

# Orthogonal test on local temperature influenced by different parameters and manipulation types of An-pressing Xinshu (BL 15)

## 不同参数和方式按压心俞穴对局部温度影响的正交试验

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### Abstract

**Objective:** To explore the optimal thermal effect parameter combination of An-pressing manipulation based on the pressing force, time and frequency, and to compare the thermal effect differences between the rhythmic and the continuous An-pressing manipulations.

**Methods:** Three levels of light, moderate and heavy pressing forces were determined according to the An-pressing forces of the clinical tuina physicians; the pressing time and frequency parameters were determined according to the literatures about An-pressing manipulation. The volunteers were stimulated by the homemade An-pressing manipulation stimulator on the right Xinshu (BL 15), and then the three-factor and three-level orthogonal tests were carried out according to the test sequence specified by the  $L_9(3^4)$  orthogonal table, and the temperature before and after pressing was recorded by an infrared thermal imaging system to screen the best parameters for the thermal effect of the An-pressing manipulation, thus to determine the optimal pressing parameters. The optimal parameters were then used for both continuous and rhythmic An-pressing manipulations to stimulate the bilateral Xinshu (BL 15). The temperature changes after pressing and the duration of the thermal effect (temperature difference  $\leq 0.5$  °C on both sides) were recorded by the infrared thermal imaging system, to explore the differences in the thermal effects of different An-pressing manipulations.

**Results:** Among the three factors of pressing force, time and frequency, the influences of different pressing forces on temperature were significantly different ( $F=32.843$ ,  $P=0.030$ ), and the influence of 2.5 kg pressing force was the most significant; the effects of different pressing time on temperature were significantly different ( $F=54.102$ ,  $P=0.018$ ), and the pressing time of 7.5 min was the most significant; the influences of different pressing frequencies on temperature were not statistically significant ( $F=2.181$ ,  $P=0.314$ ), though the influence of 10 times/min pressing frequency was the largest. The influences on temperature difference of the rhythmic and the continuous An-pressing manipulations were significantly different ( $P=0.031$  on the left side and  $P=0.045$  on the right side), but there was no statistical difference in the duration of the thermal effect ( $P=0.690$ ).

**Conclusion:** The An-pressing manipulation parameters that significantly affect the temperature difference are pressing force and time. The optimal combination of thermal effect parameters is pressing force of 2.5 kg, time of 7.5 min, and frequency of 10 times/min. The local thermal effect of the rhythmic An-pressing manipulation is significantly greater than of the continuous An-pressing manipulation.

**Keywords:** Tuina; Massage; An-pressing Manipulation; Point, Xinshu (BL 15); Temperature; Healthy Volunteers

**【摘要】目的:** 从力度、时间和频率三方面探索按法热效应的最佳参数组合,并据此比较节律性按法和持续性按法热效应的差异。**方法:** 以临床推拿医生按法力量值,确定力度轻、中、重三个水平;参考有关按法的文献,确定时间和频率参数。用自制按法刺激器对志愿者右侧心俞穴进行按法刺激,然后按照  $L_9(3^4)$  正交表规定的试验顺序进行三因素三水平的正交试验,并以红外热像仪记录按压前后温度,对按法热效应最佳参数进行筛选,以确定最佳操作参数。再以此为参数,分别以节律性按法和持续性按法刺激双侧心俞穴,用红外热像仪记录按压前后温度变化以及热效应持续时间(两侧温差  $\leq 0.5$  °C 的时间),探索按法不同刺激方式热效应的差异。**结果:** 在力量、操作时间和频率三个因素中,不同力量对温差的影响有显著性差异( $F=32.843$ ,  $P=0.030$ ), 2.5 kg 的力量影响最显著;不同操作时间对温差的影响有显著性差异( $F=54.102$ ,  $P=0.018$ ), 7.5 min 的操作时间影响最显著;频率对温差

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的影响无统计学意义( $F=2.181$ ,  $P=0.314$ ), 频率为 10 次/分的效应数值最大。节律性按法与持续性按法对按压后温度差值的影响差异有统计学意义(左侧  $P=0.031$ , 右侧  $P=0.045$ ), 但对热效应持续时间的影响无统计学差异( $P=0.690$ )。结论: 对温差影响显著的按法参数为力量与操作时间。最佳热效应参数组合为力量 2.5 kg, 操作时间 7.5 min, 频率 10 次/分。节律性按法的局部热效应比持续性按法显著。

