

## Observational Study

# Analysis of acupoint massage combined with touch on relieving anxiety and pain in patients with oral implant surgery

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## Abstract

### BACKGROUND

Oral implant surgery is an effective procedure for artificial implants in missing tooth areas under local anesthesia. Because patients under local anesthesia are conscious during this procedure, compared with general anesthesia-related operations, they are more likely to experience negative emotions, such as anxiety and tension. These emotional reactions result in shivering and chills in the limbs, leading to poor doctor-patient cooperation and even avoidance of treatment. In traditional Chinese medicine, it is believed that acupoint massage regulates blood and Qi, dredge menstruation, and relieve pain, which is beneficial for patients' emotional adjustment; however, there are few related clinical studies.

### AIM

To observe the changes in anxiety and pain in patients with oral implant after acupoint massage combined with touch therapy.

### METHODS

One hundred patients undergoing oral implantation in our hospital between May

2020 and May 2023 were randomly divided into control and study groups, according to a random number table, with 50 patients in each group. The control group received routine intervention, and the study group received acupoint massage combined with touch on the basis of the control group. Anxiety [assessed using the Modified Dental Anxiety Scale (MDAS)], pain severity, blood pressure, heart rate, and satisfaction were compared between the two groups.

## RESULTS

Before intervention, the difference in MDAS score between the two groups was not significant ( $P > 0.05$ ), while after the intervention, the MDAS scores decreased in both groups compared with those before the intervention ( $P < 0.05$ ); the MDAS score of the study group was lower than that of the control group, with a statistically significant difference ( $P < 0.05$ ). The degree of pain in the intervention group was significantly lower than that in the control group ( $P < 0.05$ ). Before the intervention, there were no significant differences in systolic and diastolic blood pressures or heart rate between the two groups ( $P > 0.05$ ). The systolic and diastolic blood pressures and heart rate in the intervention group, during and after the intervention, were significantly lower than those in the control group ( $P < 0.05$ ). The total degree of satisfaction in the study group was significantly higher than that in the control group ( $P < 0.05$ ).

## CONCLUSION

Acupoint massage combined with touch better relieves anxiety and pain in patients undergoing dental implant surgery, improving the perioperative comfort of these patients and ensuring safety and a smooth operation.

**Key Words:** Oral implant; Acupoint massage; Touch; Anxiety; Degree of pain

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**Core Tip:** Traditional Chinese medicine believes that acupoint massage can regulate blood and Qi, dredge menstruation, and relieve pain, all of which are beneficial for patients' emotional adjustment. However, patients undergoing oral implant surgery are in a state of local anesthesia and consciousness, and can feel tension and pain, which may lead to the interruption of treatment. Therefore, acupoint massage combined with touch may improve treatment efficacy.

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## INTRODUCTION

Oral implants are a new technology developed jointly by bionics and tissue engineering, which integrates materials science, oral surgery, medical cosmetology, prosthodontics, and other multidisciplinary technologies, and have gradually become the primary treatment for oral diseases, such as missing anterior teeth and severe alveolar bone absorption[1-4]. Compared with traditional restorative approaches, oral implant technology has received favorable reviews from clinical doctors and patients in terms of aesthetics and oral function restoration[5-7]. Oral implants are effective in edentulous areas under local anesthesia. However, it should be noted that patients under local anesthesia are conscious. Compared to general anesthesia-related surgery, patients are more likely to experience negative emotions, such as anxiety and progression. These emotional reactions often lead to limb tremors and chills. Additionally, they are relatively sensitive to the operating environment and equipment, and many patients experience aggravated pain. To a certain extent, these phenomena affect doctor-patient cooperation and even prevent treatment, which is not conducive to smooth operation[8-12]. To relieve adverse psychological emotions and pain levels in patients undergoing oral implant therapy, in traditional Chinese medicine, it is believed that acupoint massage is beneficial to the emotional management of patients by regulating blood and Qi, dredging channels, and relieving pain[13,14]. Studies have shown that[15] acupoint massage has certain antidepressant and anxiety effects in patients with diabetic retinopathy, and the operation is simple and easy to use; Another study[16] confirmed that touch therapy combined with acupoint massage has a significant effect in reducing the pain of patients during percutaneous laser disc decompression and improving the medical experience of patients. Therefore, it is presumed that acupoint massage combined with touch can relieve anxiety and pain of patients undergoing oral implant surgery. Therefore, in this study, acupoint massage combined with touch therapy was performed on patients with oral implants to observe changes in the degree of anxiety and pain, with the aim of helping patients benefit from it.

