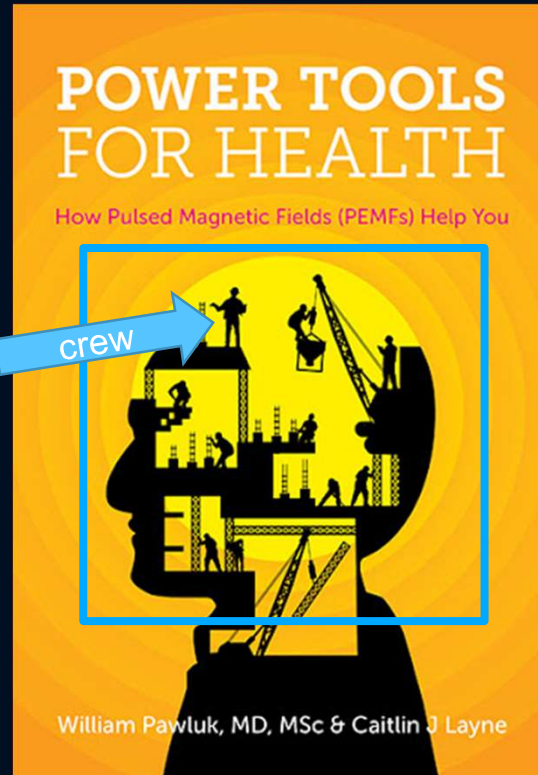
- preventive maintenance
- reducing stress
- adequate sleep
- slowing cell turnover
- optimum cell function
- activity and exercise
- good nutrition



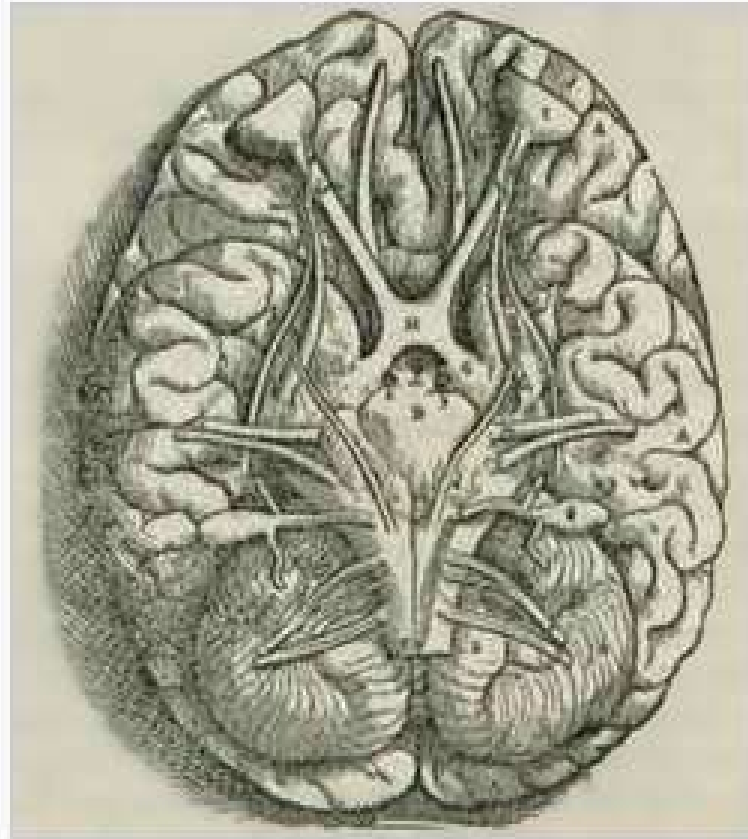
- nutrition
- carbs
- fats
- proteins
- minerals
- supplements
- herbs
- vitamins
- hydration
- oxygen
- etc



