

Research Article

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The Impact of Auricular Acupuncture on Appetite

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Abstract

Background: It has been identified that Auricular acupuncture can be a possible method for modulating appetite and suggested as a cost-effective procedure to current treatments of obesity. This study aimed to investigate the effect of auricular acupuncture on appetite. **Materials and Methods:** This study has been carried out on 40 healthy individuals. The sample was assigned randomly by using announcement placed in Isfahan medical school, in the form of face to face or by e-mail. After recording primary appetite scores, no acupuncture was used for control group but only on Tragus point in ear, it has placed a fake tape. Acupuncture medicine was applied for another group and following to cleaning the ear, based on acupuncture medicine, needles were applied on Tragus point through "press needle" method and left in the place for 24 hours. Then, for the second time, we asked participants to fill out hunger VAS forms and the results were recorded. Afterwards needles and tapes were picked. **Results:** There was no significant difference in appetite scores between the two groups at baseline and pre-intervention (P value >0.05). But a significant reduction was seen in pleasure to food and hungry feeling in acupuncture group (P value <0.001). Conversely, satiety feeling and eating ability show no significant impact in this respect (P value >0.05). In control group, no appetite-related factors had shown a significant change after intervention (P value >0.05). **Conclusions:** Auricular acupuncture may reduce pleasure to food and hungry feeling but these results suggest that larger studies of acupuncture and appetite are warranted.

Keywords: Auricular Acupuncture, Obesity, Appetite.

INTRODUCTION

Nowadays, obesity has been identified as a main medical issue worldwide with an increasing prevalence in developing countries. It may be caused by individuals' lifestyle habits [1] encouraging excessive food intake and discouraging physical activities [2].

Therefore, whereas obesity is associated with diseases such as type 2 diabetes, hypertension, cardiovascular disease, respiratory issues, all kinds of cancer and a broad variety of other medical conditions; it is becoming a leading cause of disease and premature death [2].

Thus, this event requires paying urgent and certain attention to prevent related diseases, mortality and potential economic issues [3].

Firstly, one of the primary measures to control or lose weight which can be taken into account would be change in life style through less food intake and more physical activity to lose weight. Here, it should be considered that a few obese people can keep this lost weight after 3 to 4 months and mostly not only cannot keep it but also gain even more weight and it indicates that we need therapies beyond change in lifestyle [4]. Moreover, physical activity can lead to an increase in appetite followed by more energy delivery to compensate the lack of energy [5]. Therefore, in the absence of a low calorie-density food, it is less likely to fulfill the ability of doing physical activities to lose weight [6,7].

Consequently, appetite regulation plays an important role in obesity treatment. Studies have identified appetite regulation as a complex process including both the central and autonomic nervous systems, the gastrointestinal tract and multiple hormones and proteins [8]. Regulation of food intake and satiety feeling can be done through a network of signals received from both the gut and the brainstem [9,10]. The peripheral signals of satiety including serotonin, neuropeptide Y and cholecystokinin are released prior to food intake and exert an influence on the vagus nerve [11]. Through transferring the nerve signals to the brainstem and activating neurons, both gastrointestinal function and appetite can be modulated, so it results in satiety feeling and reduction in appetite consequently [9]. To assess if acupuncture can be led to

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weight loss or not, various studies have been carried out [12-15]. So, it has been suggested that increased satiety feeling can be suppressed through acupuncture due to raising serotonin levels [16].

The reason why auricular acupuncture was applied in the current study is a connection between a branch of the vagus nerve connected to both the gut and the hypothalamus and the ear. So, this is highly likely that auricular acupuncture can have an influence not only on signals to the vagus nerve but also on those to the gut and the hypothalamus. However, the outcomes of using auricular acupuncture and reported changes in hunger and satiety feelings were assessed to identify if it is useful in this respect or not.

METHODS AND MATERIALS

This study has been carried out on 40 healthy individuals with a BMI of 25 kg/m² to 30 kg/m² aged between 20 and 40 years. This sample was assigned randomly by using announcement placed in Isfahan medical school, in the form of face to face or by e-mail.

The volunteers were screened using a 5-item SCOFF questionnaire at baseline and those with eating disorders were excluded. This was done for all volunteers to ensure a healthy attitude to foods and a rather stable weight during the past three months. Also, those with a history of diabetes, intake of appetite medicine during recent two months, pregnant and lactating women were excluded. Due to time and sample size limitations, if we faced with discontinuing the study, we would replace them with others.

After obtaining written informs consent from all participants, we divided them into two groups of intervention and control, randomly and one by one.

Before beginning the intervention, appetite scores of each participant was recorded by the hunger visual analog scale (HVAS). This scale was founded by Flint *et al.* (2000) at Frederiksberg nutrition school in

Denmark by which individuals' reports on hungry, nausea and satiety feelings will be measured through four questions [17]. So, the intensity of individual's mental feelings in each question can be ranged from 0 to 10. The validity and reliability of this questionnaire have been approved in Iran and other countries [17-19]. A Cronbach's alpha of 0.8 obtained in this study confirms its reliability.

After recording primary appetite scores, we used no acupuncture for control group but only on Tragus point in ear, we placed a fake tape. Acupuncture medicine was applied for another group. So, following to cleaning the ear, based on acupuncture medicine, needles were applied on Tragus point through "press needle" method and left in the place for 24 hours.

Then, for the second time, we asked participants to fill out hunger VAS forms and the results were recorded. Afterwards needles and tapes were picked.

It should be noted that the intervention was done on the individuals' ears based on being right handed or left handed. So, for right handed individuals, acupuncture was carried out on their right ears.