## MATERIALS AND METHODS

### General data

Study participants were selected from 100 patients with oral implants admitted to our hospital between May 2020 and May 2023. The participants were divided into two groups, according to the random number table: 50 cases in the control group, including 15 males and 35 females (age was between 22–50 years, with an average of  $35.25 \pm 5.08$  years). There were 50 cases in the study group, including 18 males and 32 females (age was between 20–58 years, with an average of  $36.15 \pm 5.15$  years). There was no significant difference in age or sex between the two groups ( $P > 0.05$ ).

### Inclusion and exclusion criteria

**Inclusion criteria:** (1) All participants who received oral implant-related treatment for the first time; and (2) all the participants signed the consent form voluntarily.

**Exclusion criteria:** (1) Patients with abnormal coagulation function or those who took anticoagulant drugs recently; (2) patients with periodontal tissue lesions; (3) systemic diseases, such as liver and kidney dysfunction and osteoporosis; (4) medication history, including anti-inflammatory drugs, glucocorticoids, and immunomodulatory agents within one month before enrollment; (5) complications of infectious diseases and ineffective treatment; and (6) combined cachexia.

### Method

**Control group:** The patients received conventional intervention: They were informed of the operating procedures, possible problems in the treatment, and corresponding solutions, and specific explanations were given for the questions raised by the patients. The patients communicated with each other during the operation interval, and anxiety and progressive emotions were relieved by verbal reassurance.

**Study group:** Acupoint massage combined with touch was performed in the study group on the basis of the control group, preparation work: Environment: The indoor temperature was controlled at 24–26 °C, and the humidity was controlled at about 70% (heating or air conditioning is required in winter and summer); Light songs or soft music can be played in the room to relax the patients and make them in a relaxed and quiet state. Before operation, the operator should wash his hands with warm water to ensure that the palm temperature is appropriate. Patients were placed in a comfortably in the supine position, as far as possible. One arm of the patient was held alternately and gently with both hands from top to bottom, and the upper arm to the wrist was massaged. During this process, the middle finger and thumb of one hand were placed at the Neiguan and Waiguan points, and the Hegu and Shenmen points were gently pressed by rotating the two fingers for approximately 3 min. We can also press the feet, massage the Sanyinjiao point on the ankle with emphasis, and adopt the manipulation of twisting, rotating, tamping and moving, 20 times per method. The opposite hand was massaged using the same technique for approximately 20 min. The patient's reaction, expression and pulse changes was observed during the massage, and a pressing force was adjusted if the patient experienced it, or hold patient's hand in time or tap the patient's left front upper limb shoulder, or press the patient's forehead outward from the center of the eyebrow, and ask patient to breathe deeply at the same time. During this process, the massage and touch areas should be far from the operation area so as not to affect the procedure of the operator.

### Outcome indicators

**Anxiety:** The Modified Dental Anxiety Scale (MDAS)[17] was used to evaluate and compare the anxiety of the patients in the two groups before and after the intervention. The MDAS contains four items; each item is assigned according to a 1–5 grading system, with a score range is 4–20 points. The higher the score, the more serious the dental anxiety. When the total score is  $\geq 13$  points, the patient is assessed to also have dental anxiety.

**Pain severity:** Pain was assessed using the World Health Organization pain classification[18], and pain during dental implant surgery was compared between the two groups. The assessment was mainly based on the subjective feelings of the patients: No pain was rated as grade 0; mild pain: Slight pain sensation, but bearable; moderate pain: The pain sensation was slightly aggravated, but all of them were within the tolerance range of the patient; and severe pain: the pain was severe and beyond the patient's tolerance, and the patient started shouting.