【关键词】推拿; 按摩; 按法; 穴; 心俞; 温度; 健康志愿者

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An-pressing is a manipulation of pressing the body surface perpendicularly with the finger pulp, palm or elbow<sup>[1]</sup>. An-pressing manipulation warms meridians, dispels cold, promotes qi and activates blood, which are all related to 'heated qi arrival'. However, there has been no description of its specific manipulation. What is the relationship between the 'heated qi arrival' effect of the An-pressing manipulation and the pressing force, time, frequency and method? This needs to be addressed for teaching, research and clinical practice. The current trial will discuss the above issues focusing the local thermal effect after pressing. The test was carried out by three steps: the first step was to collect the pressing force parameters of An-pressing manipulation by the tuina physicians, thus to provide the pressing force basis for the orthogonal test to select the optimal thermal effect parameters of the An-pressing manipulation; the second step was to screen the optimal thermal effect parameters of An-pressing manipulation based on the literatures describing the pressing time of An-pressing manipulation and the scope of the pressing force among the tuina physicians; the third step was to compare the thermal effects of the rhythmic and continuous An-pressing manipulations based on the optimal thermal effect parameters of An-pressing manipulation. The details are reported below.

## 1 Test Subjects and Instruments

### 1.1 Test subjects

Twenty-three tuina physicians who had been tuina practitioners for more than 5 years were recruited to participate in the test for collecting the force parameters of An-pressing manipulation. Six male college student volunteers were recruited to participate in the orthogonal test of the An-pressing manipulation; seventeen male college student volunteers were recruited to participate in the trial of the An-pressing manipulation method. The inclusion criteria of volunteers were 18-25 years old, 60-70 kg in body weight, 165-175 cm in body height, with good health, never experiencing physical training, and without smoking, drinking or staying up late during the trial.

### 1.2 Test instruments

Digital medical infrared thermal imaging system (Chongqing Feizhou Optoelectronic Technology Research Institute, China); SF-III type manipulation

measuring instrument (Shanghai Tengyin Teaching Instrument Co., Ltd., China); PC2000A sports stopwatch (Shenzhen Chaosuda Co., Ltd., China); homemade Chinese medicine stimulating device (patent number: 201720875963.5)<sup>[2-4]</sup>.

## 2 Test Methods

### 2.1 Collection of An-pressing manipulation force range from tuina physicians

The tuina manipulation measuring instrument was used to test the An-pressing manipulation force parameters of the 23 tuina physicians. The key points of manipulation were based on the *Tuina Science*<sup>[1]</sup>. The operators were allowed to apply light, moderate and heavy pressing forces on the manipulation measuring instrument for 2 min, and the fingerprint area of the operators at different pressing forces were recorded on white papers. The pressing force images and fingerprints were imported into the computer, and the force values and fingerprint areas were analyzed using Adobe Photoshop CS6 for Windows. Because the following An-pressing manipulation test was performed by the homemade stimulator, the pressures of light, moderate and heavy pressing forces from the tuina physicians and the areas of the massage head of the stimulator (about 2.0 cm<sup>2</sup>) were converted into the corresponding forces to obtain the force parameters of the instrument. As shown in Table 1.

Table 1. Conversion table for the force data of the An-pressing manipulation ( $\bar{x} \pm s$ )

Item	Pressing force		
	Light	Moderate	Heavy
Pressing force (kg)	1.60±0.99	2.63±1.04	3.70±1.07
Fingerprint area (cm <sup>2</sup> )	2.20±0.79	2.63±0.96	2.94±1.20
Pressure (N/cm <sup>2</sup> )	7.12	9.80	12.33
Converted force (kg)	1.5	2.0	2.5

### 2.2 Orthogonal test of An-pressing manipulation thermal effect

The parameters of the An-pressing manipulation mainly included pressing force, frequency and time.

Pressing force: 1.5 kg, 2.0 kg and 2.5 kg were selected as the three levels of pressing force.

