

Brief communication (Original)

Efficacy of electro-acupuncture at the main acupoints for weight reduction in Thai obese women

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Background: Alternative medicine and Asian traditional medicine propose the use of acupuncture for treating obesity that generates several collateral effects on overall health.

Objective: Analyze the efficacy of electro-acupuncture (EA) at the main acupoints in overweight/obese Thai women.

Methods: Thirty women were recruited from Srinakharinwirot University Hospital. The patients were divided into three groups based on the type of obesity by the traditional Chinese medicine. Electro-acupuncture was done at 22 main acupoints. The primary outcome was efficacy of EA effect on body-weight reduction, while changes of other anthropometric parameters were considered as secondary outcome.

Results: At the end of acupuncture, 87% of women had weight reduction, and major benefit was observed in type 2 and type 3 groups. The overall weight reduction was 2.6 kg (95%CI: 1.2-4.0 kg). However, the deficiency-type obese women (type 2 and 3) had more weight reduction than the excess-type obese women (type 1) with mean weight reduction of 2.3 kg and 0.8 kg, respectively. All other anthropometric parameters decreased significantly compared to those at the beginning of acupuncture.

Conclusion: Acupuncture was useful for treatment for obesity in middle age women. Our standardized acupoints may be of clinical use for the application of acupuncture to patients.

Keywords: Acupuncture, deficiency, obesity, traditional medicine, weight loss

Obesity correlates with high morbidity and mortality. Several diseases are associated to obesity such as arthritis, diabetes, lung disease, and hypertension [1,2], which affects overall health and has a high social cost (quality of life reduction, hospitalization, and medical care).

Life-style modifications through diet and physical exercise give only short-term positive results. A weight loss within one to three years leads to reduction in insulin resistance, and to a lower blood pressure and improved atherogenic lipid profile. However, in long-term studies, no difference between interventions and control has been observed [3].

Acupuncture has been used for pain treatment for thousand years in Asian traditional medicine

[4, 5]. Recently, this therapy has been used for obesity control [6]. Acupuncture points (acupoints) depend on the type of obesity to be treated. In general, they are divided into two classes, main and additional acupoints. The differentiation of the treatment requires personal experience of practitioners to classify the correct obesity type. Individual institutes often have their own acupoints for treatment of obesity.

In this study, we evaluated the efficacy of electro-acupuncture (EA) in Thai overweight or obese women at the main points. The primary outcome was efficacy of EA on weight reduction, while changes of other anthropometric parameters were considered as secondary outcome.

Materials and methods

Subjects

This study protocol was approved by the Ethics Committee of Faculty of Medicine, Srinakharinwirot University.

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Thirty overweight or obese women who had body mass index (BMI) >23 kg/m², waist circumference >80 cm and aged >15 years [7] were recruited from Srinakharinwirot University Hospital between September and December 2009. Exclusion criteria were pregnancy or lactation, severe underlying diseases (hematological or bleeding disorders, cardiovascular diseases or uncontrolled hypertension, pulmonary or uncontrolled asthma, or psychotic disorders), recently committing to other weight reduction treatments, and active dermatologic diseases at the area of acupoints treatment. Written informed consent was obtained from all participants before enrolment to the study.

Thirty women, enrolled into the study had mean age of 33.1 years (range: 21-46 years). Out of the 30 participants, 19 had not been on any weight reduction programs prior to the study, and none of them had any other treatment during the study. Based on

syndrome differentiation by Traditional Chinese Medicine (TCM) [8], participants were divided into three groups as follows. Type 1 included patients with an excess of the spleen and stomach, type 2 was characterized by spleen deficiency and excessive dampness, and type 3 by primary “Qi”-deficiency. **Figure 1** shows the profile of enrolled participants. In the TCM syndrome classification, 19 participants were classified as type 1, 5 as type 2, and 6 as type 3.

Procedure of acupuncture

Demographic data and anthropometric parameters (age, weight, height, waist, and hip circumference) were recorded. The percentage of total body fatness (TBF) was measured based on bioelectrical impedance analysis using Tanita Body Composition Analyzer (BF-680W, Tokyo, Japan). The BMI was calculated in terms of (weight)/(height)² (kg/m²).

