Acupuncture and body temperature regulation

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Abstract
Man has the ability to keep body temperature within a short range, in spite of temperature variations in the surrounding environment. This balance is achieved through a nerve center that activates thermogenesis or thermolysis, according to the needs of the human body.

Acupuncture consists of the placement of thin needles with a therapeutic purpose, being important to understand their relevance in neuronal regulation. This trial on healthy volunteers intended to study the effects of acupuncture on body temperature regulation.

INTRODUCTION
Man is a homeothermic species, that is to say, man has the ability to keep body temperature in a pre-determined range, in spite of thermic changes in the environment. This balance is achieved through a thermo-regulatory center located in the anterior hypothalamus with the activation of thermogenesis or thermolysis mechanisms in line with the needs of the human body.

Acupuncture consists of the placement of thin needles with a therapeutic purpose and it stimulates several self-regulatory mechanisms of the body through the nervous, endocrine and immune system, being important to understand their relevance in neuronal regulation.

OBJECTIVES
This trial intended to study the effects of acupuncture in healthy volunteers and its possible interference with body temperature regulation.

MATERIALS AND METHODS
This study had the participation of 30 healthy volunteers, university students of both sexes (15 male and 15 female), ages between 18 and 23 years old. Some parameters were determined: body mass index (BMI), abdominal girth, thighs, legs and arms perimeter.

Two sessions per volunteer were performed in successive weeks, one with the puncture of 9 points (07CO, 07PE, 41ES, 06RM, 09RM and 12RM - Figure 1), and another without puncture. After removing clothing, the volunteers were subjected a few minutes to the room temperature, which was also measured. Body temperature measurements were done in three points in time (at baseline, 10 minutes after and 15 minutes after) and in 16 different locations (Figure 2), including abdomen, limbs, forehead and tympanic temperature. The infrared digital thermometer used to the effect was Geratherm®duotemp, applied without physical contact with an accuracy of ± 0.3 ºC. In the session with puncture, body temperature was measured at baseline, 10 minutes after putting needles and 5 minutes after their removal.

A statistical analysis of the data obtained from the diet and anxiety questionnaires (STAI – State-Trait Anxiety Inventory) as well as the values on registered temperatures was conducted. The values of mean, standard deviation and Pearson correlation coefficient (r) between the variables are among the parameters assessed.

Figure 1 - Acupuncture points selected for the study
RESULTS
The main correlations found are the following (Table 1 and Table 2). The correlations above were also calculated for male and female separately.

Tables explanation:
T0 = Temperature at baseline
T1 = Temperature 10 minutes after
T2 = Temperature 15 minutes after
RT = Room temperature
TT = Tympanic temperature
FT = Forehead temperature
LFET = Left feet temperature
RFET = Right feet temperature
RLT = Right leg temperature
LLT = Left leg temperature
LTT = Left thigh temperature
RTT = Right thigh temperature
LHT = Left hand temperature
LAT = Left arm temperature
RAT = Right arm temperature
ABT = Abdominal temperature
TT = Tympanic temperature

Table 1 - Session without puncture

<table>
<thead>
<tr>
<th></th>
<th>T0</th>
<th>T1</th>
<th>T2</th>
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<tbody>
<tr>
<td>r(TT-RTT)</td>
<td>0.41</td>
<td>0.52</td>
<td>0.40</td>
</tr>
<tr>
<td>r(TT-LTT)</td>
<td>0.33</td>
<td>0.48</td>
<td>0.44</td>
</tr>
<tr>
<td>r(TT-RLT)</td>
<td>0.57</td>
<td>0.61</td>
<td>0.50</td>
</tr>
<tr>
<td>r(TT-LLT)</td>
<td>0.47</td>
<td>0.58</td>
<td>0.56</td>
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<tr>
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Table 2 - Session with puncture

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DISCUSSION
The analysis of the correlation between the room temperature and ear and forehead measured temperature suggests puncture affects temperature regulation. Tympanic temperature had the major differences. There are some individual anatomical and physiological factors, as muscle mass, fat mass and hormonal climate, which may be important for body temperature regulation, with impact on their segment. The analysis of temperature variations in the “no puncture” and “with puncture” groups shows there are some irrelevant variations that differ with topography and gender.

CONCLUSIONS
From the results, acupuncture seems to modify temperature regulation under the experiment's conditions. It is also observed that there are no major differences between genders in this study. However, the possibility that increasing sample dimension leads to statistically significant differences cannot be ruled out. It is important to understand better how diet profile may interfere with these functions, since this sample is not large enough to draw conclusions.

REFERENCES