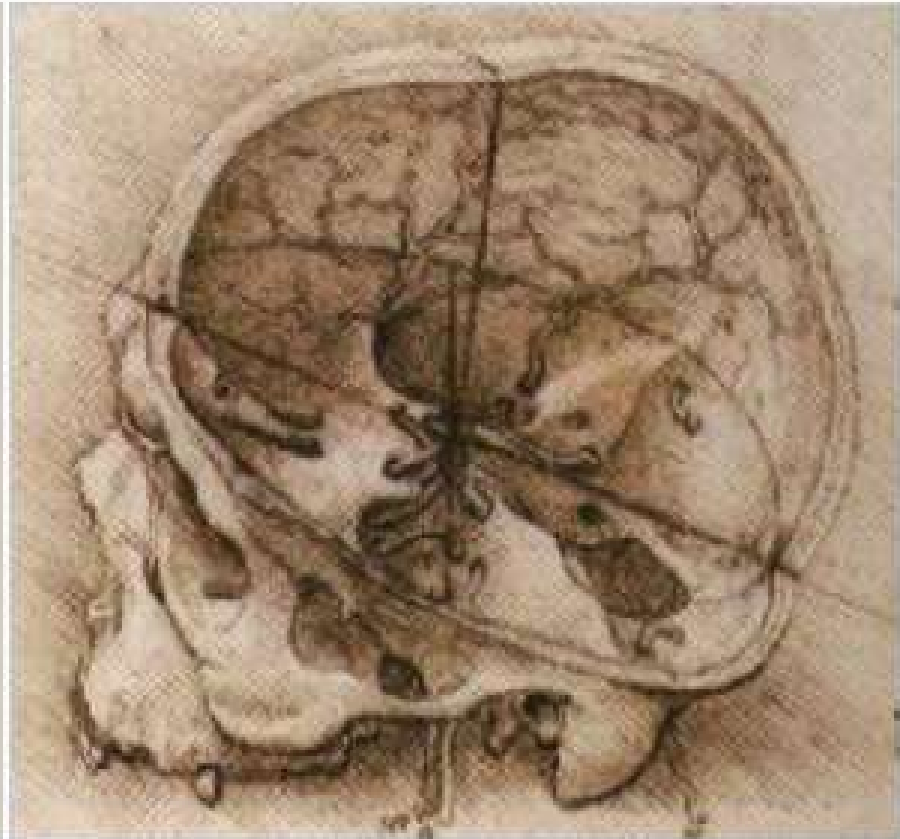




# the brain and PEMFs

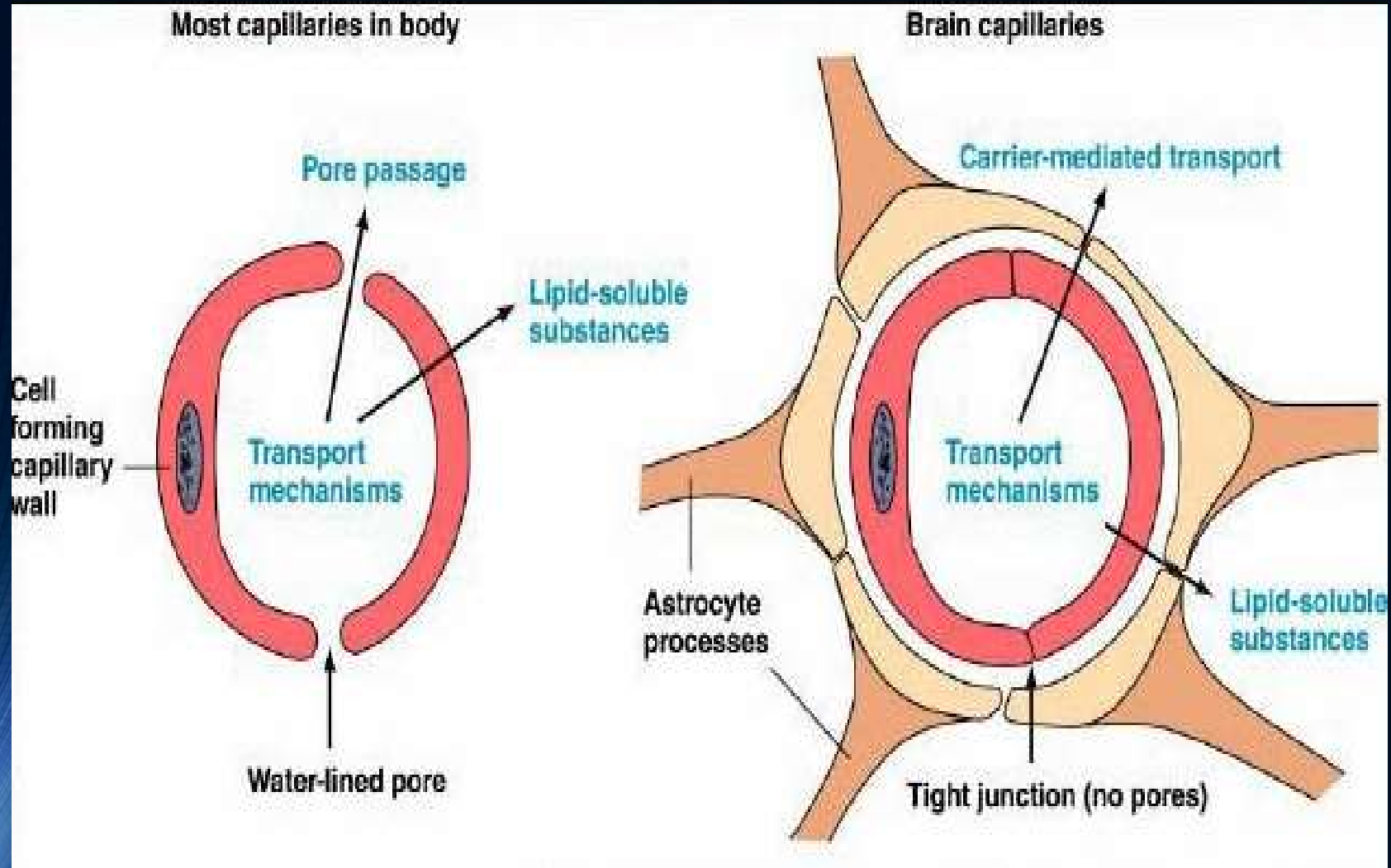


Drawing of the base of the brain, from Andreas Vesalius's 1543 work *De humani corporis fabrica*



One of Leonardo da Vinci's sketches of the human skull

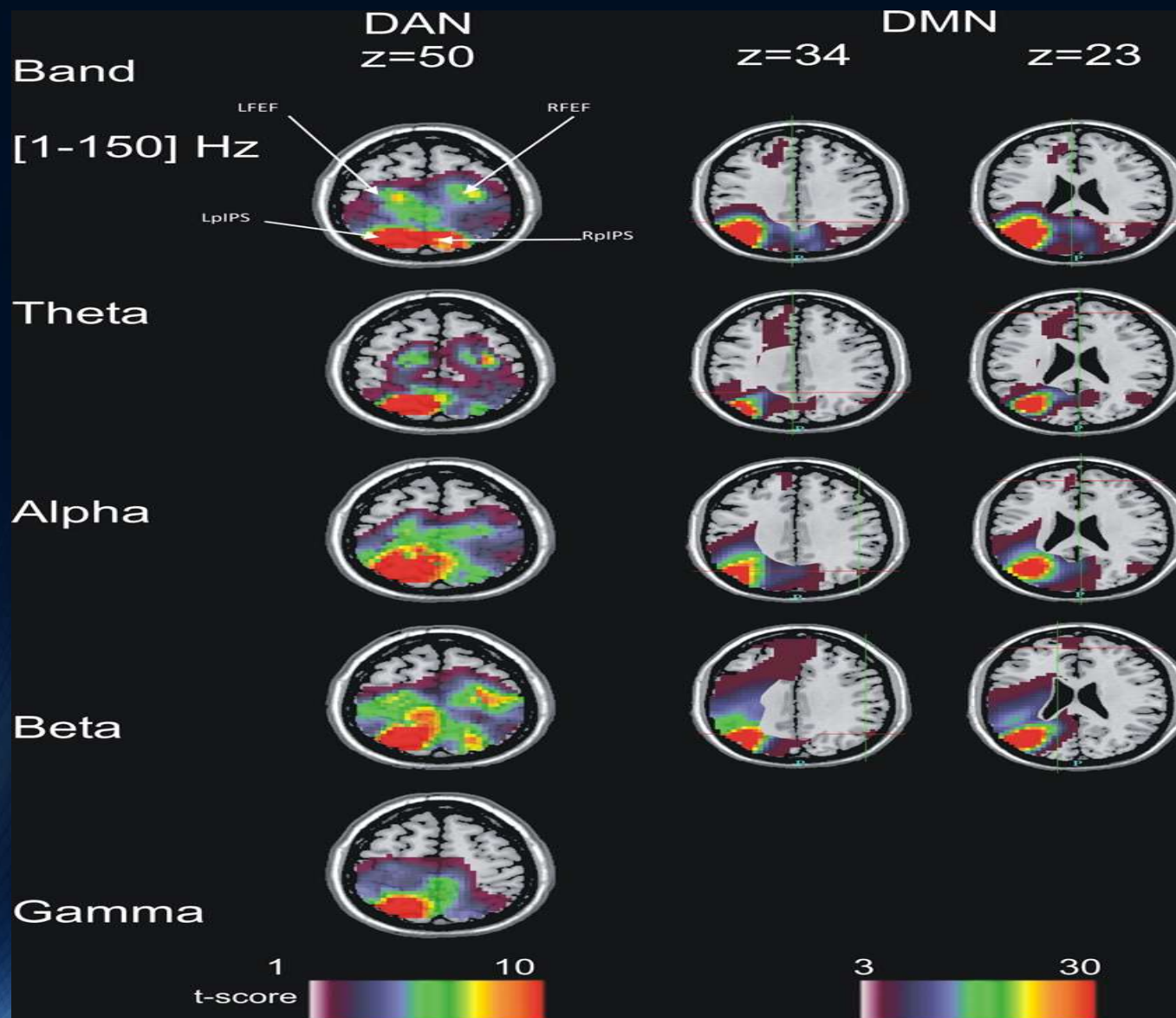
# the blood brain barrier





- Parkinson's disease
- multiple sclerosis
- Alzheimer's disease
- seizure disorders
- concussion & brain injury
- infections
- toxicity
- ADD/ADHD
- cerebral palsy
- sleep disorders and
- many others