Finally, collected data entered into SPSS software for Windows (SPSS, Inc., Chicago, IL, USA, version 20) and based on the result of Kolmogorov-Simonov test about if data are distributed normally or not, we used nonparametric tests such as Wilcoxon test to compare between mean appetite scores of pre-intervention and post-intervention in both groups. In all analyses, we considered a significance level of <0.05.

RESULTS

This study included 2 men (6.7%) and 28 women (93.3%) with a mean age of 28.01±11.12 yrs. in acupuncture group and 3 men (10%) and 27 women (90%) with a mean age of 30.47±9.81 yrs. in control group. These two groups were similar in age and sex (P value>0.05) (Table 1).

Table 1: Descriptive statistics of main characteristics of participants

| characteristics | Acupuncture (n=20) | Control (n=20) | P value |
|-----------------|--------------------|----------------|---------|
| Sex | Male | 2 (6.7%) | 0.640 |
| | Female | 28 (93.3%) | |
| Age; year | 28.01±11.12 | 30.47±9.81 | 0.462 |

Table 2: Determination and comparison of pre- and post-intervention appetite scores in both groups

| Questions | | Acupuncture (n=20) | Control (n=20) | P value ¹ |
|---|----------------------|--------------------|----------------|----------------------|
| 1. How pleasant would it be to eat right now? | Before | 4.80±2.27 | 5.05±1.62 | 0.691 |
| | After | 2.50±1.67 | 4.62±1.75 | 0.042 |
| | P value ² | <0.001 | 0.425 | |
| 2. How hungry do you feel right now? | Before | 3.83±1.90 | 4.94±1.84 | 0.068 |
| | After | 2.56±1.32 | 4.70±1.36 | 0.010 |
| | P value ² | 0.001 | 0.462 | |
| 3. How full do you feel right now? | Before | 3.94±1.86 | 4.58±2.19 | 0.325 |
| | After | 4.22±2.31 | 5.11±2.09 | 0.209 |
| | P value ² | 0.488 | 0.249 | |
| 4. How much do you think you could eat right now? | Before | 4.39±2.38 | 4.77±2.05 | 0.592 |
| | After | 4.09±1.39 | 4.47±1.23 | 0.365 |
| | P value ² | 0.894 | 0.578 | |

1. Obtained significance level from comparison of these two groups

2. Obtained significance level from comparison of these two groups in pre- and post-intervention

The results of appetite scores assessment shows that these two groups are the similar in appetite at baseline and pre-intervention (P value>0.05). However, there was a significant difference between these two groups of acupuncture and control in post intervention pleasure to food and hungry feeling and these two factors' scores were significantly lower in control group (P value<0.05).

Also, acupuncture has led to a significant reduction in pleasure to food (Question 1) and hungry feeling (Question 2) of participants (P value<0.001, changes in pleasure to food=-2.3; P value<0.001, changes in hungry feeling=-1.27). Conversely, satiety feeling and eating ability (Question 3 and 4) show no significant impact in this respect (P value>0.05). In control group, no appetite-related factors had shown a significant change after intervention (P value>0.05) (Table 2).

DISCUSSION AND CONCLUSION

The results showed that acupuncture on a specific point of ear (Tragus) after a day (24 hours) can lead to significant reductions in pleasure to food and hungry feeling and this change showed no considerable difference compared to control group. However, it resulted in a slightly changes in satiety feeling as well as being able to eat more food.

In line with the current study, Bradford *et al.* [20] also indicated that it is likely that auricular acupuncture can lead to a reduction in hungry feeling, although satiety feeling had shown a significant reduction in their study as well, that was not significant in our study. However, pleasure to food showed a significant reduction in our study. This conflict can be occurred because of too short period of the mentioned study.

However, the ear is connected to the gut and hypothalamus by 10th cranial nerve (CN X), it has been also known as the agent which triggers secretory impulses to the abdominal viscera [21]. To have an effect on appetite or satiety feelings, studies have suggested some routes for applying auricular acupuncture [12-15]. According to previous studies, auricular acupuncture on obese individuals can increase the excitability of the satiety center in ventromedial nucleus of the hypothalamus [22] and/or lead to decreased hungry feeling, increased satiety as well as regulated appetite [23] and controlled weight [24,25].

According to previous studies, stimulating the vagal region of ear in rats could regulate neuronal activity of appetite [26] and nutritional instinctive behavior [27]. Other clinical studies also found that auricular acupuncture plays an important role in increasing the excitability of the satiety center in hypothalamus, raising the serotonin in the body [13] and suppressing appetite [12].

Compared with other studies, one of the reasons why acupuncture effects on appetite such as hunger, satiety, pleasure to food are so various, may be the presence of points in auricular acupuncture.

In auricular acupuncture using some points is common as mentioned in many studies [12,14,26,27]. We selected Tragus point which is associated with hunger directly [28]. However other points act as sedatives [29,30]. In our study, we asked participants to report their feelings on hunger, satiety, pleasure to food and eating more by using VAS criterion. Although this way of reporting cannot explain the auricular acupuncture mechanism, it allows us to monitor their feelings on hunger. Access to a more appropriate control group to this study could have demonstrated changes in individuals' feeling during a short time of 24hrs. So, we found no significant difference between these two groups in satiety feeling and ability to eat more pre-and post-intervention and auricular acupuncture effects observed only on reductions in pleasure to food and hunger feeling. Since our study was restricted in two major aspects including small sample size and placing needle for a short time (24hrs) in one session, further studies with larger sample size are required.

Also, to identify the impact of the duration in which the needle places in the ear for a short time compared to a longer time, it is required that in a study the needle places for a longer time to be compared with and/or stimulating specific points in the ear frequently (and in more sessions). This allow the investigator(s) to generalize the results to the population with more certainty.

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