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Tissue Responds to Absence of Ambient High EMF

Implications for chronic pain treatment and recovery

by Jack Taunton, MSc, MD*

Electromagnetic fields (EMF) are well identified and the subject of much discussion among such organizations as the World Health Organization (WHO), BC Hydro, California Hydro, Health Canada and the Tsawwassen power lines group, also in British Columbia. These organizations primarily discuss health problems caused by the presence of EMF, in association with cellphones, microwave ovens and power lines. A somewhat different perspective is to examine what happens in the absence of ambient EMF. Clinical research, including research involving fibromyalgia patients, has been published showing that the absence of EMF decreases chronic pain.

Sources of EMF Research

EMF is a magnetic field inherent in both natural and manmade environments. The most commonly measured range is 60 hertz, which is also the range associated with common use of household electricity. An example of the opposite and higher range is associated with diagnostic X-ray.

Information regarding the effects of the low range of EMF is compiled by international organizations such as WHO through "The International EMF Project" and Health Canada through its website section "It's Your Health, Electric and Magnetic Fields at Extremely Low Frequencies." EMF-specific research is also conducted by researchers in many countries – their findings can be sourced with a simple Internet search. Phrases searched in Google or PubMed that include "EMF cell" or "EMF wound closure" generate pages reporting on ongoing research on EMF.

In Canada, the Lawson Health Research Institute includes its Bioelectromagnetics Society (BEMS), which has an international reputation for, and expertise in, research regarding the biological effects of static and time-varying magnetic field (MF) exposures and stimulations.

The international interest and research is limited to concerns regarding the long-term harmful effects of low-range EMF and short-term therapeutic results of low-range EMF. The discussion regarding the potential harm from low-range EMF is expressed in terms of prolonged exposure to cellphones and power lines.

Applications in Health Care

Clinical EMF is applied in hospitals to support healing of and provide relief from chronic pain conditions. Devices used to generate low EMF ranges in hospital and clinical settings have been shown to promote some specific recovery of injury, including fracture and chronic pain. Pulsed electromagnetic fields (PEMF) are reported to be used in 78 per cent of hospitals in the United States in the healing of non-union fractures.¹ The published article titled Pulsed Electromagnetic Fields and Low Intensity Pulsed Ultrasound in Bone Tissue, reports on the metabolism of bone tissue and the integrity of joint cartilage.

Studies are now beginning to highlight another and higher range of EMF that is associated with improved cell function of the body's connective tissue with no risk of harm to date.² The range of this EMF is 300 megahertz to four gigahertz.

Absence of EMG plays a role

Two important findings are demonstrated by this research: one is that the absence of ambient high EMF is also responsible for cellular response, and the other is that the range of conditions that respond to the absence of ambient high EMF is consistent with the same tissue class, namely, connective tissue. The list of conditions that react to this environment is expanding with continued observation and research.

It is paramount to understand that when noting the multiple symptoms or conditions that respond, these symptoms are not created by existing ambient high EMF.

The conditions reported in literature, as well as recorded in clinical settings and observations from users, range from reduction in pain or enhanced recovery of:

phantom limb pain experienced by amputees³

persons experiencing fibromyalgia⁴

delayed onset muscle syndrome following exercise and athletics⁵

reduced spectral power of brainwaves⁶

reduction of pain from carpal tunnel syndrome

reduction of pain and swelling of chronic knee conditions

reduction of muscle pains and hot flush of menopause

These are some of the documented symptoms and conditions that respond to the absence of ambient high EMF. Clearly, the conditions themselves are not created by, or exist due to, ambient high EMF. There is, further, an association with low EMF, since low EMF influences a cell's normal physiology. When we consider existing treatment by devices creating primarily low EMF, a similar or enhanced benefit occurs in the absence of ambient high EMF.

What does this mean?

These findings begin to facilitate an unprecedented discussion and understanding of basic cell function with respect to EMF in our everyday environment whether normal/ambient or manmade.

Most notably, in the measurable and visible effects on tissue, two dramatic things are found:

1 We should not limit our thinking to only low EMF, and

2 The absence of high EMF has unprecedented effects on common chronic conditions and the speed in which they change and improve.

Further studies on the range of symptoms and their improvement rate are planned based on existing studies. As well, further observations including wound closure, reduction of swelling and chronic pain, and reduction of hot flashes will be recorded.

Finally, the development of devices for shielding this ambient high EMF may have therapeutic value for patients who have these symptoms or conditions.

References

Leo Massari, MD, Gaetano Caruso, MD, Vincenzo Sollazzo, MD, Stefania Setti, MSc. Pulsed electromagnetic fields and low intensity pulsed ultrasound in bone tissue. *Clinical Cases in Mineral and Bone Metabolism* 2009; 6(2): 149-154.

Zhang J, Clement D, Taunton J. The efficacy of Farabloc, an electromagnetic shield, in attenuating delayed-onset muscle soreness. *Clin J Sport Med.* 2000 Jan;10(1):15-21.

Tali A. Conine, DHSc, PT, Cecil Hershler, MD, PhD, FRCP(C), Steacy A. Alexander, BSc, PT, Robert Crisp, BSc, PT. The Efficacy of Farabloc™ in the Treatment of Phantom Limb Pain. *Canadian Journal of Rehabilitation*, Volume 6, Number 3, 993 pp. 155-161.

Dr. G.L. Bach, Dr. D.B. Clement. Efficacy of Farabloc as an analgesic in primary fibromyalgia. *Clin Rheumatol.* 2007 Mar;26(3):405-10. Epub 2007 Jan 11.

Zhang J, Clement D, Taunton J. The efficacy of Farabloc, an electromagnetic shield, in attenuating delayed-onset muscle soreness. *Clin J Sport Med.* 2000 Jan;10(1):15-21.

Ke Wu, Amirsaman Sajad, Syed A. A. Omar, and William MacKay. The effect of high frequency radio waves on human brain activity: an EEG study. *University of Toronto Journal of Undergraduate Life Sciences*, Vol 3, No 1 (2009).

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