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Research Progress on Acupoint Catgut Embedding Therapy for Obesity

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1. Introduction

Obesity has become a global public health challenge, closely associated with chronic diseases such as type 2 diabetes and cardiovascular disorders. Acupoint catgut embedding, an innovative extension of traditional Chinese medicine (TCM) external therapy, has gained increasing attention as a clinical intervention for obesity. By implanting absorbable sutures into specific acupoints, it provides continuous stimulation to regulate meridian qi and blood flow, offering advantages such as simplified operation and sustained therapeutic effects. Despite its growing application, challenges remain in clinical standardization, protocol consistency, and efficacy evaluation. This review systematically examines the mechanisms, influencing factors, and clinical applications of acupoint catgut embedding in obesity management, aiming to support its evidence-based development and standardized practice.

2. Methods

This review is based on a systematic analysis of published research articles, clinical trials, and experimental studies related to acupoint catgut embedding for obesity. Literature was sourced from academic databases including PubMed, CNKI, and relevant TCM journals. Studies focusing on mechanisms, suture materials, acupoint protocols, and clinical outcomes were included. Data were synthesized to summarize current understanding, identify research gaps, and propose future directions.

3. Results

3.1. Mechanisms of Action

Neuroendocrine Regulation: Embedding stimulates local nerve endings, modulating appetite and energy expenditure via the vagus nerve–hypothalamus–pituitary axis. It reduces ghrelin and increases leptin levels, suppressing appetite and enhancing satiety.

Gut Microbiota Remodeling: Treatment improves gut microbial balance, increasing beneficial bacteria (e.g., Bifidobacterium) and reducing the Firmicutes/Bacteroidetes ratio, which correlates with BMI reduction.

Energy Metabolism Modulation: Activation of the AMPK pathway promotes mitochondrial biogenesis, fatty acid oxidation, and white-to-brown adipose tissue conversion, enhancing overall energy expenditure.

3.2. Influencing Factors

Suture Materials: Natural catgut degrades rapidly (7–14 days), while synthetic materials like PGA (20–30 days) and PDO (>60 days) provide longer stimulation. Diameter and surface coatings (e.g., herbal extracts) also affect efficacy and safety.

Acupoint Combinations: Core acupoints include Zhongwan (CV12), Tianshu (ST25), Zusanli (ST36), and Fenglong (ST40). Protocols are often modified based on TCM syndrome differentiation (e.g., adding Quchi for heat excess or Yinlingquan for dampness).

Individual Differences: Age, constitution, and comorbidities influence outcomes. Adolescents respond better but require careful material selection; patients with metabolic comorbidities may need adjusted protocols.

3.3. Clinical Applications

Simple Obesity: Embedding reduces BMI by 2–5 kg/m² and waist circumference by 4–8 cm, with treatments typically administered every 2–4 weeks over 3–6 months.

Obesity with Metabolic Syndrome: Combined with lifestyle interventions, embedding improves lipid profiles, insulin resistance, and gut microbiota composition.

Childhood/Adolescent Obesity: Safer protocols using absorbable sutures (e.g., PGA) and reduced embedding depth (0.5–1 cm) show efficacy without impeding growth.

4. Discussion

Acupoint catgut embedding offers a multi-target, sustained therapeutic approach for obesity, integrating neuroendocrine, microbiotal, and metabolic mechanisms. Its advantages include prolonged stimulation, reduced treatment frequency, and personalized acupoint selection. However, limitations persist:

Lack of standardized operational protocols leads to variability in depth, angle, and suture selection.

Efficacy evaluation remains fragmented, often overemphasizing BMI without comprehensive metabolic or patient-reported outcomes.

Safety thresholds for special populations (e.g., children) are not well-defined.

5. Future Research Should Focus On

1) Mechanistic studies using multi-omics to clarify gut–brain axis interactions and suture degradation effects.
2) Development of evidence-based clinical pathways specifying materials, acupoints, and operation standards.
3) High-quality, multicenter RCTs with long-term follow-up to validate efficacy and safety.
4) International collaboration to establish globally recognized guidelines.

6. Conclusion

Acupoint catgut embedding represents a promising TCM-derived intervention for obesity, with demonstrated effects on appetite regulation, gut microbiota, and energy metabolism. While current evidence supports its clinical utility, further efforts are needed to deepen mechanistic understanding, standardize treatment protocols, and expand high-quality evidence. By addressing these challenges, this therapy can evolve into a more widely accepted, standardized, and effective option in integrative obesity management.