Pressing frequency: According to the *Science of Tuina Manipulations*<sup>[5]</sup>, each pressing needed to maintain for 3-10 s, that is, the frequency was 6-20 times/min, therefore, the three levels of 15 times/min, 10 times/min and 7.5 times/min were selected.

Pressing time: Referring to the relevant research<sup>[6]</sup>, the tissue temperature under tuina for 2 min could be obviously increased and basically stable after 5 min, and there should be no significant difference in the temperature between 10 min and 5 min of tuina, so the three levels of 2.5 min, 5.0 min and 7.5 min were selected.

According to the level of each parameter, a three-factor and three-level orthogonal test was designed, and the factors and levels are shown in Table 2.

**Table 2. L<sub>9</sub>(3<sup>4</sup>) orthogonal table for factor numbers and level numbers**

Level	Factor A	Factor B	Factor C
	Pressing time (minute)	Pressing frequency (times/minute)	Pressing force (kg)
1	2.5	7.5	1.5
2	5.0	10.0	2.0
3	7.5	15.0	2.5

### 2.3 Local thermal effect test of two different An-pressing manipulation types

The pressing force, time and frequency parameters to produce the optimal thermal effect of An-pressing manipulation were obtained by the above orthogonal test. Therefore, these parameters were used for rhythmic An-pressing manipulation, while the parameters of pressing force and time were used for the continuous An-pressing manipulation. Two different An-pressing manipulation types were performed on the bilateral Xinshu (BL 15) of the volunteers with An-pressing manipulation stimulator, and the interval was 30 min.

### 2.4 An-pressing manipulation

Referring to *Science of Acupuncture and Moxibustion*, Xinshu (BL 15) was located at 1.5 cun lateral to the spinous process of the fifth thoracic spine<sup>[7]</sup>. The homemade An-pressing manipulation stimulator simulates the human thumb pressing action and the parameters can be set according to requirements, which can solve the quantification and normalization of An-pressing manipulation, meanwhile simulate the temperature of human thumb pressing<sup>[4,8]</sup>. Volunteers were not allowed to eat or drink within 30 min before the test, and were asked to expose the back and rest for 10 min during the manipulation.

## 2.5 Measurement items

### 2.5.1 Temperature difference

The temperature difference refers to the local temperature change after pressing Xinshu (BL 15).

### 2.5.2 Thermal effect duration

Studies found that the temperature difference above 0.5 °C between the left and right symmetrical acupoints is clinically significant, so the time from the end of the pressing to temperature difference ≤0.5 °C between the left and right Xinshu (BL 15) was recorded as the thermal effect duration<sup>[9]</sup>.

### 2.6 Test site and environment

The test was conducted at the First Hospital of Hunan University of Chinese Medicine under the condition of room temperature (23-25 °C) and 60%-65% humidity without obvious air flow; the room was quiet without noise and strong magnetic field interference around<sup>[10]</sup>.

### 2.7 Statistical analysis

Statistical analysis of all data was conducted using SPSS 21.0 for Windows. The numerical variable data following a normal distribution were expressed as mean ± standard deviation ( $\bar{x} \pm s$ ). The L<sub>9</sub> (3<sup>4</sup>) orthogonal design was analyzed using variance analysis for orthogonal design, regardless of the interaction of different factors. The main effect of each factor was analyzed to explore the best combination of the three factors at each level. Multiple sets of repeated measurements were compared using variance analysis of repeated measurement data and Student-Newman-Keuls (SNK) multiple comparison. The pressing time fitting the normal distribution was analyzed by one-way ANOVA. P≤0.05 was considered statistically significant.

## 3 Results

### 3.1 L<sub>9</sub> (3<sup>4</sup>) orthogonal test results of the An-pressing manipulation

The orthogonal test results of An-pressing manipulation are shown in Table 3. Combined with the results of variance analysis in Table 4, the pressing time and force showed significant impact on the thermal effect. K3>K2>K1 for the pressing time, so the level 3 was used; K3>K2>K1 for the pressing force, so level 3 was used; the effect of pressing frequency was not statistically significant, but its effect value was large, and clinical An-pressing manipulation has the manipulation requirement of 'pressing and maintaining', that is, the pressing action should be kept for a period of time, the frequencies of 7.5 times/min, 10.0 times/min and 15.0 times/min corresponded to about 8 s, 6 s and 4 s for each pressing. The 6 s pressing was moderate since it would not cause the operator fatigue due to excessive pressing, therefore, B2 was used. As a result, A3B2C3 was the best combination, which meant that the

pressing time of 7.5 min, the pressing frequency of 10 times/min, and the pressing force of 2.5 kg made up the optimal parameter combination of An-pressing manipulation to produce thermal effect. It was also suggested that within a certain range, the thermal effect of An-pressing manipulation was positively correlated with pressing force and time.

