



Original Article

Characteristic patterns of normal meridian acupoint temperature

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Abstract

Background: Body temperature is an important indicator of health and illness. However, a single temperature measurement is not always reliable. Such measurements can be made using meridians, which are energy channels with acupoints being the nodes. To date, there is no published reference of meridian acupoint temperatures applicable to human health, and there is no clear digitalized indicator that could be utilized to evaluate human health by way of meridian acupoints up to now.

Methods: Our study recruited 100 healthy medical college students for the measurement of acupoint temperature. The temperatures of 135 acupoints of 14 main meridians were measured using infrared thermometers in order to provide a comprehensive body temperature reading of each study participant.

Results: The degree of the acupoint temperature consistently ranged from 34.88°C to 36.14°C. The gross thermograph was concentric, with high degree readings around the heart and low degree readings originating from the feet. The left and right body sides had significant correlation between the degrees of bilateral same name acupoint temperatures of 12 regular meridians (correlation coefficient, 0.367–0.985; $p < 0.0001$). There was also a significant correlation between the acupoint temperature for the governor vessel and the conception vessel (correlation coefficient, 0.083; $p = 0.006$).

Conclusion: These findings indicate that meridian acupoint temperature is characterized by a consistently narrow range, as well as concentricity and symmetry in body temperature degree readings in college students. Meridian acupoint temperature may be a sensitive and valuable indicator to assist in the accurate evaluation of meridian and general human health, and the significance and changes of acupoint temperature in clinical conditions warrants future exploration.

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Keywords: acupoint; medical college students; meridian; skin temperature; symmetry

1. Introduction

Our previous research indicated that Chinese medicine and acupuncture demonstrated a similar efficacy for treatment of obesity as Western antiobesity drugs, but with fewer reported

effects.¹ Meridian and acupoint are the unique systems recorded in *The Yellow Emperor's Internal Classic* or *Canon of Medicine*, and are considered to be energy channels with acupoints being the nodes in modern medicine.^{2–4} Body temperature closely relates to energy metabolism, and it is generally understood that a quick evaluation of a person's health can be accomplished by measuring oral or axillary temperatures. However, single temperature reading is not always reliable. A patient with furunculosis may have a normal core body temperature, but the skin temperature around furunculosis may be feverish.⁵ A patient with lower extremity varicose veins may have normal axillary temperature, but the feet may feel almost icy to the touch.⁶ Owing to the properties

Conflicts of interest: The authors declare that they have no conflicts of interest related to the subject matter or materials discussed in this article.

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of meridian and acupoint, we conjecture that skin temperature of meridian acupoint may be a good parameter to help evaluate health condition. Some studies have described some acupoint skin temperatures, but they merely focused on only one or two meridians.^{4,7} There is no standard of meridian acupoint temperature and no clear digitalized indicator to evaluate health associated with meridians to date. In this study, we have summarized the characteristics of 14 main meridians acupoint temperatures and have established a meridian acupoint temperature map. In addition, meridian theory is the foundation of traditional Chinese medicine (TCM) and acupuncture. Skin temperature of meridian acupoint may also provide clearly valuable information for TCM formula modification and acupoint combination for the treatment.

2. Methods

2.1. Participants

The study processes were performed in accordance with international ethical standards and was approved by the Ethics Committee of Guilin Medical University Affiliated Hospital (approval No.: GLMC15032013HL). All participants fully understood the procedure and the purpose of this noninvasive test, and they took part in the study voluntarily. All patients provided written and signed informed consent documents before they were admitted to the university's clinical research center.

The study included 100 healthy medical college students (50 males and 50 females), aged 20.65 ± 1.53 years, with a

weight range of 55.67 ± 8.33 kg. The participants met the following requirements: (1) age, between 18 years and 25 years; (2) weight, between 45 kg and 65 kg; (3) no smoking, no alcohol use, no drug use, no addiction to network; (4) vital signs of the individual including heart rate, breath rate, pulse rate, and blood pressure are normal, and the individual is proven to be healthy without illness in important organs (lung, heart, liver, and kidney) after undergoing physical examination in Guilin Medical University Affiliated Hospital; laboratory examination results (including liver function test, kidney function test, blood glucose, blood lipids, blood red cell, and blood white cell) were normal; (5) besides the requirements above, females needed to meet the requirements of duration of menstruation of 28 ± 7 days, with no uncomfortable symptoms of breast pain, diarrhea, hypogastralgia, and insomnia in the premenstrual and menstrual cycle, no pregnancy, no problem in the reproductive system proved by B ultrasonic examination, and leukorrhea routine examination, and need to avoid menstruation.