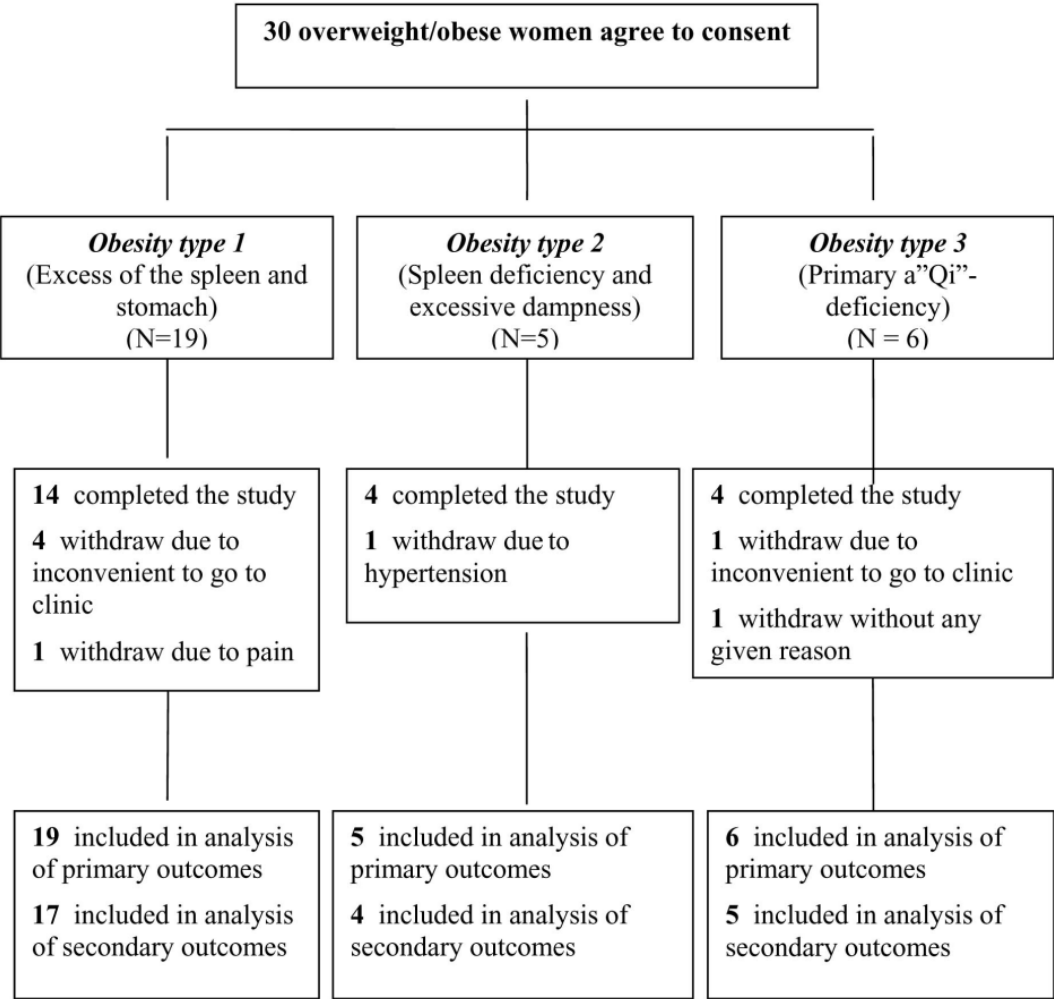


Fig. 1 Profile of enrolment.

A four-week controlled period of anthropometric and baseline measurements without acupuncture was carried out in all participants. No specific instructions regarding diet and exercise or medication for weight reduction were given to participants.

Acupuncture was performed using a stainless silver needle (0.25 mm in diameter) at 22 main acupoints as follows:

Guanyuan (RN4), Qihai (RN6), Xiawan (RN10), Zhongwan (RN12), Huaroumen (ST24), Tianshu (ST25), Wailing (ST26), Shuidao (ST28), Liangmen (ST21), Daheng (SP15), Fujie (SP14), Zusanli (ST36), and Sanyinjiao (SP6). All ST-points (ST 6, 14, 15, 21, 24, 25, 26, 28, and 36) had two points each (right and left side), and all RN-points, (RN 4, 6, 10, and 12) had one point each.