**3.2 Main effect variance analysis results for the pressing force, time and frequency of An-pressing manipulation**

Each test was repeated 6 times according to the orthogonal factors and levels in Table 2, as well as the test combination specified by the L<sub>9</sub> (3<sup>4</sup>) orthogonal table, regardless of the interaction between the factors.

The variance analyses for the main effects of the An-pressing manipulation, including pressing force, time and frequency, were performed and the results are shown in Table 4. The statistical results showed that among the three factors of An-pressing manipulation, the influences of pressing time and force on temperature difference were statistically significant ( $P=0.018$ ), and the influence of pressing frequency on temperature difference was not statistically significant ( $P=0.314$ ). The results suggested that the pressing time and force of An-pressing manipulation should have significant impacts on the thermal effect, while the pressing frequency had no significant impact on the thermal effect.

**Table 3. L<sub>9</sub> (3<sup>4</sup>) orthogonal test results of An-pressing manipulation**

Test number	A	B	C	Temperature difference (°C)
	Pressing time (minute)	Pressing frequency (times/minute)	Pressing force (kg)	
1	2.5	7.5	1.5	1.68
2	2.5	10.0	2.0	1.96
3	2.5	15.0	2.5	1.91
4	5.0	7.5	2.0	2.15
5	5.0	10.0	2.5	2.20
6	5.0	15.0	1.5	1.95
7	7.5	7.5	2.5	2.25
8	7.5	10.0	1.5	2.04
9	7.5	15.0	2.0	2.15
K1	1.850	2.027	1.890	
K2	2.100	2.067	2.087	
K3	2.147	2.003	2.120	
R	0.297	0.064	0.207	
The optimal value	A3	B2	C3	

**Table 4. Variance analysis results of L<sub>9</sub> (3<sup>4</sup>) orthogonal test**

Source of variation	Sum of deviation square	Degree of freedom	Mean square	F-value	P-value
Pressing time (minute)	0.153	2	0.076	54.102	0.018
Pressing frequency (times/minute)	0.006	2	0.003	2.181	0.314
Pressing force (kg)	0.093	2	0.046	32.843	0.030
Error	0.003	2	0.001		

**3.3 Comparison of local thermal effects at different time points between rhythmic and continuous An-pressing manipulations**

As shown in Table 5, Table 6, and Figure 1, the variance analysis results of multiple set repeated measurement data are as follows. There was no significant difference in Xinshu (BL 15) temperature before pressing between the left side rhythmic and left side continuous An-pressing manipulation groups ( $P=0.640$ ). There was no interaction between the group

and the measurement time ( $P=0.869$ ); the measured time factors, that were, the temperature differences in the same group at 0, 1, 2, and 5 min were statistically significant ( $P=0.001$ ), and the SNK multiple comparison showed 0 min>1 min>2 min>5 min, which suggested that when the An-pressing manipulation was completed, the local temperature was gradually decreased; the influence on the temperature difference between the two groups was statistically significant ( $P=0.031$ ). The multiple comparisons at the four time points of 0, 1, 2,

and 5 min showed that the temperature difference of the left side rhythmic An-pressing manipulation group was more significant than that of the left side continuous An-pressing manipulation group.

There was no significant difference in the Xinshu (BL 15) temperature between the right side rhythmic An-pressing manipulation group and the right side continuous An-pressing manipulation group ( $P=0.933$ ); there was no interaction between the groups and the measurement times ( $P=0.710$ ); the measured time factors, that were, the temperature differences in the same group at 0, 1, 2, and 5 min were statistically significant ( $P=0.000$ ), and the SNK multiple comparison showed 0 min>1 min>2 min>5 min, which suggested when the manipulation was completed, the local temperature was gradually decreased; the influence of groups on the temperature difference was statistically

significant ( $P=0.045$ ). The multiple comparison results at the four time points of 0, 1, 2 and 5 min showed that the temperature difference of the right side rhythmic An-pressing manipulation group was more significant than that of the right side continuous An-pressing manipulation group.

