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±16.1kg) 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>0.05). 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<0.05), 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 = −0.65, p<0.01). There were no such relationships found in SHAM (r=0.04, p>0.05 and r=0.03, 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.