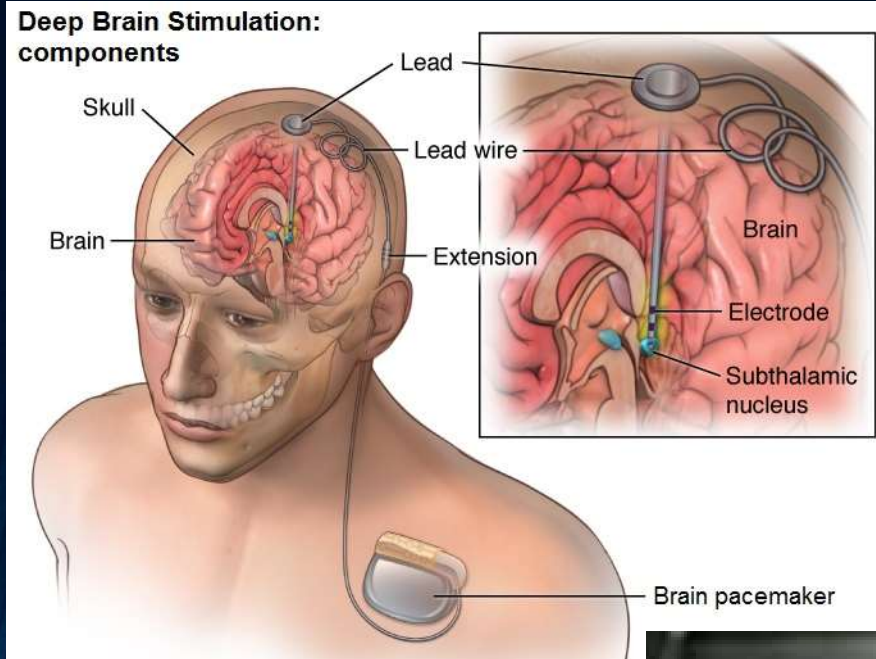






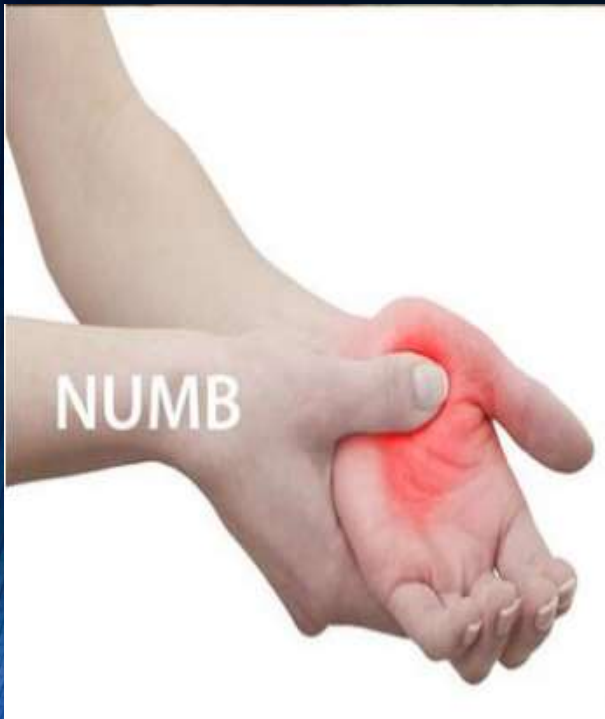


- mood
- alertness
- reduce pain and irritability
- increase calmness
- enhance learning
- facilitate meditation, yoga, and hypnosis





<http://www.instituteforchronicpain.org/understanding-chronic-pain/what-is-chronic-pain/central-sensitization>





- anxiety, Panic and PTSD
- concussion and TBI
- depression
- migraine
- MS
- neuromyelitis optica (NMO)
- Parkinson's disease
- seizure disorders
- sleep
- spinal cord injury
- stroke
- tremor



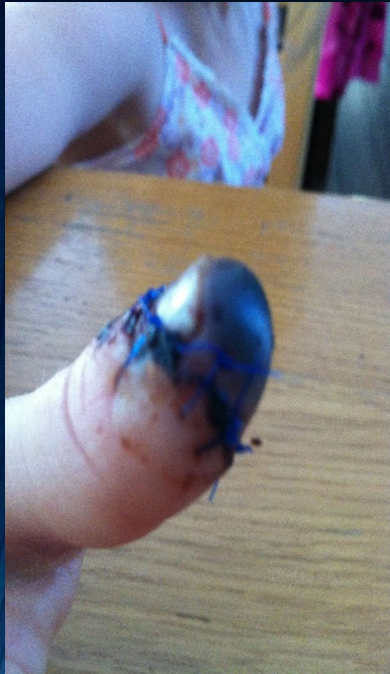
# wound healing



- production of hyaluronic acid
- 46% more collagen
- increased fibroblasts with
- 10-13X increase in total collagen
- increase strength and elasticity
- accelerate healing rate by 25-30%
- increase stem cells
- decrease edema
- 21% faster healing  
open surgical wounds

- reduced bacterial contamination
- better pain reduction
- graft enhancement
- speed skin ulcer healing
- reduction of abnormal scarring
- improve re-attachments
- preoperative tissue preparation
- electrostimulation versus PEMF stimulation

## 3 yr old w complete avulsion of distal thumb



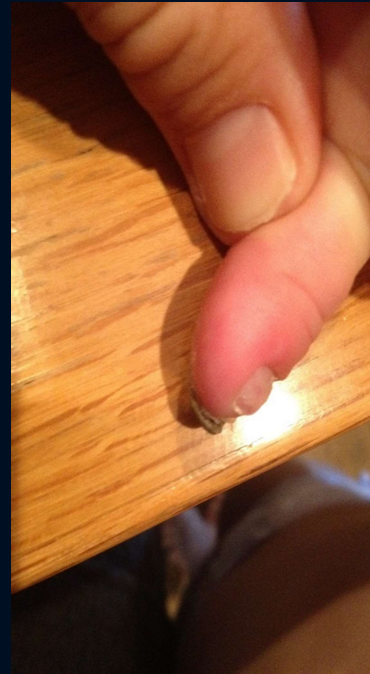
07.12.12

pre-PEMF



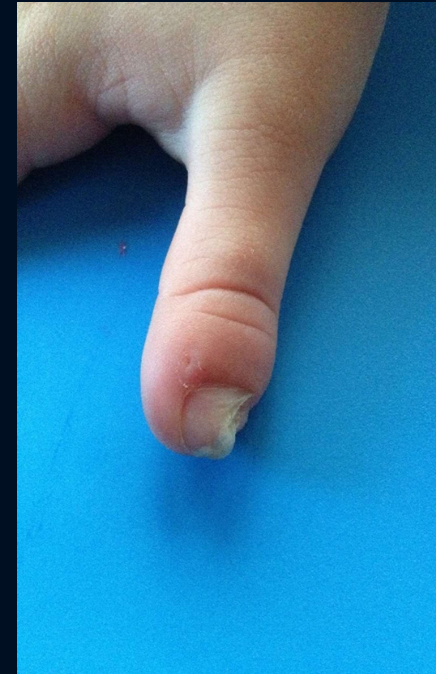
08.06.12

post-PEMF



08.27.12

post-PEMF



10.02.12

post-PEMF



# athletic performance



41 year old male

A recreational ultra-distance runner. I am currently competing in “Racing The Planet’s” 4 Desert races, self supported, multi-day endurance foot race. A race in which Time Magazine recently rated as one of the hardest endurance races in the world.

“After completing the Sahara Race and Atacama Crossing, my focus is now on training for the Gobi March.”

- “recovery after workouts and long runs has sped up and muscle fatigue has been greatly decreased.
- energy levels increased.
- recording personal best training times and 2 months ahead of normal out-put ranges.
- weekly training time and distances increased due to overall energy and stamina increases.
- general repair to chronic knee and hip soreness to the point of little or no discomfort.
- in summary, I use the portable PEMF 5-7 days a week, 1-4 hours per day.”





