∎ Research Article ∎

Assessing the Links Between Anthropometrics Data and Akabane Test Results

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Available online 12 January 2018

Abstract
According to popular belief, metabolic disorders and imbalances are one of the main factors contributing to various human illnesses. Early diagnosis of these disorders is one of the main methods for preventing serious diseases. The goal of this study was to assess the correlations between main physical indicators and the activity of certain acupuncture channels using the thermal Akabane test based on ancient Chinese diagnostic methods. This test measures the pain thresholds' temperature sensitivity when a point source of heat is applied to the "entrance−exit" points of each channel. The skin temperature sensitivity in our bodies is a basic reactive system; it is as significant as such important indicators as body temperature and provides a very clear representation of functional and psychophysiological profiles. On the basis of our statistical study, we revealed reliable correspondence between the activity of certain acupuncture channels and main anthropometric and biometric data.

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Introduction

Acupuncture physicians extensively explore acupuncture channels (ACs) and points that regulate anthropometric data [1−6]. Traditional Chinese medicine (TCM) states that each AC can reflect various physiological and biochemical body indicators in addition to basic links with certain organs and physiological systems. Therefore, the goal of this study was to expand this list of links of ACs with biometric indicators. To assess the bioenergy status of the ACs, we used the Akabane test. This test was described by the Japanese doctor Kobe Akabane in 1952 [7]. The following parameters were assessed: height (cm), weight (kg), body mass index (BMI), gender, and age. As a result of the study of 338 patients, we discovered that all of the abovementioned anthropometric data relate to different ACs with clear sex difference.

2. Materials and methods

A total of 338 patients (198 women and 140 men) were examined. The majority of the study participants were staff members at the National Center for Emergency and Radiation Medicine of the Ministry of Emergencies (EMERCOM) of Russia (St. Petersburg) who did not have any pronounced pathologies. The average age of the female study participants was $45.12 + 13.67$ years and of the male participants was $40.02 + 15.79$ years. The anthropometric data were collected using direct measurements. The Akabane test measures the pain thresholds' temperature sensitivity (TS) when heat is applied to the "entrance−exit" points of each channel by applying an impulse Light Emitting a Diode (LED) noncoherent infrared range (IR) light onto the skin (f = 1 Hz and $\lambda = 920$ nM, with the total energy expenditure in joules [8, 9]). Each impulse radiates 0.07 joules of thermal energy. To assess TS, we used 24 standard zones, which are traditionally examined in acupuncture to evaluate the channels (LU11, LII1, PC9, TE1, HT9, Si1, SP1, LR1, St45, GB44, Ki1, and BL67).

To identify the links, we assessed correlations and regression dependencies, which were calculated based on the absolute values of the channel TS, their scaled values (the level of TS of each AC is divided by the arithmetic average for all the 24 ACs to level out individual variability in TS), and the left/right branch ratios of the 12 main channels. To make the distribution symmetric, in some cases we implemented logarithms. Assessing AC links based on the left/right branch ratio is also very important, because it shows the level of asymmetry in AC, which has primary importance in the development of pathologies [13, 14, 24, 25].

The analysis of the relationship between biometrical indicators and ACs was carried out using correlations (Pearson and Spearman coefficients) and multiple regression analysis. One-way multivariate analysis of variance (MANOVA) by Least Significant Difference (LSD) *post hoc* comparisons analyzed the effect of sex on the AC data. Wilcoxon signed-rank test and the Mann−Whitney test were used for paired comparisons. Statistical decisions were made at the 5% significant level ($p \leq 0.05$). We used the SPSS software package, version 15.

Results

The following parameters were assessed: height (cm), weight (kg), BMI, gender, and age. For each of these parameters, we analyzed all the possible correlations and chose to discuss only the most significant ones.

1. Body weight

The results of the relationships with body weight are presented in Table 1. In men, the most strong associations were with the right lung (LUr) channel with plus sign (+) correlations. Previously, it was revealed that this AC reflects the level of tissue oxygenation [13, 14]. Normally, the right branch always has larger values than the left and its values increase after walking outdoors and after moderate exercise. The prevalence values of the left branch are associated with a state of hypoxia, fatigue, and drowsiness. Another reliable marker linked to weight in men is the right pericardium channel that reflects muscular activity with a negative (minus) sign. The higher the muscular activity, the lower is the weight, especially in younger people. In general, thesetwo ACs can be compared to a balance of the two sides of the scales with opposing vector influences, where their ratio reflects weight.

The gallbladder channel (GB) was found in women to be the highest links to weight, especially the right branch and the ratio between the two branches. This AC reflects the state of the peripheral nervous system and emotional states of irritability and anger [11]. The regression model was also included. In addition, there were links to the triple heater channel (TE), which reflects the thyroid function, the stomach AC (ST), and the spleen (SP), which according to TCM are involved in food digestion and the transportation of nutrients through the blood. We noted a single link with the BL, which reflects the balance of sexual hormones. The overall regulation depends on the AC activity balance with the positive and negative influence vectors for this particular parameter.

2. Height

When assessing the links with the height parameter, we did not expect to find any clear dependencies due to the nature of this parameter. Nevertheless, among men (Table 2) significant links were revealed with the AC-BL and the kidney channel (KI) through the left/right branch ratio. According to TCM, both these channels regulate the energy accumulation in the human body. Among other ACs and their branches, we noted stable links, repeated in various types of correlation analysis with the small intestine (SI), large intestine (LI), and pericardium (PC).

Among women, the following channels showed the highest correlations: both branches of the stomach channel (ST), the left branch of the pericardium channel (PC-l), and the spleen channel (SP-l). Thus, the influence of this channel on height depends on gender. Among men, the high influence is from the hormonal channels, while among women, the greatest influence is from the channels involved in digestion, diet, and metabolism. In general, we observed that various systems are involved in the regulation of this parameter (in comparison to weight).