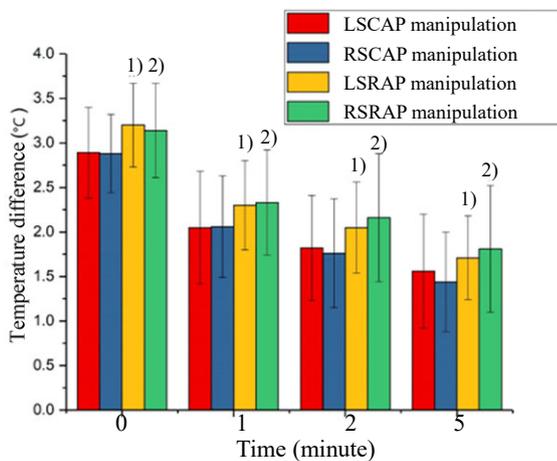
**Table 5. Comparison of Xinshu (BL 15) temperature before An-pressing manipulation ( $\bar{x} \pm s, ^\circ\text{C}$ )**

Group	n	Temperature
Left side continuous An-pressing manipulation	17	33.03±1.01
Right side continuous An-pressing manipulation	17	33.23±1.09
Left side rhythmic An-pressing manipulation	17	33.05±0.88
Right side rhythmic An-pressing manipulation	17	33.46±0.64

**Table 6. Comparing thermal effects of the two different An-pressing manipulation methods at different time points ( $\bar{x} \pm s, ^\circ\text{C}$ )**

Group	n	0 min	1 min	2 min	5 min
Left side continuous An-pressing manipulation	17	2.89±0.51	2.05±0.63	1.82±0.59	1.56±0.64
Right side continuous An-pressing manipulation	17	2.88±0.44	2.06±0.57	1.76±0.61	1.44±0.56
Left side rhythmic An-pressing manipulation	17	3.20±0.47 <sup>1)</sup>	2.30±0.50 <sup>1)</sup>	2.05±0.51 <sup>1)</sup>	1.71±0.47 <sup>1)</sup>
Right side rhythmic An-pressing manipulation	17	3.14±0.53 <sup>2)</sup>	2.33±0.59 <sup>2)</sup>	2.16±0.72 <sup>2)</sup>	1.81±0.71 <sup>2)</sup>

Note: Compared with the left side continuous An-pressing manipulation group at the same time point, 1)  $P \leq 0.05$ ; compared with the right side continuous An-pressing manipulation group at the same time point, 2)  $P \leq 0.05$



**Figure 1. Thermal effects of the two An-pressing manipulation methods**

Note: LSCAP=Left side continuous An-pressing; RSCAP=Right side continuous An-pressing; LSRAP=Left side rhythmic An-pressing; RSRAP=Right side rhythmic An-pressing; compared with the left side continuous An-pressing manipulation at the same time point, 1)  $P \leq 0.05$ ; compared with the right side continuous An-pressing manipulation at the same time point, 2)  $P \leq 0.05$

### 3.4 Comparison of the thermal effect duration between the rhythmic An-pressing manipulation and continuous An-pressing manipulation

There was no significant difference in the thermal effect duration among the four groups ( $P=0.690$ ), which suggested that there was no statistically significant difference in the effect of the two An-pressing manipulation methods on the thermal effect duration (Table 7 and Figure 2).

**Table 7. Comparing the thermal effect duration of the two An-pressing manipulation methods ( $\bar{x} \pm s, s$ )**

Group	n	Duration
Left side continuous	17	451±320
Right side continuous	17	458±256
Left side rhythmic	17	445±226
Right side rhythmic	17	469±193