The needle was connected to an electro-acupuncture apparatus (SDZ-II model, Hwato, China). Using a frequency of 40 Hz and 3 mA, EA treatment was applied for 30 minutes per session, twice a week for eight weeks. During the study period, weight was measured weekly at the end of each week. Waist and hip circumferences, and TBF were measured during the last week. Adverse events during the treatment were recorded. The efficacy of EA, at the main acupoints, in each type of obesity classified by TCM was also measured.

Statistical analysis

The results were descriptively presented as mean, standard deviation (SD), 95% confidence interval (CI), and percent values. Paired t-test was used to compare continuous variables between pre-treatment and beginning of the treatment, and between beginning and end of the study. Continuous variables among groups (TCM obesity type 1, 2, and 3) were compared

using analysis of variance (ANOVA). The least square difference (LSD) method was used for post-hoc comparisons. Statistical analysis was performed with the SPSS 11.0 software package. A p-value <0.05 was considered statistically significant.

Results

There were no significant differences in any anthropometric parameters among the three TCM types. Out of 30 participants, eight participants withdrew during the eight-week study. The major reason for withdrawal was inconvenience to go to the clinic. One participant reported pain as a withdrawal cause. Another was diagnosed with hypertension at the third week of the study. One woman did not give any explanation about the withdrawal. For these participants, the body weight recorded at the last follow-up before withdrawal was used to calculate the primary outcome based on an intent-to-treat analysis. Out of eight withdrawal participants, four participants came back to the clinic on call to have waist, hip circumferences and TBF measurement for secondary outcome analysis.

Table 1 shows mean weight, BMI, TBF, and waist and hip circumference of all participants measured at the enrolment, at the beginning of treatment and at the end of study. Apparently, all fatness parameters, including body weight, BMI, and waist and hip circumferences, had increased before starting the treatment (during pre-treatment period). During the four-week of pre-treatment period, participants had mean weight gain of 1.2 kg and weight had decrease of 1.4 kg after commenced on the treatment. Mean weight change from the enrolment to the end of study was 2.6 kg (95%CI=1.2-4.0 kg).

Table 1. Anthropometric parameters at pre-treatment, beginning and end of study (N=22).

Parameters	Pre-treatment (4 weeks before) Mean (SD)	Beginning of treatment (week 0) Mean (SD)	End of study (week 8) Mean (SD)
Weight (kg)	75.6(13.4)	76.8(12.3)	75.4(12.6)
BMI (kg/m ²)	30.1(5.0)	30.6(4.6)	30.1(4.6)
Waist (cm)	96.5(12.2)	101.7(11.7)	89.7(10.9)*
Hip (cm)	104.7(10.6)	107.1(9.0)	99.6(7.1)*
Waist/Hip ratio	0.92(0.08)	0.95(0.07)	0.90(0.09)*
% TBF	36.2(5.8)	37.8(5.3)	35.1(5.2)*

*N =26, BMI=body mass index, TBF=total body fat.

Table 2 shows changes in anthropometric parameters treatment. Interestingly, all other anthropometric parameters (waist and hip circumferences, waist/ hip ratio, BMI, and TBF) declined significantly after treatment period. Out of 30 participants, 26 had weight reduction at the end of study. All participants who had no response to treatment were classified in TCM type 1. Note that all of eight participants who were unable to finish the study had weight reduction at the time of withdrawal.

Table 3 shows anthropometric parameters in the three TCM types. Apparently, there were no significant differences in anthropometric parameters between groups at the beginning of treatment (week 0). After treatment, participants in type 2 and 3 had a more significant decline in body weight and BMI than participants in type 1 (2.3 kg, 2.3 kg and 0.8 kg, respectively; 0.9, 0.9, and 0.3 kg/m², respectively).

Table 2. Changes in anthropometric parameters and mean differences between before and after treatment (N=22).

Paramters	Before treatment	After treatment	Mean difference (95% CI)	P-value
	Mean (SD)	Mean (SD)	Mean (SD)	
Weight (kg)	1.2 (2.9)	-1.4 (1.4)	2.6 (1.2-4.0)	<0.01
BMI (kg/m ²)	0.5 (1.2)	-0.5 (0.5)	1.0 (0.5-1.6)	<0.01
Waist (cm)	5.2 (8.4)	-9.9 (7.2)*	16.0 (10.2-21.7)*	<0.01
Hip (cm)	2.4 (4.0)	-5.5 (5.1)*	8.2 (5.1-11.3)*	<0.01
Waist/ hip ratio	0.03 (0.07)	-0.05 (0.08)*	0.08 (0.02-0.13)	<0.01
% TBF	1.6 (3.2)	-2.1 (2.5)*	4.0 (1.9-6.1)*	<0.01

*N = 26.