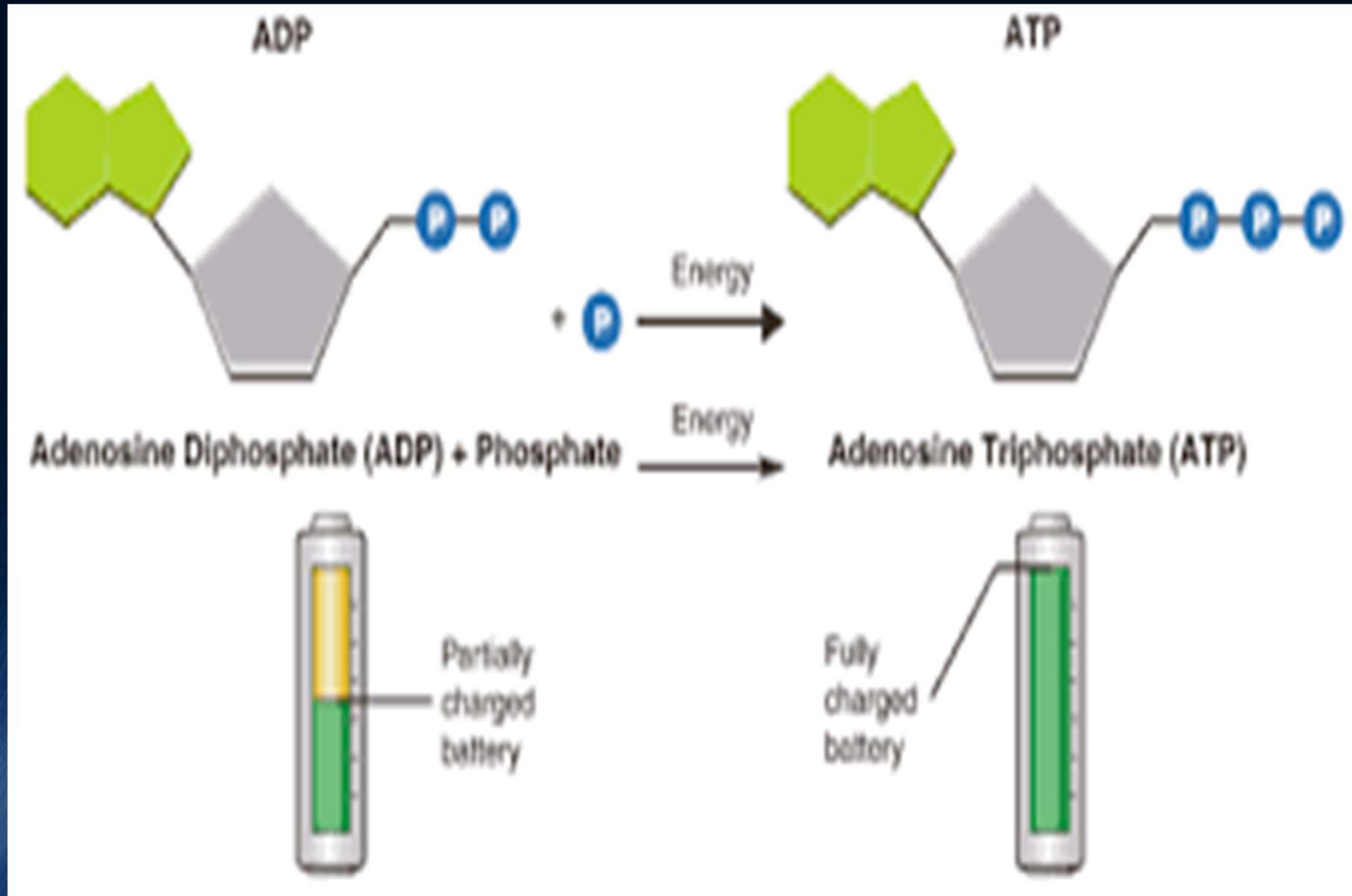
marathon runner

hockey goalie injury



distance cyclist



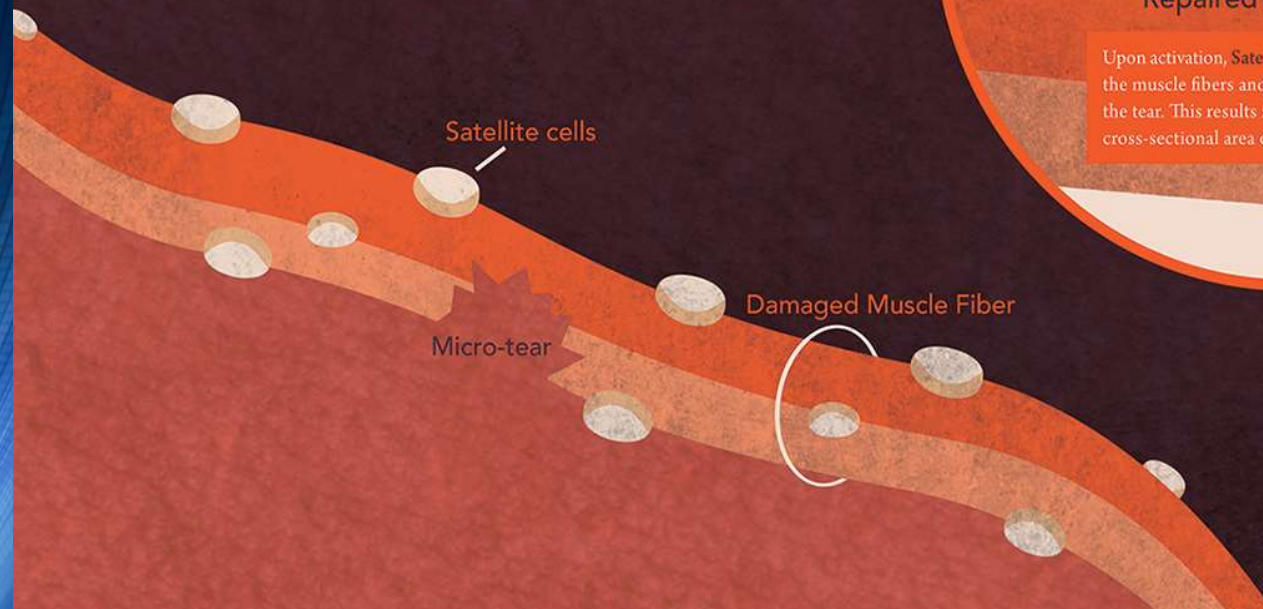


## PEMFs have 2 important roles:

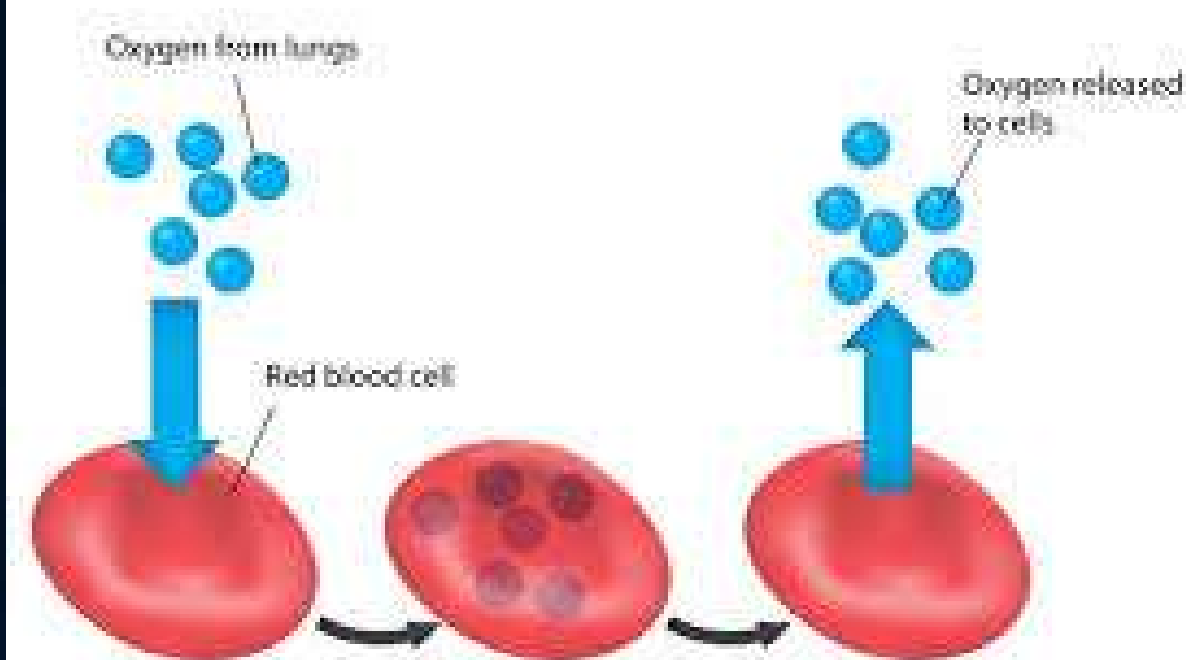
- enhance performance in somebody who is already in good shape
- help with the various, even minor, injuries that all athletes have to work through

## HYPERTROPHY PROCESS Satellite Cells

When muscles undergo intense exercise resistance training (When muscles are forced to contract against an external force) micro-tears form on the myofibril and there is a biological effort to repair or replace damaged muscle fibers. Disruption to muscle cells activates satellite cells which are located outside of the muscle fibers.



## Oxygen Transport







## PEMFs help with

- training enhancement
- recovery from injury and wear and tear
- improving muscle function
- stabilizing the nervous system
- increased energy
- improved sleep
- enhancing nutrition
- improving focus
- improved circulation
- increased stamina
- increased naturally produced anabolic steroids
- combine well with other therapies
- reaching deep into the body to heal tissues, that ice cannot help.