**Blood pressure and heart rate:** Blood pressure and heart rate were measured and compared between the two groups using an upright sphygmomanometer before, during, and after the intervention. Radial arterial pulse was also recorded.

**Satisfaction:** A self-made scale was used to assess satisfaction of the patients (Cronbach's  $\alpha$  coefficient was 0.89, and re-test validity was 0.88). The assessment content of the scale mainly included the development of clinical work, work suggestions, and work attitudes. The full score on both sides was 100 points, with a score of  $\geq 90$  points was very satisfactory, 70–89 points was generally satisfactory, and  $< 70$  points was unsatisfactory.

### Statistical analysis

Statistical analysis was performed using SPSS version 24.0. All measurement data were subjected to Shapiro-Wilk normality test, and the measurement data was represented by mean  $\pm$  SD in line with a normal distribution. An independent sample *t* test was used for intergroup comparisons, and analysis of variance was used for multi-time point comparisons. Count data were expressed as percentage using  $\chi^2$  test, and rank data were tested using rank-sum test, with the test level of  $\alpha = 0.05$ .

## RESULTS

### Comparison of anxiety (MDAS score)

Before the intervention, the difference in the MDAS anxiety scores between the two groups was not significant ( $P > 0.05$ ). After the intervention, the MDAS scores of the two groups were lower than those before the intervention ( $P < 0.05$ ). Moreover, the MDAS score of the intervention group was significantly lower than that of the control group ( $P < 0.05$ ) (Table 1).

### Comparison of the degree of pain

The degree of pain in the intervention group was significantly lower than that in the control group ( $P < 0.05$ ) (Table 2).

### Comparison of blood pressure and heart rate

Before the intervention, there were no significant differences in systolic blood pressure, diastolic blood pressure, or heart rate between the two groups ( $P > 0.05$ ). Compared with the control group, the systolic blood pressure, diastolic blood pressure, and heart rate of patients in the study group, during and after the intervention, were significantly lower ( $P < 0.05$ ) (Table 3).

### Comparison of degree of satisfaction

The total degree of satisfaction in the intervention group was significantly higher than that in the control group ( $P < 0.05$ ) (Table 4).

## DISCUSSION

Anxiety, tension, and other emotions of patients undergoing oral implantations are triggered by many factors. For example, many patients undergoing oral implantations face unfamiliar medical specialties and treatment experiences due to lack of adequate cognition of dental treatment and understanding of related medical interventions. This triggers a series of negative emotions, such as tension and anxiety, leading to increased secretion of endogenous epinephrine and sympathetic nerve excitability. The final manifestations in these patients include increased blood pressure, heart rate, sweating, chest congestion, and palpitations. The patients were skeptical about the treatment or even evaded it, which affected the smooth development of oral treatment and oral health. Deteriorating oral health could adversely cause anxiety in patients, thereby forming a vicious circle[19-21]. Therefore, it is particularly important to implement effective measures to alleviate anxiety in patients undergoing oral implant surgery.