Table 3. Anthropometric parameters in regard to the TCM syndrome classification.

	Type 1 (N = 19) Mean (SD)	Type 2 (N = 5) Mean (SD)	Type 3 (N = 6) Mean (SD)	P-value
At beginning (week 0)				
Age (year)	32.4 (5.2)	32.2 (6.0)	36.0 (7.7)	0.41
Weight (kg)	76.7 (13.5)	79.3 (9.9)	75.0 (11.5)	0.86
BMI (kg/m ²)	30.6 (5.0)	31.5 (4.5)	30.0 (4.6)	0.88
Waist (cm)	102.2 (13.6)	101.0 (6.4)	100.5 (9.6)	0.95
Hip (cm)	108.0 (9.9)	104.0 (7.0)	106.7 (7.8)	0.69
Waist/Hip ratio	0.95 (0.08)	0.97 (0.05)	0.94 (0.03)	0.73
% Total body fat	37.4 (5.5)	39.8 (5.8)	37.3 (4.6)	0.67
Duration of treatment (week)				
Median (range) (week)	6.9 (1.9)	6.8 (2.7)	7 (1.6)	0.99
Changes after treatment				
Weight (kg)	0.8 (1.2)	2.3 (1.5) ^a	2.3 (1.1) ^a	0.02
BMI (kg/m ²)	0.3 (0.5)	0.9 (0.6) ^a	0.9 (0.5) ^a	0.02
Waist (cm)	9.9 (8.2)*	8.6 (6.8)**	11.2 (4.3)***	0.88
Hip (cm)	6.6 (5.1)*	0.4 (4.2)**	5.8 (3.8)***	0.09
Waist/Hip ratio	0.04 (0.09)*	0.08 (0.06)**	0.06 (0.06)***	0.65
% Total body fat	2.5 (2.9)*	2.0 (2.0)**	0.9 (0.8)***	0.48

^aSignificantly different compared to type-1 group (p-value <0.05). *N = 17, **N = 4, ***N = 5.

Discussion

The present study showed therapeutic effects of electro-acupuncture at the main acupoints in body weight and all other anthropometric parameters reduction in overweight or obese Thai women. In our evaluation, electro-acupuncture was the only intervention used for reducing weight. This is different from other reports regarding combined effects of acupuncture and diet [9]. In our study, weight increased in all patients during the pre-treatment period. Diet or physical exercise recommendation was not included during the study. We did not observe any adverse effect. In fact, one patient who withdrew had hypertension during treatment (probably related to hypertension episodes prior to the study). The other causes of withdrawal did not depend on hypertension. In **Table 1**, we showed that the mean bodyweight over 22 patients four weeks before acupuncture treatment was comparable to that at the end of study. Fifty-five percent of the patients had weight reduction after completing the 8-week lasting treatment. Out of 10 participants who had no weight-loss (compared to the pre-treatment), eight persons had weight reduction at the end of study compared to the beginning of treatment. These weight levels tend to continuously increase in the obese patients. Therefore, electroacupuncture could control the weight and block the increase. Furthermore, we observed the best results in patients with type-2 or type-3 obesity classified by TCM. TCM is based on deficiency or excess principles. Our 22 acupoints are usually used in both deficiency and excess syndromes. We could observe more benefits in deficiency compared to excess syndrome. Recently, Bai et al. [10] have reported an effective rate of 84% only in excess type obesity. Their result is in contrast to our result. This discrepancy may be because we used additional points rather than only traditional ones, usually proposed in TCM guidelines.

Compared to the TCM guideline [11,12], we recommend more acupoints for the deficiency-type than the excess-type syndrome. Our recommended acupoints are not on the back of patient as recommended in TCM [12]. This may help both practitioners and patients to limit their movement during acupuncture. Indeed, patients can lie steady on the back during treatment period. This can last for 30 minutes according to our protocol. Up to now, there is no standard protocol for acupuncture. Our study provides some indications to classify TCM obesity and treat obesity with acupuncture.

In conclusion, acupuncture was useful for

treatment for obesity in middle age women. Our standardized acupoints may be of clinical use in the application of acupuncture points to patients.

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