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A Retrospective Analysis of Acupoint Catgut Embedding Therapy For Overweight/Obesity

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Abstract

[Objective] To retrospectively analyze the clinical efficacy and safety of acupoint catgut embedding therapy in treating overweight/obesity. [Methods] A total of 48 overweight/obese patients were treated with acupoint catgut embedding. Changes in body weight and body mass index (BMI) before and after treatment were observed, and intraoperative/postoperative adverse reactions were recorded. [Results] Both the effective rate and marked effectiveness of the acupoint catgut embedding therapy rate were favorable. [Conclusion] Acupoint catgut embedding therapy is safe and effective for treating overweight/obesity.

Keywords Acupoint Embedding Thread; overweight; obesity
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1 Background

Overweight/obesity represents a significant public health concern, with its global prevalence continuously increasing. According to reports, the overweight/obesity rate among Chinese adults has reached 50.7[1]. Over the past two decades, alongside shifts in dietary patterns and lifestyle habits, there has been a marked rise in the consumption of high-sugar, high-fat, and highly processed foods, while physical activity time has declined due to more sedentary behavior—factors contributing to the rapid increase in overweight and obesity cases.

Obesity is fundamentally a chronic disease influenced by multiple factors, including genetic predisposition and environmental conditions. Research indicates[2] that overweight and obesity are closely associated with increased risks of non-communicable diseases (NCDs), such as type 2 diabetes, non-alcoholic fatty liver disease, hypertension, myocardial infarction, stroke, dementia, osteoarthritis, obstructive sleep apnea, and certain types of cancer. These comorbidities significantly reduce quality of life and elevate the risk of premature mortality.

Current treatment approaches for overweight/obesity include pharmacotherapy, exercise, dietary interventions, and surgical procedures. However, these methods often face limitations such as low patient adherence and procedural invasiveness. Acupoint catgut embedding therapy (ACE)[3], known for its operational simplicity and sustained efficacy, has the potential to improve compliance. ACE integrates multiple therapeutic modalities—including acupoint-blocking effects, acupuncture-like stimulation, bloodletting, tissue repair responses, and localized therapeutic effects—into a single intervention.

In recent years, ACE has seen widespread application in weight management. This study retrospectively analyzed 48 overweight or obese patients who underwent ACE therapy at Longhua District Maternal and Child Health Hospital in Shenzhen between 2023 and 2024, aiming to evaluate its clinical efficacy and safety. Additionally, a comprehensive literature review on ACE for overweight/obesity was conducted using databases such as CNKI, VIP, and PubMed. The objective is to summarize existing findings and explore the potential mechanisms and limitations of ACE, thereby providing a more robust theoretical foundation for its clinical application in obesity treatment.

2 Materials and Methods

This retrospective study included 48 overweight or obese patients who underwent acupoint catgut embedding (ACE) therapy at Longhua District Maternal and Child Health Hospital in Shenzhen between January 2023 and December 2024. Inclusion criteria were: (1) body mass index (BMI) ≥ 24 kg/m^2 for overweight or ≥ 28 kg/m^2 for obesity, and (2) provision of informed consent and signature of the ACE therapy consent form. Patients were excluded if they had obesity secondary to other underlying diseases, were pregnant, suffered from severe primary comorbidities, presented with skin lesions or ulcers at treatment sites, had a history of foreign protein allergy, or had coagulation disorders.

The treatment protocol followed standard procedures. Acupoints were selected based on the national TCM curriculum and WHO nomenclature, including CV 12, ST 25, CV 4, CV 6, ST 28, ST 36, and ST 40. Polyglycolic acid (PGA) absorbable sutures (2 cm) were embedded into either the muscle layer (limbs, ST 36/ST 40) or adipose layer (abdomen, CV and ST points) depending on body region. Treatment was performed biweekly over two months (2 sessions total). The patient lay supine while acupoints were disinfected with iodophor. After strict aseptic preparation, a PGA suture was threaded through a 5 mL syringe needle and inserted into the acupoint to achieve "de qi." The needle was then withdrawn, leaving the suture embedded. Postoperative care included compression with sterile cotton, application of dressings, and avoidance of bathing, pressure, or spicy foods for a specified time. Patients were instructed to report any adverse reactions such as pain, nodules, redness, or fever.