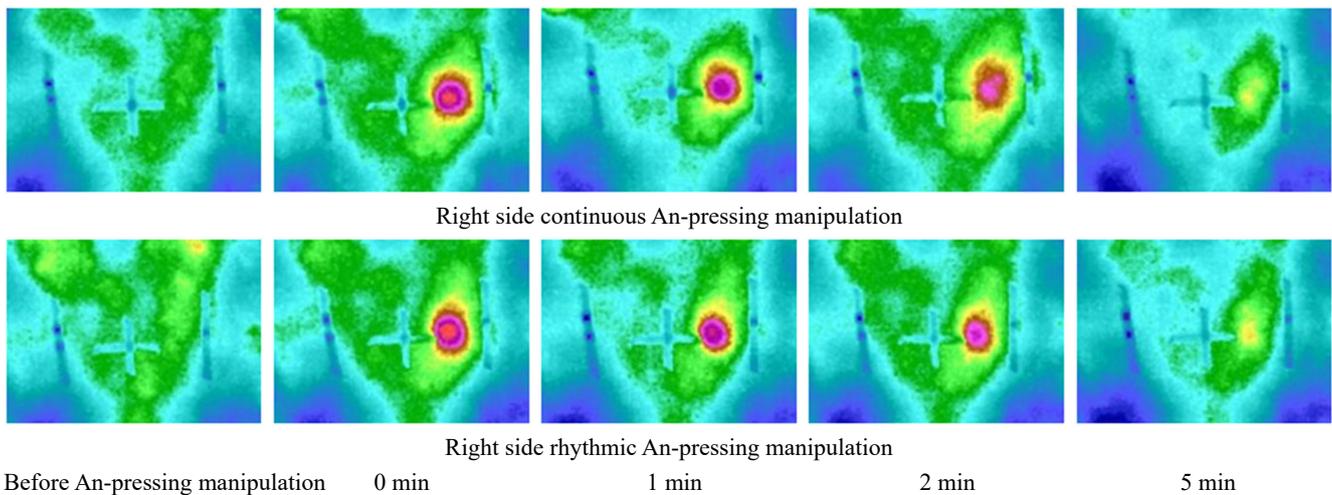


Figure 2. Local infrared thermal imaging system of the two An-pressing manipulation methods at different time points

#### 4 Discussion

Modern research suggests that the appropriate manipulation can produce a certain thermal effect locally or throughout the body. The thermal effect may be related to the transformation of the manipulation work, the heat transfer of the operator's hand, the compression-induced local blood flow changes, or a certain heat production mechanism in the subject due to the manipulation<sup>[10]</sup>. The studies found that tissue metabolism levels were increased by about 10% for every 1 °C increase in the tissue temperature<sup>[11]</sup>, and the increase in temperature was related to the release of bioactive substances<sup>[12]</sup>. The thermal effect of the manipulation is related to the manipulation method. The factors affecting the thermal effect of An-pressing manipulation are the pressing force, time and method and local temperature of the manipulation site.

Forcefulness is one of the basic requirements of the tuina manipulation. In clinical practice, the stimulation degree is generally selected by personal experience, which is based on a feeling of soreness, numbness and distending pain in the patients with the pressure<sup>[13]</sup>. For a patient with a big figure, strong muscles, and better tolerance to pain, the pressing force can be increased appropriately, and the pressing force should be appropriately reduced<sup>[14]</sup>. Three pressing force levels of light (1.5 kg), moderate (2.0 kg) and heavy (2.5 kg) were set in this test. As shown in Table 3 and Table 4, the results of this test showed that the influence of the pressing force on the thermal effect of An-pressing manipulation was statistically significant ( $P=0.030$ ). The effect values of the three levels of An-pressing manipulation (from heavy to light) were  $K3>K2>K1$ , which suggested the best pressing force to produce the thermal effect by An-pressing manipulation was 2.5 kg. It showed that the thermal effect of An-pressing manipulation was positively correlated with the pressing force within a certain range, that was, the

greater the pressing force, the higher the temperature. However, the difference between  $K3$  and  $K2$  was smaller, which suggested that the peak value may be close, that was, the thermal effect won't increase infinitely with force increase. The mechanism may be that An-pressing manipulation works to enhance the blood circulation, or it may be that An-pressing manipulation stimulates different levels of tissues to produce heat.