Touch is a non-drug intervention method. Regular, scientific, and orderly mild touch is performed on a patient's body with both hands. Combined with energy technology, touch is an auxiliary method for adjusting and balancing a patient's energy field, thereby affecting patient's physical, psychological, and emotional aspects through intentional guidance[22-24]. In traditional Chinese medicine, it is believed that the body and mind are integrated, internal organs correspond to five aspirations and five emotions of the body, and the running channels of Qi and blood are fundamentally meridians and collaterals. Acupoint massage, as an external therapy in traditional Chinese medicine, can achieve the purpose of harmonize Qi, blood, and the body and mind by stimulating specific acupoints to follow the meridians. Modern pharmacology indicates that acupoint massage can increase nervous system excitability, accelerate metabolism, and improve the immune system[25,26]. The results of this study showed that the degree of pain was lower in the experimental group than that in the control group. The systolic blood pressure, diastolic blood pressure, and heart rate of patients in the study group were lower during and after the intervention, and the overall satisfaction was high, suggesting that acupoint massage combined with touch was beneficial in relieving the degree of pain, improving anxiety, and improving satisfaction. The reasons for this findings may be as follows: (1) Touch can increase the production of natural morphine-like substances, such as dynorphin and enkephalin in the brain, which are transported to the whole body through the body conduction system, to help the body relieve pain and promote emotional excitement[27,28]; (2) touch can reduce the expression of norepinephrine and cortisol, which in turn, improves the stress levels of the body and relieves tension and anxiety[29,30]; and (3) Shenmen and Neiguan points are acupoints in the heart and pericardium meridians, which have the effects of tranquilizing and relieving anxiety. The large intestine meridian runs from the upper arm to the head, and the Hegu point is the source point of the large intestine meridian, and is of great significance in stimulating the healthy Qi of the body for resist stasis[31]. Touch and acupoint massages exhibit strong operability, good randomness, and repeatability. Additionally, acupoint massage uses hand-to-point instead of a needle, which can integrate the respective advantages of the two methods to achieve the effects of moving Qi and activating blood, dredging meridians and collaterals, relieving local pain in patients, and tranquilizing the mind[32,33]. The frontal lobe is the emotion generating center of the human brain, the left frontal lobe is mainly responsible for regulating and generating positive emotions, while the right frontal lobe is responsible for regulating and generating negative emotions. Changes in frontal lobe function are important factors for anxiety. Fan *et al*[34]'s study found that transcutaneous electrical acupoint stimulation of Neiguan can effectively relieve anxiety, with the most obvious changes in the left and right frontal lobes, suggesting that transcutaneous electrical acupoint stimulation of Neiguan can alleviate anxiety through promoting the brain functional activities of the frontal lobe, but it is different from the acupoint massage stimulation in this study. Whether the mechanism of improving anxiety and depression is consistent still needs further study. He *et al*[35] compared the anxiety and pain levels of 36 cases of oral implant patients receiving conventional nursing care, and 36 cases of oral implant patients receiving acupoint massage in combination with touch. Their results showed that the anxiety and pain

**Table 1 Comparison of anxiety (Modified Dental Anxiety Scale score) between the two groups (mean ± SD, point)**

Group	Pre-intervention	Post-intervention	t value	P value
Control group (n = 50)	17.12 ± 1.05	11.85 ± 0.58	31.066	< 0.001
Study group (n = 50)	17.15 ± 1.07	8.25 ± 0.45	54.216	< 0.001
t value	0.142	34.676		
P value	0.888	< 0.001		

MDAS: Modified Dental Anxiety Scale.

**Table 2 Comparison of pain severity between the two groups, n (%)**

Group	Painless	Mild pain	Moderate pain	Severe pain
Control group (n = 50)	3 (6.00)	25 (50.00)	20 (40.00)	2 (4.00)
Study group (n = 50)	42 (84.00)	8 (16.00)	0	0
Z value	7.890			
P value	< 0.001			

**Table 3 Comparison of blood pressure and heart rate between the two groups (mean ± SD)**

Group	Pre-intervention	Under intervention	Post-intervention	F value	P value
Systolic blood pressure (mmHg)					
Control group (n = 50)	130.12 ± 10.20	138.25 ± 15.52	128.25 ± 10.75	9.208	< 0.001
Study group (n = 50)	130.25 ± 10.22	120.12 ± 8.25	115.25 ± 6.85	40.027	< 0.001
t value	0.064	7.294	7.211		
P value	0.949	< 0.001	< 0.001		
Diastolic blood pressure (mmHg)					
Control group (n = 50)	85.25 ± 5.15	90.25 ± 8.15	88.25 ± 8.25	5.900	< 0.001
Study group (n = 50)	85.23 ± 5.12	75.12 ± 5.50	72.12 ± 4.50	92.253	< 0.001
t value	0.020	10.881	12.137		
P value	0.985	< 0.001	< 0.001		
Heart rate (beats/min)					
Control group (n = 50)	115.25 ± 8.10	120.25 ± 5.25	95.25 ± 10.12	134.211	< 0.001
Study group (n = 50)	115.20 ± 8.05	92.25 ± 5.85	82.25 ± 5.80	322.693	< 0.001
t value	0.031	25.189	7.881		
P value	0.975	< 0.001	< 0.001		