Observation metrics included body weight, BMI, and waist circumference measured before and after treatment. Fasting weight in undergarments was recorded, and BMI calculated to two decimal places. Efficacy was categorized as: *markedly effective* (weight loss ≥ 5 kg or BMI reduction ≥ 2 kg/m^2), *effective* (weight loss 3–5 kg or BMI reduction 1–2 kg/m^2), or *ineffective* (weight loss < 3 kg or BMI reduction < 1 kg/m^2, or no change). The total effective rate was calculated using the following formula:

$$\text{Total Effective Rate (\%)} = \left(\frac{\text{Markedly Effective Cases + Effective Cases}}{\text{Total Cases}}\right) \times 100\%$$

Adverse events such as syncope, pain, bruising, fever, and suture rejection were monitored, and the incidence of adverse events was calculated as:

$$\text{Adverse Event Incidence (\%)} = \left(\frac{\text{Number of Adverse Events}}{\text{Total Procedures}}\right) \times 100\%$$

Data analysis was performed using SPSS version 26.0. Measurement data were tested for normality; those conforming to a normal distribution were expressed as mean $\pm$ standard deviation. Pre- and post-treatment comparisons were made using paired-sample t-tests. A p-value < 0.05 was considered statistically significant.

3 Results

3.1 General Characteristics

Among the 48 overweight or obese patients who completed ACE therapy, the majority were female (43 cases, 89.58%), reflecting the hospital' s focus on maternal and child health. Only 5 participants (10.42%) were male. Most patients (87.5%) were between 20 and 40 years of age. Based on BMI diagnostic criteria, 25 patients (52.08%) were classified as obese (BMI $\geq$ 28 kg/m^2), and 23 patients (47.92%) as overweight (BMI $\geq$ 24 kg/m^2).

Table 1 Baseline Patient Characteristics and Clinical Information

Items	N%
Gender	
Male	5(10.42%)
Female	43(89.58%)
Age/years	
<20	0(0%)
20-30	27(56.25%)
30-40	15(31.25%)
40-50	6(12.50%)
>50	0(0%)
BMI (kg/m^2)	
24-27.9	23(47.92%)
>28	25(52.08%)

3.2 Comparison of Weight and BMI Before and After Treatment

After treatment, patients showed statistically significant reductions in both body weight and BMI compared to their pre-treatment values (p < 0.05), as detailed in Table 2.

Table 2 Comparison of Weight, BMI (*n=48*)

	Weight（kg）	BMI（kg/m2）
Pre-ACE	67.7750±7.7921	27.6552±2.0506
Post-ACE	64.2579±7.0869*	26.2535±2.2325**

*Sig: *Compared to pre-treatment, P < 0.05; **Compared to pre-treatment, *P < 0.01.*

3.3 Treatment Efficacy

The total effective rate of catgut embedding therapy was 64.6%, with outcomes categorized as markedly effective, effective, or ineffective. Overall, the therapeutic response was favorable, as summarized in Table 3.

Table 3 Treatment Efficacy

Efficacy (Number of Cases)			Total Effective Rate（%）
Marked Efficacy	Effective	Ineffective	
16	15	17	64.6%

3.4 Adverse Events

Across 96 treatment sessions (two sessions per patient), intraoperative pain and bleeding occurred in 100% of procedures, while no cases of needling syncope were reported (0%). Postoperatively, prolonged pain lasting up to 7 days was observed in 70.8% of cases, but no instances exceeded 7 days (0%). Nodule formation was not observed (0%), and bruising occurred in 2.08% of cases, with half of those lasting more than 7 days. No severe adverse reactions—including suture rejection, fever, infection or abscess, or fat liquefaction—were documented in this retrospective analysis.

