Yong Seok Jee, J Nov Physiother 2018, Volume 8
DOI: 10.4172/2165-7025-C2-025

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Effect of WB-EMS with isometric exercise on adipocytokine and body condition in abdominal obese men

Background: A whole body-electromyostimulation (WB-EMS) can provide electrical stimulation to wide area where several muscles can be trained simultaneously through wearing a garment using electrode system. Even though there is some evidence that WB-EMS improves body condition, the issues have not been confirmed that a dose-response effect exists between different impulse-intensity and how WB-EMS affects adipocytokine and anthropometric variables including body composition, waist circumference (WC), and thigh circumference (TC) in obese men.

Methods: 33 abdominal obese men (mean age=24.42; SD=2.28) were recruited. They provided written informed consent and participated in baseline testing on a range of anthropometric and blood sample measures. After taking baseline test, subjects were randomly assigned to one of four groups: Control (CON; n=9), low impulse-intensity (LII; n=9), mid impulse-intensity (MII; n=8) or high impulse-intensity (HII; n=7). From baseline, at Week 6 and at Week 12 anthropometric and adipocytokine measures were re-assessed. All of them were given a WB-EMS suit that fit their size, composed of a silicone conductive pad, and wireless materials made by Miracle®. The electrical impulse-intensity of the suit was controlled via Bluetooth. WB-EMS enabled the simultaneous activation of 8 muscle groups with selectable intensities. Although the electric frequency (85 Hz), impulse-width (350 msec), and impulse on:off time (6:4 sec) were same in all groups, the impulse-intensity was provided 0%, 50%, 60% and 80%, of 1 maximal tolerance (160V) with CON, LII, MII and HII, respectively. All groups underwent 20 min WB-EMS-sessions three times a week for 12 weeks. The non-parametric Kruskal-Wallis and Friedman tests were used to examine the differences of variables among groups and within times.

Results: In comparison with the CON, three groups provided by WB-EMS stimuli had significant reductions in a number of anthropometric measures and improvements in adipocytokine measures. The improvements on both anthropometric measures and adipocytokine of obese men were greater for the high impulse intensity condition, which indicated that changes in adipocytokine might be mediated by body condition changes. In detail, the visfatin (P=0.005) and resistin (P=0.012) of HII were significantly lower, whereas adiponectin (P=0.029) of HII was higher at Week 12. Second, the WC of HII (P=0.001) was decreased sequentially. Meanwhile, muscle mass (P=0.014) of HII was higher, whereas fat mass (P=0.021) and BMI (P=0.022) of HII were lower compared with those of other groups. Third, abdominal visceral fat area (AVF; P=0.028) and abdominal subcutaneous fat area (ASF; P=0.013) of HII were lower than those of other groups at Week 12, except for abdominal total fat area (ATF) of HII. Fourth, right and left TVF (thigh visceral fat area) of CON, LII and MII from Week 0 to Week 12 showed little increasing or no change, whereas all variables of HII showed significant decreases.

Conclusion: This study confirmed that the high electrical impulse of WB-EMS can improve adipocytokine, BC and WC and TC in abdominal obese men.

Biography

Yong-Seok Jee has completed his PhD from Korea University and obtained certification for Obesity Treatment from Harvard Medical School in 2006. He is the Director of Sports Industrial Science, a premier bio-soft service organization. He has published more than 250 papers in reputed journals and has been serving as an Editorial Board Member of *Journal of Exercise Rehabilitation* and as a Reviewer in *Brain Research*.

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