**Table 4 Comparison of satisfaction between the two groups, n (%)**

Group	Very satisfied	General satisfaction	Dissatisfied	Total satisfaction
Control group (n = 50)	12 (24.00)	32 (64.00)	6 (12.00)	44 (88.00)
Study group (n = 50)	48 (96.00)	2 (4.00)	0	50 (100.00)
χ <sup>2</sup> value				4.433
P value				0.035

levels of patients with oral implants receiving acupoint massage in combination with touch were significantly lower than those of patients receiving conventional nursing care. Additionally, their findings suggest that a combination of acupoint massage and touch could alleviate pain and anxiety of patients, which were consistent with the conclusions of this study. Liang *et al*[36] compared the efficacy of 50 cases of adult dental anxiety patients receiving conventional nursing care, and 50 cases of adult dental anxiety patients receiving psychological intervention combined with traditional Chinese medicine acupoint massage. Their results showed that the total effective rate of the treatment group (64.00%) was higher than that of the control group (22.00%), suggesting that psychological intervention combined with acupoint massage can alleviate the anxiety and depression of dental anxiety patients, which is also consistent with the conclusion of this study.

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## CONCLUSION

Acupoint massage combined with touch is conducive for alleviating anxiety and pain severity of patients undergoing oral implant surgery, thereby improving the perioperative comfort of these patients and ensuring a safe and smooth operation. However, it should still be noted that due to the small sample size and single center research, the credibility of the research conclusion needs to be verified by increasing the sample size and carrying out multi center research in the future.

## ARTICLE HIGHLIGHTS

### **Research background**

Oral implant surgery generally involves local anesthesia, and patients are in a conscious state. Under normal circumstances, patients are prone to negative emotions, such as nervousness, and may resist treatment and other uncooperative situations, which are not conducive for a smooth operation. In traditional Chinese medicine, it is believed that acupoint massage can regulate blood and Qi, dredge menstruation, and relieve pain, and its application in oral implant surgery may have certain effects in relieving pain.

### **Research motivation**

At present, there are few clinical studies on the application of acupoint massage combined with touch in patients undergoing oral implant surgery; therefore, this study applied acupoint massage combined with touch in patients undergoing oral implant surgery to observe its influence on anxiety and pain.

### **Research objectives**

This study aimed to observe the changes in anxiety and pain in patients with oral implants using acupoint massage combined with touch.

### **Research methods**

One hundred patients undergoing oral implantation were randomly divided into control and study groups, according to a random number table, with 50 patients in each group. Anxiety [assessed using the Modified Dental Anxiety Scale (MDAS)], pain severity, blood pressure, heart rate, and satisfaction were compared between the two groups.

### **Research results**

The MDAS score and degree of pain were lower in the study group than those in the control group. The systolic blood pressure, diastolic blood pressure, and heart rate of patients in the study group were lower during and after the intervention, and the overall satisfaction was high.

### **Research conclusions**

Acupoint massage combined with touch is better in relieving anxiety of patients undergoing dental implant surgery, thereby relieving their pain and improving perioperative comfort.

### **Research perspectives**

It should be noted that due to the small sample size and single center research, the credibility of the research conclusion needs to be verified by increasing the sample size and carrying out multi center research in the future.

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## FOOTNOTES

**Co-first authors:** Jin-Hong Qu and Qin Wang.

**Author contributions:** Qu JH and Wang Q contributed equally to this work as co-first authors; Qu JH, Shou CC, He X, Wang Q, and Fang YX designed the research study; Qu JH, Shou CC, He X, Wang Q, and Fang YX performed the research; Qu JH and Wang Q contributed new reagents and analytic tools; Qu JH and Wang Q analyzed the data and wrote the manuscript; and all authors have read and approve

the final manuscript.

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