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The Impact Of Pulsed Electromagnetic Field Therapy On Blood Pressure And Circulating Nitric Oxide Levels: A Double-blind, Randomized Study In Subjects With Metabolic Syndrome.

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(No relationships reported)

Regulation of blood pressure (BP) is important in reducing the risk for cardiovascular disease. There is growing interest in non-pharmacological methods to treat BP including a novel approach using pulsed electromagnetic field therapy (PEMF). PEMF therapy has been proposed to impact physiological function at the cellular and tissue level and one possible mechanism is through an impact on endothelial function and nitric oxide (NO) related pathways

PURPOSE: The purpose of this study was to evaluate the therapeutic effect of PEMF on BP and NO in subjects with metabolic syndrome

METHODS: 23 subjects (PEMF group, Age: 58±12yrs, Ht: 169.7±11.9cm, Wt: 93.2±17.7kg) underwent PEMF therapy (Biomobie Inc., Shanghai, China) and 21 subjects (SHAM group, Age: 59±10yrs, Ht: 167.3±10.7cm, Wt: 87.5±18.1kg) underwent sham therapy. The protocol for therapy included 16-min sessions, 3 sessions/day for 12 wk using both hands and feet. BP was measured at rest and near the end of submaximal exercise pre and 12 wk post therapy. Moreover, NO was measured at similar time points

RESULTS: There were no changes in wt in either group over the 12 wk of therapy. The PEMF demonstrated a trend toward increases in NO after therapy but SHAM did not (p=0.09). For resting BP, there were no differences in systolic BP (SBP), diastolic BP (DBP) or mean arterial pressure (MAP) between groups (p>0.05). During exercise, the PEMF had a reduction in pk SBP (p=0.04), but not SHAM (p=0.57). However the PEMF demonstrated a significant relationship between baseline SBP and change in SBP following therapy (r= -0.71, p<0.01) and between MAP and change in MAP following therapy (r= -0.60, p<0.01), but there were no such relationships found in SHAM (r=-0.040, p>0.05 and r=-0.043, p>0.05 respectively). Subjects with resting hypertension (defined as BP>140 SBP) in the PEMF (n=11) had significant reductions in SBP, DBP and MAP when compared to SHAM with HTN (n=9) (p<0.05). In this sub-group analysis, PEMF demonstrated lowered pk SBP (p=0.04) at a given exercise load (p=0.40) but SHAM did not (p>0.05)

CONCLUSIONS: PEMF may increase plasma NO availability and improve BP at rest and during exercise. This indicates that PEMF may be a therapeutic technique to regulate BP in metabolic syndrome. However, this beneficial effect appears to be limited to subjects with existing high blood pressure

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Sleep Metrics are Associated with Markers of Cardiovascular Disease Risk in Youth

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(No relationships reported)

There is accumulating evidence identifying relationships between insufficient sleep in children and adolescents and negative cognitive, psychosocial, and metabolic health consequences. However, the relationship between childhood sleep metrics and cardiovascular (CV) risk profile is less clearly defined.

PURPOSE: To characterize the relationship between sleep and CV health in young, healthy children through traditional risk factor assessment and vascular function assessments.

METHODS: Sleep metrics and habitual physical activity assessments were performed on 12 young, healthy boys and girls (12.3 ±1 years) using wrist-worn accelerometry for 7 days and nights. Sleep onset latency (SL) was calculated as the mean time of transition from wakefulness to sleep, while sleep efficiency (SE) was calculated as the mean percentage of time spent asleep between sleep onset and wake onset. Central blood pressures and markers of wave reflection were assessed using pulse wave analysis (PWA) with an oscillometric device. Arterial stiffness was assessed through pulse wave velocity (PWV) measurements obtained using applanation tonometry and volumetric displacement. Vascular function was assessed using Doppler ultrasound measurements of femoral artery hemodynamics and diameter during passive leg movement (PLM).

RESULTS: SL was significantly associated with body mass index (r=0.66, p<0.05) and PWV (r=0.64, p<0.05) and tended to show moderate relationships with leg blood flow (LBF) responses during PLM (ΔLBF from baseline to peak, r=-0.45; LBF area under the curve, r=-0.50). SE was significantly associated with systolic blood pressure (SBP) (r=-0.58, p<0.05) and aortic SBP (r=-0.57, p=0.05). Subjects whose SE was >85% had lower aortic SBP (86.9 ±1 vs. 93.7 ±2, p<0.05) and tended to have lower percent body fat, more steps per day, and better blood flow responses during PLM compared to those whose SE was <85%.

CONCLUSIONS: Preliminary findings suggest that metrics indicative of better sleep quality, such as greater SE and reduced SL, are associated with more favorable CV profiles in children. These results support the usefulness of assessing sleep as a potential approach for early prevention of CV disease risk during youth.

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Investigating the Effect of a High Fat Meal and Prolonged Sitting on Executive Function: A Pilot Study

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(No relationships reported)

Prolonged periods of sitting have been shown to reduce cerebral blood flow and autoregulation, which may subsequently impair executive function. Similarly, the consumption of a high-fat diet can negatively impact cerebral perfusion. However, whether prolonged sitting combined with a high fat meal additionally impairs both executive function and cerebral perfusion is unknown.

PURPOSE: To investigate the effects of consuming a high-fat meal followed by 3 hours of prolonged sitting on executive function and cerebral perfusion.

METHODS: Five young healthy males (Age: 22.8 ± 2.9 yrs; stature 177.7 ± 6.4 cm; mass 78.9 ± 14.3 kg), from a target of 18, were recruited. Following familiarisation, participants completed two randomised sessions of 3 hours of prolonged sitting following the consumption of a high-fat (HF) and low-fat (LF) meal. Each visit was separated by a minimum of 2 and maximum of 7 days. Participants completed a Stroop test (containing both congruent and incongruent trials) and trail-making test (TMT) both pre- and post- sitting period. The TMT consists of two parts, A and B. Continuous wave near-infrared spectroscopy (cw-NIRS) was used to measure cerebral perfusion at AF4 both before (baseline) and throughout each trial. Data was analyzed using two-way repeated measures analysis of variance. Alpha was set at $P < 0.1$ *a priori* for preliminary analyses.

RESULTS: There were no significant differences between or within trials for completion time for Stroop and TMT part A. Completion time for TMT part B was significantly ($p = 0.078$, $d = 2.2$) faster in the low-fat condition compared to HF condition (16.4 ± 4 s vs. 21.6 ± 0.7 s). There were no significant differences in cerebral perfusion between or within groups ($p = 0.201$).

CONCLUSIONS: These preliminary findings suggest that the consumption of a high-fat meal may negatively impact core executive functions measured by TMT Part B, namely working memory and task-switching ability. However, cerebral perfusion, as measured by cw-NIRS, failed to identify a mechanism. This may be a consequence of limited statistical power given the sample size, or uncertainties regarding the sensitivity of cw-NIRS when measuring cerebral perfusion.

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Serial Lower Limb Occlusion and Reperfusion Augments Muscle Oxygen Saturation despite Attenuated Cardiac Hemodynamics

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