# mechanisms of action of PEMFs

PEMFs seem to be too good to be true  
why and how?

health conditions share  
common pathways that create  
most human conditions

acupuncture  
anti-infective  
anti-coagulant  
anti-edema  
anti-inflammatory  
anti-spasm  
ATP - mitochondria  
autophagy  
circadian rhythms  
circulation  
collagen/HA/GAGs  
detox  
growth factors - NO

healing  
heart  
immunity  
nerves function  
oxygen  
pain reduction  
psych - cognitive  
RBC functions  
skin  
stem cell  
stress  
tissue healing  
water structure

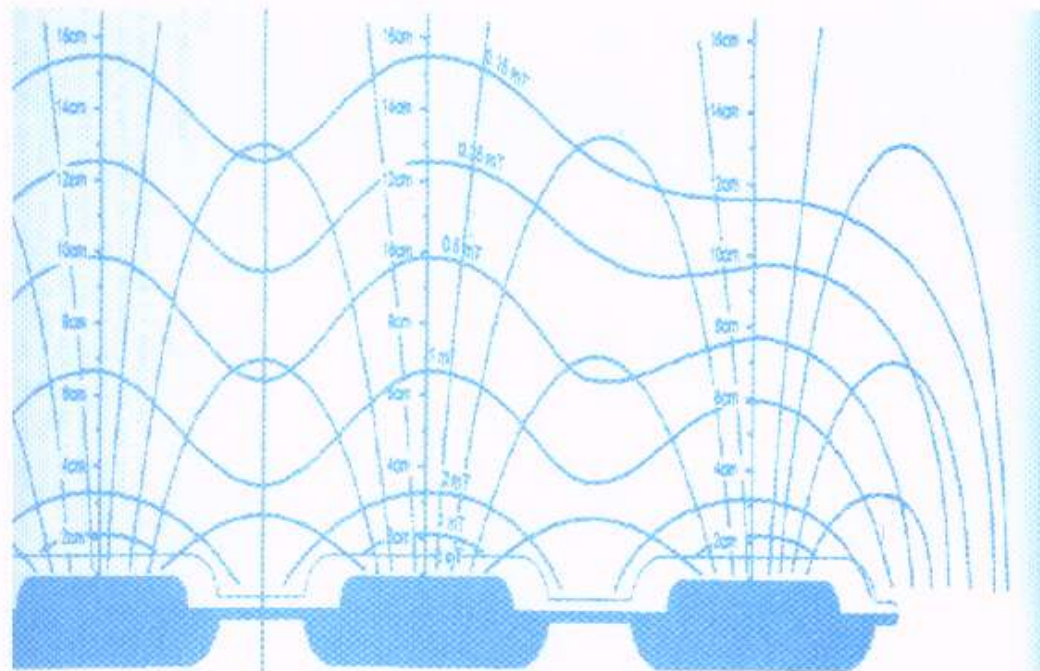


long track record of safety

how can PEMFs be considered safe when there is so much concern expressed about EMFs [environmental magnetic fields]?

# MAGNETIC THERAPY

## In Eastern Europe A Review of 30 Years of Research



Jiri Jerabek, M.D., Ph.D.

William Pawluk, M.D., M.Sc.

**General Wellness:  
Policy for Low Risk Devices**

---

**Guidance for Industry and  
Food and Drug Administration Staff**

**Document issued on: July 29, 2016.**

<https://www.fda.gov/downloads/MedicalDevices/DeviceRegulationandGuidance/GuidanceDocuments/UCM429674.pdf>

