BEMS 2007 Abstract – Dave McNamee

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Abstract Details **PRESENTATION TYPE:** Poster Preferred
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SUB-CATEGORY: None
Frequency: ELF (<3 kHz)

Abstract **TITLE:** THE EFFECT OF ACUTE EXPOSURE TO A 60 HZ, 1800 MT MAGNETIC FIELD ON HUMAN MICROCIRCULATION
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ABSTRACT BODY:
Objectives: The effects of magnetic field (MF) exposure on the peripheral circulatory system have been questioned and debated in the literature for many years now. Several studies that have investigated the effects of pulsed and static MFs on both human and animal models have yielded inconsistent results. This is likely due to the heterogeneous field characteristics employed in these experiments. Presently, the effect of power line frequency MF exposure on human peripheral microcirculation remains undefined. Previous unpublished work conducted in our laboratory on rats has suggested a decrease in microcirculation as a result of exposure to power line frequency MFs. This information would be of value in determining risk assessment models for populations subject to this type of exposure and as a possible therapeutic approach to microcirculatory pathologies.
Our objective thus, is to determine if changes in peripheral microcirculation and other cardiovascular parameters occur during and/or after an acute, 60 Hz MF exposure session at 1800 μT.
It is hypothesized that MF exposure will decrease peripheral microcirculation and heart rate variability (HRV) and have no effect on heart rate frequency (HR) or systolic blood pressure (SBP).

Methods : This project is part of a current study protocol (University of Western Ontario Health Sciences Research Ethics Board # 11956E) investigating various physiological responses to power line frequency MF exposure. Ethics has been obtained to recruit 70 healthy adult volunteers between the ages of 18 and 55 years of age. The experiment uses a double blinded computer program (National Instrument Inc., USA) to assign subjects to 2 counterbalanced exposure sessions administered on 2 separate days. The exposure sessions are either real (active) or control (sham). Each session is composed of 4 blocks of testing inter spaced with 15 minutes of rest. Testing occurs 15 minutes before the beginning of exposure, after 15 and 45 minutes of exposure and 15 minutes following exposure.
During each block of testing, the subject's peripheral microcirculation is measured with a laser Doppler flowmetry probe (PF 5010 Laser Doppler Perfusion Unit, Perimed, Sweden) attached to the ventral tip of the middle finger of the non dominant hand. After each perfusion recording has been taken in each block of testing, a systolic blood pressure measurement is taken with a digitally controlled pressure cuff (PF 5050 Pressure Unit, Perimed, Sweden). Additionally heart rate and skin temperature are continuously recorded throughout the testing block with an ambulatory electrocardiogram (Siesta, Compumedics Inc., USA) and skin surface thermistor (Series 400, Yellowstone Scientific Instruments, USA) respectively.
The exposure chamber consists of two Helmholtz like orthogonal coils, 1.6 m wide (80 turns of AWG10 wire) spaced with 1.2 m apart. The subject is seated in the middle of the coils for whole body exposure.

Results: Data is presently being collected and analyzed (SPSS 15.0, SPSS Inc., Chicago, USA). Results will be presented at the BEMS conference in June as only preliminary data is available at this time.

Conclusions : This is a work in progress.

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KEYWORDS: microcirculation, ELF magnetic fields, human exposure. (No Table Selected)

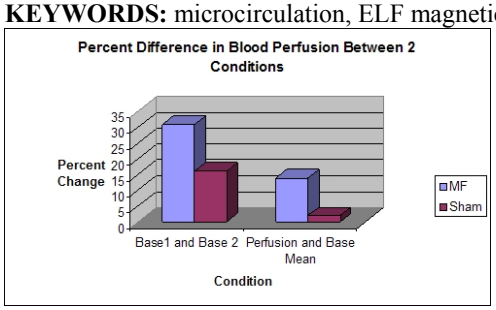

Figure 1: Skin blood perfusion data of one subject to demonstrate how findings will be presented.

Membership and Sponsor Information **BEMS Member?:** David McNamee : Student Member Alexandre Legros : BEMS Member Alex Thomas : BEMS Member Frank Prato : BEMS Member
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