Table 4 Adverse Event Incidence (Cases (%))

	Pain	Bleeding	Needling Syncope	Nodule Formation	Bruising	Redness/ Swelling	Fat Liquefaction	Infection	Fever
During ACE	96 （100）	96 （100）	0	—	—	—	—	—	—
Within 7 Days Post-ACE	68 （70.8）	2 （20.8）	—	—	2 （2.08）	3 （31.3）	—	—	—
Beyond 7 Days	0	0	—	—	1 （1.04）	—	—	—	—

4 Discussion

Modern medicine considers overweight and obesity to be chronic metabolic disorders characterized by excessive adipose tissue accumulation and abnormal body weight, resulting from a complex interplay of genetic, environmental, and other contributing factors[4]. An energy surplus induces dynamic changes in adipose tissue volume and cellular architecture, leading to adipose tissue remodeling. The imbalance between energy intake and expenditure is widely recognized as the primary driver of overweight and obesity[5]. Scientifically validated strategies for weight management emphasize dietary regulation and increased physical activity. However, many patients struggle to sustain long-term adherence to exercise regimens, underscoring the need for alternative therapeutic approaches.

Acupoint Catgut Embedding (ACE) therapy involves the implantation of absorbable surgical sutures into specific acupoints, where sustained stimulation through needling, thread retention, and micro-bloodletting synergistically dredges meridians, regulates qi-blood balance, and eliminates dampness and turbidity. Functioning as a long-acting form of acupuncture[6], it shares mechanistic similarities with traditional acupuncture by promoting qi circulation and meridian regulation. The insertion of sutures induces localized inflammatory responses, activating immune phagocytic functions that aid in clearing necrotic tissue and triggering apoptosis in senescent cells. Studies[7] have suggested that weight loss following embedding is associated with a reduction in peripheral adipose tissue volume. ACE therapy thus exhibits distinct therapeutic mechanisms and has demonstrated significant clinical efficacy in managing overweight and obesity. By modulating multiple physiological systems, it offers a non-pharmacological and non-surgical option for effective weight control.

4.1 Comparison of Different Suture Materials

Clinically used embedding materials include catgut and collagen sutures, most of which are absorbable surgical sutures (excluding traditional catgut). The flexibility and biocompatibility of these materials are critical for therapeutic outcomes. As ACE therapy relies on sustained acupoint stimulation, preference is given to sutures with optimal absorption duration and safety profiles. Consequently, traditional catgut—

owing to its instability—has been largely replaced by modern absorbable sutures. The composition and characteristics of various suture types are summarized in Table 5.

Commonly used suture lengths include 1 cm, 1.5 cm, and 2 cm. For acupoints located in muscle-rich or adipose-rich areas (e.g., limbs, abdomen), longer sutures (1.5–2 cm) are preferred to enhance stimulation intensity. In contrast, for superficial or pain-sensitive regions, shorter sutures (1 cm) are selected to minimize the risk of suture protrusion and patient discomfort.

Table 5 Comparison of Different Suture Materials

Suture Material	Composition	Absorption Time	Advantages and Disadvantages
Catgut	Submucosal connective tissue from sheep or cattle	4-5d	Low cost, unstable performance, frequent adverse reactions
Collagen	Collagen derived from the bones of higher animals	4-5d	Non-irritating, minimal tissue reaction, easy storage
PGLA	PGA (Polyglycolic Acid) or PLA (Polylactic Acid)	2-4w	Good flexibility, biocompatibility, and biodegradability
PGA	Corn or sugar beet	2-4w	Good flexibility, biocompatibility, and biodegradability
PDS	Polymer of polydioxanone with ≥99% purity	2-4w	Non-allergenic
PLA	Lactic acid	2-4w	Non-toxic material, non-irritating, excellent biocompatibility

4.2 Embedding Depth

Current literature indicates that embedding depths for catgut sutures primarily target the subcutaneous layer, subcutaneous adipose tissue, or muscle layer. Sutures embedded in the adipose layer have demonstrated superior weight-loss efficacy, while those placed in the muscle layer are associated with a lower risk of suture protrusion. Due to anatomical variations in the vertical distance between the skin and underlying adipose or muscle layers, embedding depth should be adjusted based on specific body regions.

The muscle layer, being richer in blood vessels and nerves than the adipose layer, often induces more pronounced local soreness and pain during the embedding process. For patients with low pain tolerance, placement of sutures within the adipose layer is recommended to reduce discomfort and enhance treatment compliance.

4.3 Medical Evaluation of Obesity

In clinical practice, acupoint catgut embedding therapy for obesity often emphasizes treatment over obesity staging or stratified management. However, not all stages of obesity respond equally to this intervention. The severity and progression of obesity influence appropriate therapeutic strategies[8]. According to the guidelines of the American Association of Clinical Endocrinologists (AACE)[9], obesity is defined as a chronic disease characterized by excess adipose tissue, with an emphasis on grading and staging to guide treatment.