safety of PEMF treatments has  
been thoroughly studied

primary concerns are:  
exposure time and intensity level

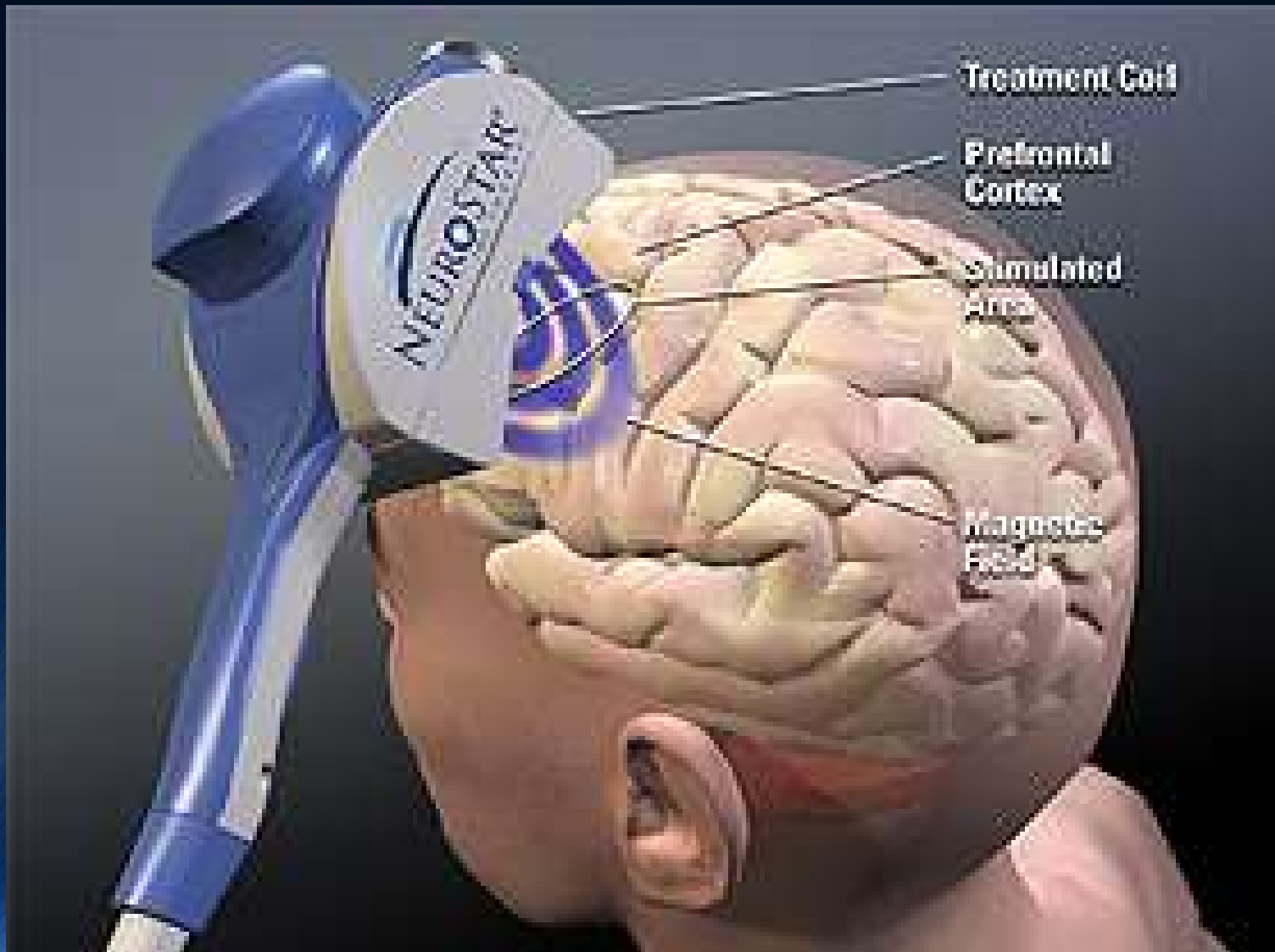








## Neurostar



## risk to the brain

- TMS or rTMS does not carry risk since total time too short.
- 1 person w 70 treatment sessions over 12 months, 420,000 pulses, with no side effects
- 75-yo had 130 sessions over 26 mons, 156,000 stimuli
- 7 people had 60 sessions over 12 months, 72,000 stimuli
- healthy men had 12,960 rTMS magnetic pulses a day for up to 3 days in 1 week, 38,880 pulses over 1 week
  - one of the largest known rTMS exposures
  - no significant side effects
- doses to 12,960 pulses/day appear safe and tolerable

*Anderson B, Mishory A, Nahas Z, Borckardt JJ, Yamanaka K, Rastogi K, George MS. Tolerability and safety of high daily doses of repetitive transcranial magnetic stimulation in healthy young men. J ECT. 2006 Mar;22(1):49-53.*  
*Rossia S, Hallett M, Rossini, PM, Pascual-Leone A. The Safety of TMS Consensus Group1. Safety, ethical considerations, and application guidelines for the use of transcranial magnetic stimulation*



## risk to the brain

- relapsing remitting MS with TBI
- no patient had relapse during follow-up for over 8 mons
- magnetic brain stimulation easy to perform, painless, and safe

*Ingram DA, Thompson AJ, Swash M. Central motor conduction in multiple sclerosis: evaluation of abnormalities revealed by transcutaneous magnetic stimulation of the brain. J Neurol Neurosurg Psychiatry 51(4):487-494, 1988.*

## risk to the brain

- question of whether PEMFs act as cancer promoter
- rats w experimental brain glioma
- no promotion tumor growth

*Eberhardt JL, Persson BRR. Development of rat brain tumours during exposure to continuous and pulsed 915 MHz electromagnetic radiation (meeting abstract). First World Congress for Electricity and Magnetism in Biology and Medicine, 14-19 June, Lake Buena Vista, FL, Abstract No. I-1, p. 27-28, 1992.*

## risk to the brain

- PEMFs are very unlikely to cause seizures, even high-intensity
- University Louisville studied patient with partial seizures un-responsive to medications
- # seizures in 1 month of stimulation vs month before
- seizures reduced 70% and
- 77% reduction in risk of seizures between episodes of seizures

## risk to the prostate

- risk of cancer promotion
- 60 Hz PEMFs from only 1 to 5 G were compared with and without Taxol
- after 48 hrs. of treatment PEMFs with taxol, prostate cancer cells died
- PEMF by itself also induced cancer cell death

- magnetic field exposure has shown no important adverse side effects
- PEMFs of wide ranges of intensity and treatment times are safe
- regardless of the area of the body being treated, or gender or age of the patient
- even pets and other animals do not appear to have issues