2.2. Design

The skin temperature of 135 acupoints of 14 main meridians was measured by an infrared thermometer (DT-8806H; Shenzhen Everbest Machinery Industry Co. Ltd., Shenzhen, China). Prior to use, the thermometer was validated for accuracy against a standard thermometer certified by National Bureau of Standards and accurate to 0.2°C . The 135 acupoints of 14 main meridians are shown in Table 1, and elucidated in the human body as noted in Fig. S1.

Table 1
135 acupoints of 14 main meridians in the study.

Meridian	Acupoint
Lung meridian (LU)	Zhongfu (LU1), Chize (LU5), Kongzui (LU6), Lieque (LU7), Jingqu (LU8), Taiyuan (LU9), Yuji (LU10), Shaoshang (LU11)
Large intestine meridian (LI)	Shangyang (LI1), Erjiang (LI2), Sanjiang (LI3), Hegu (LI4), Yangxi (LI5), Wenliu (LI7), Quchi (LI11), Jianyu (LI15), Yingxiang (LI20)
Stomach meridian (ST)	Chengqi (ST1), Dicang (ST4), Xiaguan (ST7), Touwei (ST8), Liangmen (ST21), Tianshu (ST25), Futu (ST32), Liangqiu (ST34), Zusanliu (ST36), Tiaokou (ST38), Xiajuxu (ST39), Jiexi (ST41), Chongyang (ST42), Xiangu (ST43), Neiting (ST44), Lidui (ST45)
Spleen meridian (SP)	Yinbai (SP1), Dadu (SP2), Taibai (SP3), Gongsun (SP4), Shangqiu (SP5), Sanyinjiao (SP6), Diji (SP8), Yinlingquan (SP9), Xuehai (SP10), Daheng (SP15), Dabao (SP21)
Heart meridian (HT)	Jiquan (HT1), Shaohai (HT3), Lingdao (HT4), Yinxi (HT6), Shenmen (HT7), Shaofu (HT8), Shaochong (HT9)
Small intestine meridian (SI)	Shaoze (SI1), Qiangu (SI2), Houxi (SI3), Wanggu (SI4), Yanggu (SI5), Zhizheng (SI7), Xiaohai (SI8), Tianzong (SI11), Tinggong (SI19)
Bladder meridian (BL)	Jiangmin (BL1), Dazhu (BL11), Feishu (BL13), Xinshu (BL15), Geshu (BL17), Ganshu (BL18), Danshu (BL19), Pishu (BL20), Weishu (BL21), Sanjiaoshu (BL22), Shenshu (BL23), Dachangshu (BL25), Xiaochangshu (BL27), Panguangshu (BL28), Weizhong (BL40), Chengshan (BL57), Kunlun (BL60), Jinggu (BL64), Shugu (BL65), Zutonggu (BL66), Zhiyin (BL67)
Kidney meridian (KI)	Yongquan (KI1), Rangu (KI2), Taixi (KI3), Zhaohai (KI6), Fuliu (KI7), Yingu (KI10), Dahe (KI12), Huangshu (KI16)
Pericardium meridian (PC)	Quze (PC3), Ximen (PC4), Jianshi (PC5), Neiguan (PC6), Daling (PC7), Laogong (PC8), Zhongchong (PC9)
Triple energizer meridian (TE)	Guangchong (TE1), Yemen (TE2), Zhongzhu (TE3), Yangchi (TE4), Waiguang (TE5), Zhigou (TE6), Tianjing (TE10), Jianliao (TE14)
Gallbladder meridian (GB)	Fengchi (GB20), Riyue (GB24), Fengshi (GB31), Yanglingquan (GB34), Xuanzhong (GB39), Qiuxu (GB40), Zulingqi (GB41), Xiashi (GB43), Zuqiaoyin (GB44)
Liver meridian (LR)	Dadun (LR1), Xingjian (LR2), Taichong (LR3), Zhongfeng (LR4), Ququan (LR8), Zhangmen (LR13), Qimen (LR14)
Governor vessel (GV)	Mingmen (GV4), Zhiyang (GV9), Dazhui (GV14), Fengfu (GV16), Baihui (GV20), Shangxing (GV23), Suliao (GV25), Shuigou (GV26)
Conception vessel (CV)	Zhongji (CV3), Guanyuan (CV4), Qihai (CV6), Shenque (CV8), Zhongwan (CV12), Jueque (CV14), Danzhong (CV17)

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