When applying embedding therapy, obesity-related comorbidities must be concurrently assessed and addressed. Evidence suggests that ACE therapy has demonstrated clinical efficacy in managing obesity accompanied by hyperlipidemia, hypertension, prediabetes, polycystic ovary syndrome (PCOS), and non-alcoholic fatty liver disease (NAFLD)[10]. However, the severity of comorbidities must be carefully evaluated. In some cases, a combination of ACE therapy and pharmacological treatment may be necessary. For patients with severe complications—such as hypothyroidism, Cushing' s syndrome, acanthosis nigricans, or hypothalamic disorders—standalone embedding therapy is contraindicated.

Patients may present with obesity in the absence of suboptimal health manifestations—such as thermoregulatory dysfunction, constipation, insomnia, or anxiety/depression—and without abnormal laboratory findings. In such cases, where organ function remains intact, significant weight loss can often be achieved through a combination of embedding therapy, dietary regulation, and moderate exercise. These individuals primarily suffer from energy imbalance, making them more responsive to non-pharmacological interventions.

In contrast, patients with underlying metabolic disorders (e.g., diabetes, NAFLD) or endocrine abnormalities (e.g., polycystic ovary syndrome, cortisol excess) require comprehensive, multimodal interventions. For these patients, embedding therapy alone typically yields limited results. Effective management must integrate dietary adjustments, control of comorbidities, and systemic health optimization.

Tailored treatment protocols should be developed based on individual patient characteristics, including adiposity distribution, comorbidity profiles, and metabolic resilience, to ensure sustainable and clinically meaningful outcomes.

4.4 Efficacy of Catgut Embedding for Weight Loss

In this retrospective analysis, acupoint catgut embedding therapy demonstrated favorable outcomes in the management of overweight and obesity, with notable effective and markedly effective rates. Significant improvements were observed in body weight, BMI, waist circumference, and overall clinical efficacy, laying a foundation for achieving target weight reduction. Clinically, individualized treatment protocols should be developed to enhance patient adherence and optimize therapeutic outcomes.

It is noteworthy that some patients in this cohort received combination therapy involving both embedding and pharmacological interventions; however, these cases were excluded from the present analysis. Future studies should employ controlled trial designs to better assess the efficacy of combined therapeutic approaches.

Study Limitations:(1)Limited sample size ($n = 48$) and short follow-up duration (2 months).(2) No patients received more than three treatment sessions, preventing assessment of long-term efficacy.(3)The durability of therapeutic effects—particularly the issue of “weight rebound,” a major patient concern—remains undetermined.(4)Potential selection bias exists, as only patients who completed follow-up were included. Expanding the study cohort in future research will improve data reliability and generalizability.

4.5 Safety of ACE for Weight Loss

In terms of treatment safety, no severe intraoperative adverse reactions—such as fat liquefaction, infection, or needling syncope—were observed in this cohort (0% incidence). The most prolonged adverse event was bruising, reported in 2.08% of cases, with symptoms lasting beyond one week. To optimize safety, we recommend shortening the treatment interval from four weeks to two weeks, ensuring complete resolution of prior adverse events before administering the next session. No severe complications (e.g., fever, infected abscesses, or fat liquefaction) were reported, supporting the overall safety profile of ACE therapy.

However, patient willingness to continue treatment is largely influenced by intraoperative and postoperative experiences. Future research should focus on minimizing procedural pain and reducing postoperative adverse effects through technical refinement.

5 Summary

In conclusion, this retrospective analysis demonstrates that acupoint catgut embedding therapy effectively promotes weight reduction in overweight and obese individuals while addressing limitations associated with conventional pharmacological and surgical treatments. Importantly, the therapy’s favorable safety profile and tolerability support sustained patient adherence, making it a viable long-term weight management strategy. ACE therapy is recommended as a safe and effective approach to obesity treatment and is worthy of broader clinical application.

Conflict of Interest: The authors declare that they have no conflict of interest.
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Authors' Contributions Ying CHEN drafted the manuscript. Ying CHEN, Jingwen WANG, Dan ZHU, and Xiaoying YI collected the clinical data. Ying CHEN performed the data analysis.
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