Lastingness is another requirement of the tuina manipulation, and it refers to the manipulation time. In clinical practice, the choice of An-pressing manipulation time is generally based on the specific condition of a patient and the doctor's experience, generally 2-3 min per acupoint<sup>[15]</sup>. As shown in Table 3 and Table 4, the results of this test showed that the influence of manipulation time on the thermal effect of An-pressing manipulation was statistically significant ( $P=0.018$ ). The three An-pressing manipulation durations (from long to short) corresponded to the effect values of  $K3>K2>K1$ , which suggested that the optimal pressing time parameter of the An-pressing manipulation was 7.5 min, and the thermal effect of An-pressing manipulation was positively correlated with the pressing time. That was, the longer the pressing time, the higher the temperature. However, the difference between the effect values of  $K3$  and  $K2$  was small, suggesting that the peak value may be close, that was, the thermal effect won't increase indefinitely with the increase of the pressing time. The thermal effect was proportional to the pressing time within a certain range, which indicated that the influence of An-pressing manipulation on the thermal effect was additive during this phase in terms of heat transfer, heat production by manipulation work and impacts on local circulation. The relationship between pressing time and thermal effects also provided insights to us that the use of An-pressing manipulation could be extended to improve the efficacy, but it didn't mean the better the longer.

A proper frequency is also the basic requirement of

the tuina manipulation. Some researchers measured the finger An-pressing manipulation of the tuina experts and found that the frequency of finger An-pressing manipulation was 3.6-18 times/min<sup>[16]</sup>. As shown in Table 3 and Table 4, the results of this trial suggested that there was no statistically significant difference in the local thermal effect between different frequencies ( $P=0.314$ ). It was suggested that the frequency of An-pressing manipulation had no obvious influence on its local thermal effect. The main effect values corresponding to the three frequencies were similar, but the K2 value was the largest, that was, when the frequency was 10 times/min, the effect value was the largest. And An-pressing manipulation has the main point of 'pressing and maintaining'. If the frequency is too high, it will cause discomfort due to the strong impact. If the frequency is too low, it will easily cause fatigue in the operator. Therefore, it was considered that the appropriate frequency was 10 times/min.

Rhythmic and continuous An-pressing manipulations are commonly used. The results of this trial showed that the temperature difference of the rhythmic An-pressing manipulation was higher than that of the continuous An-pressing manipulation (left:  $P=0.031$ , right:  $P=0.045$ ), regardless of the left or right Xinshu (BL 15). It was suggested that the thermal effect of rhythmic An-pressing manipulation was significantly higher than that of continuous An-pressing manipulation; however, there was no statistically significant difference in the thermal effect duration between rhythmic and continuous An-pressing manipulations ( $P=0.690$ ); the time factor of temperature measurement, that was, the temperature difference in the same group at 0, 1, 2, and 5 min was statistically significant ( $P=0.001$  on the left and  $P=0.000$  on the right). From the mechanical point of view, the rhythmic An-pressing manipulation in the test was much more effective than the continuous An-pressing manipulation. However, the temperature difference was only about 15%. That was, An-pressing manipulation work was only a small part of the heat source that caused the local temperature rise after the An-pressing manipulation, and most of the heat should be generated by the pressed body itself. This showed that An-pressing manipulation had a lower weight in the thermal effect of An-pressing manipulation. This indicated that we should pay more attention to the mechanism of heat production in the pressed body when the thermal effect of An-pressing manipulation is explored in the future. However, there was no difference in the effect of An-pressing manipulation on the thermal effect duration. This may be the result of disappearance of the body's heat production when the pressing stimulation stopped and local natural heat dissipated.

In summary, this study focused on the local thermal effect of An-pressing manipulation. It was confirmed by

this test that the parameters significantly affecting the local thermal effect in An-pressing manipulation were pressing force and time; the pressing force of 2.5 kg, the pressing time of 7.5 min, and the pressing frequency of 10 times/min made up the best combination of thermal effect parameters for An-pressing manipulation; the local thermal effect of rhythmic An-pressing manipulation was significantly greater than that of continuous An-pressing manipulation. This trial explored the optimal thermal effect parameters of the An-pressing manipulation. Further research will be carried out to study the specific thermal effect mechanism of An-pressing manipulation and the clinical guiding role<sup>[17-20]</sup>.

#### Conflict of Interest

The authors declared that there was no potential conflict of interest in this article.

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#### Statement of Informed Consent

Informed consent was obtained from all individual participants in this study.

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