# contraindications and precautions

implanted electronics

pregnancy

implanted prosthetics with high intensity

## side effects of PEMF treatments

PEMF treatments are  
tissue and cellular fitness training



couch potatoe training

inflammation aggravation  
detoxification  
Herxing reactions

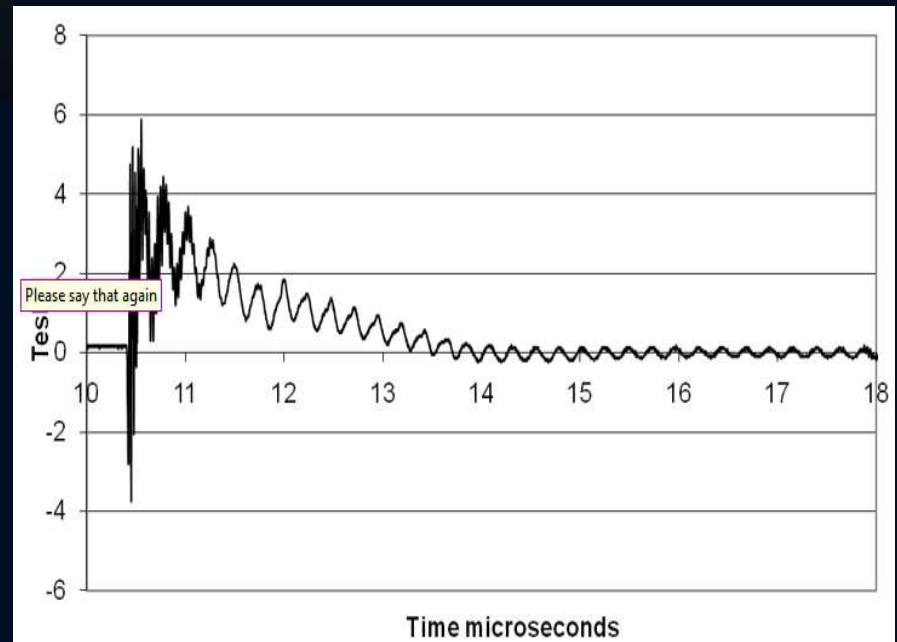


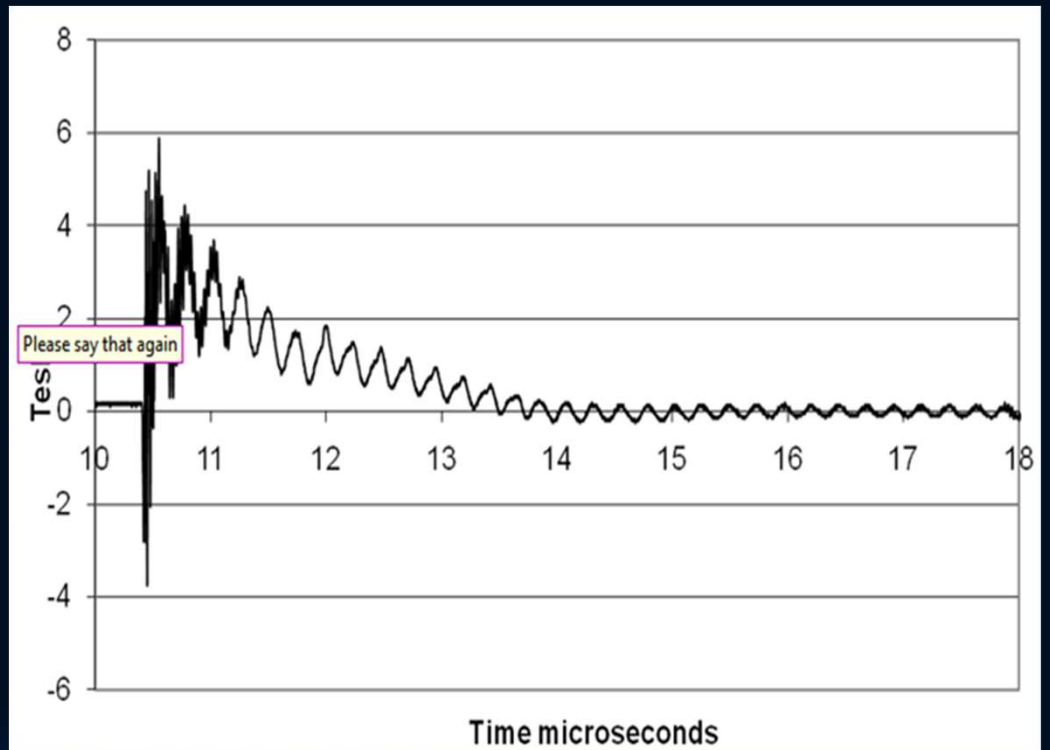
## choosing a PEMF system

intensity and frequency

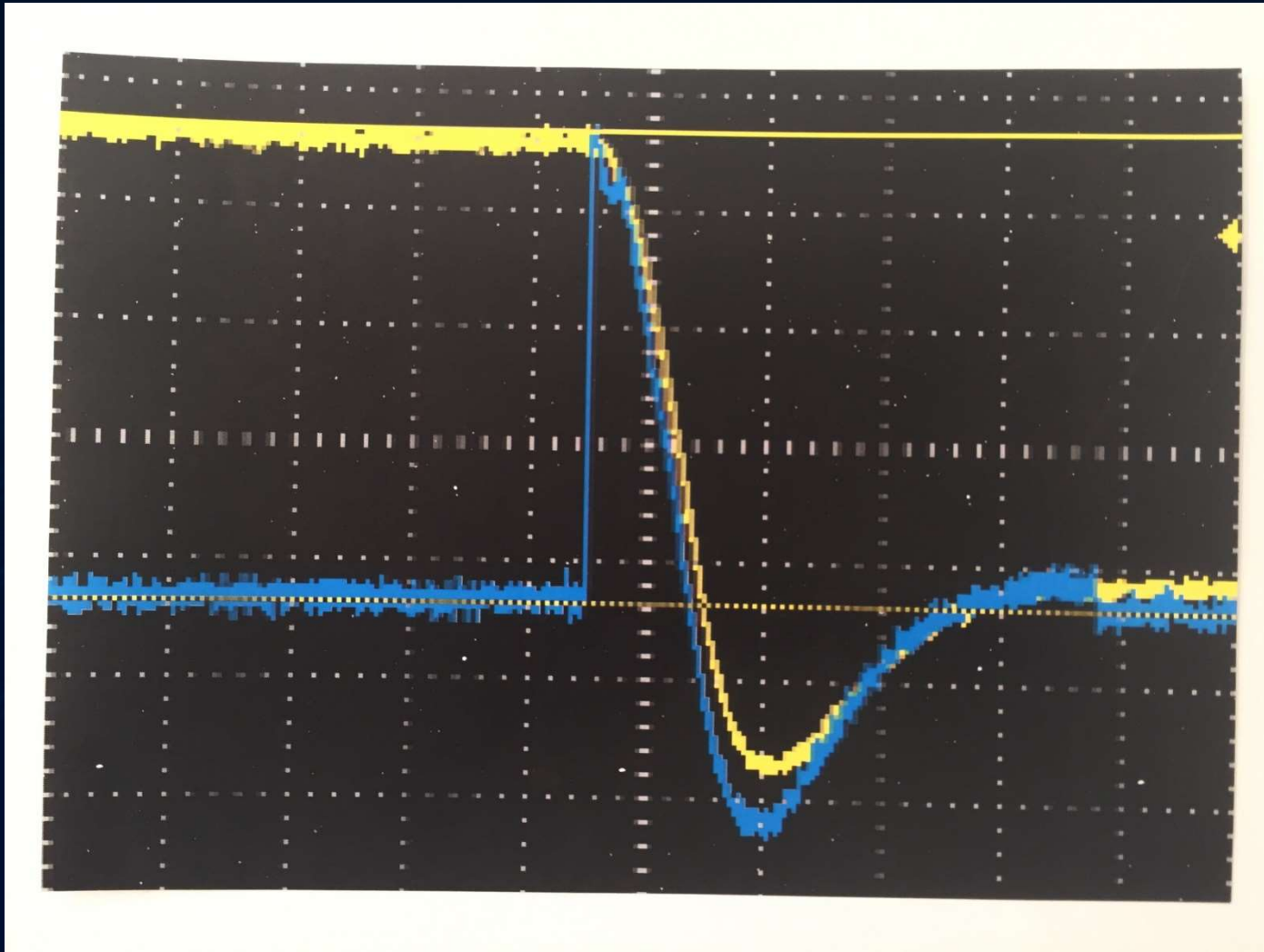
## terminology

- intensity Gauss/Tesla
- frequency Hertz (Hz)
- waveform various
- power volts (v)
- current ampere (A)





## Digital Tesla Fit





## intensity levels

very low 1 pT – 100 uT (1 gauss)

Earth's intensity average 50 uT

low 101 uT (1 gauss) – 10 mT

medium 10 mT (100 gauss) – 100 mT (1000 gauss)

high 101 mT – 1000 mT (10000 gauss = 1T)

very high - > 1T

these are somewhat arbitrary to be able to classify  
PEMF device intensities

**DrPawluk.com**

Healing with magnetic fields

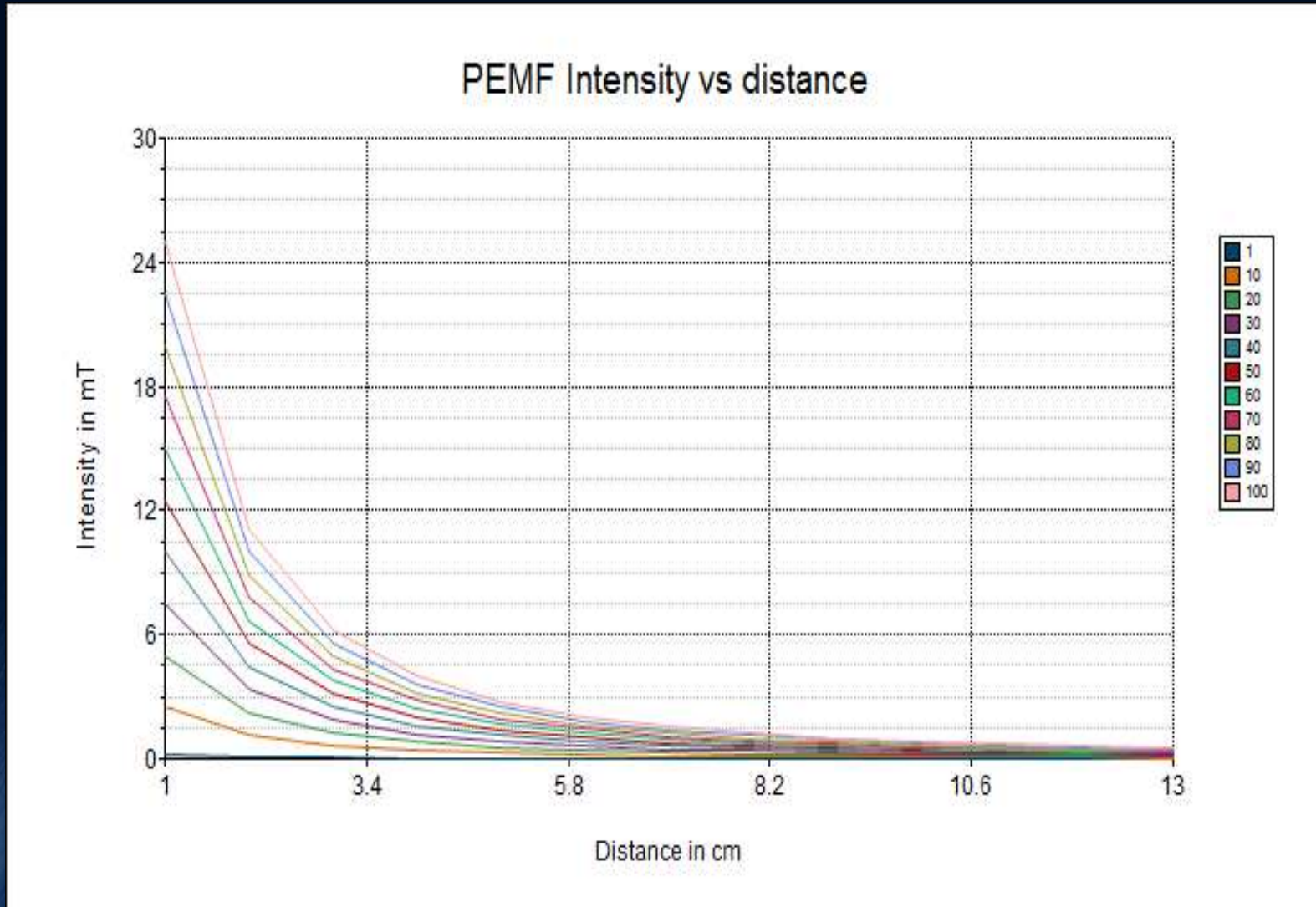


frequency

most PEMF systems  
operate under 1000 Hz (1 kHz)

cell phones are in the  
1,000,000,000 Hz (1GHz) range

intensity matters



graphically represented this is what rapidly declining intensities look like. The color codes for the intensities are in the legend to the right on the graph.

## treatment considerations

- consider reality of the problem/s
- body's capacity to heal
- way magnetic fields work
- time available for treatment
- number of places in the body needing treatment



# PEMF Buyer's Guide

[www.pemfbuyersguide.com](http://www.pemfbuyersguide.com)

see sections 4 and 5 of the book

Why are PEMF systems expensive?



**GUCCI: \$4,180**



**DUPE: \$65**



**YSL: \$2500**



**DUPE: \$44**



**YSL: \$2,717**



**DUPE: \$63**



**GUCCI: \$980**



**DUPE: \$69**



**CELINE: \$2,500**



**DUPE: \$54**

“Apple Spent Over \$150 Million  
To Create The Original iPhone”

- and that's just the money, it  
also put its best people on the  
project, taking them away from  
other projects.

<http://www.businessinsider.com/apple-spent-over-150-million-to-create-the-original-iphone-2013-10>

Why is MFT not adopted more widely?

What's in the future?



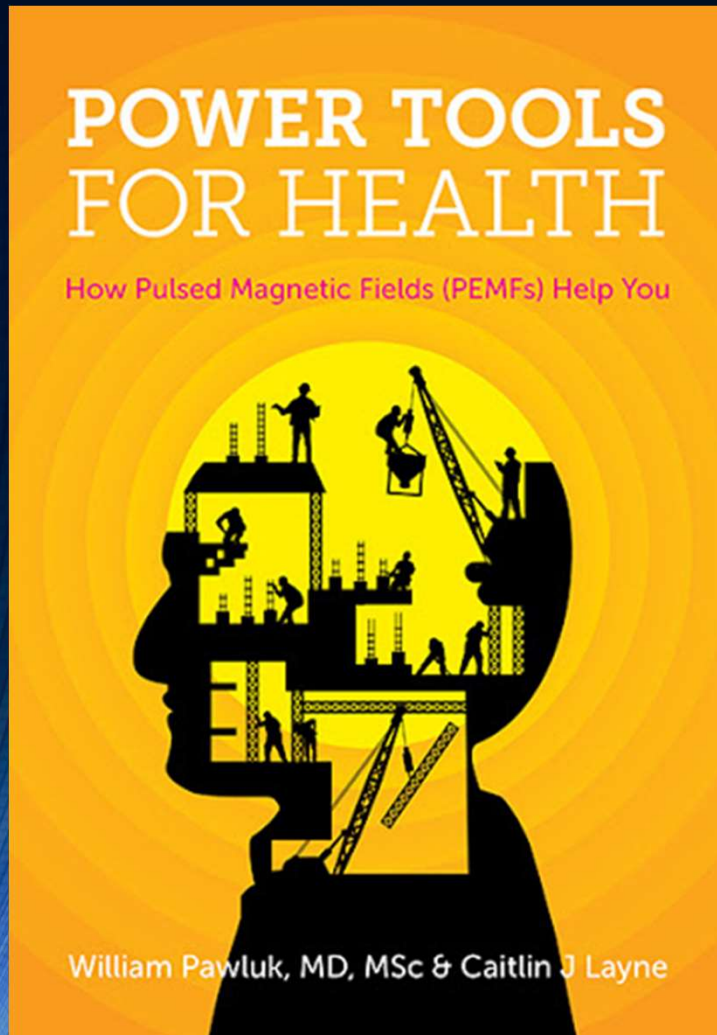
- lack of awareness
- lack of funding support
- not convenient
- cost
- understanding cost of disease  
vs cost of treatment
- benefits not obvious
- societal acceptance

last year, Apple's spending on advertising  
increased by 50% to a \$1.8 billion

- lack of awareness
- lack of funding support
- not convenient
- cost
- understanding cost of disease  
vs cost of treatment
- all the benefits not obvious
- societal acceptance

# conclusion

we each need to take control of our health



knowledge without  
application is interesting  
but not helpful

knowledge by itself will  
not help you

- improve your symptoms,
- heal your tissues
- reduce aging and
- improve cognitive and physical functioning and performance.





“We shall not cease from exploration  
And the end of all our exploring  
Will be to arrive where we started  
And know the place for the first time.”  
— T.S. Eliot, Four Quartets