

# Research Overview of Warm Acupuncture in the Treatment of Functional Dyspepsia

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**Abstract:** *Functional dyspepsia (FD) is a common and impactful disorder of the digestive system. Although it lacks organic lesions, its recurrent symptoms impose a significant burden on patients' quality of life and daily functioning. Warm acupuncture, as a traditional Chinese medicine therapy, has been confirmed by multiple clinical studies to be highly effective in treating FD. Its mechanisms of action are associated with regulating brain-gut axis dysfunction, improving gastrointestinal motility, and alleviating visceral hypersensitivity. This paper systematically reviews recent clinical research on warm acupuncture for FD, explores its potential mechanisms, and aims to provide a scientific basis and reference for further research and clinical application of this therapy.*

**Keywords:** Warm acupuncture, Functional dyspepsia, Research overview, Mechanisms of action.

## 1. Introduction

Functional dyspepsia (FD) is a common functional gastrointestinal disorder worldwide, characterized by symptoms such as epigastric pain, burning sensations, postprandial fullness, and early satiety. Although no definite organic lesions are present, FD symptoms are chronic and recurrent, significantly affecting patients' quality of life and work capacity [1,2]. Global epidemiological data indicate that the prevalence of FD ranges from 10% to 30% [3], with multicenter studies in Asia reporting prevalence rates as high as 43% [4].

The etiology of FD is complex and not yet fully understood. It is believed to involve multiple factors, including brain-gut axis dysfunction, abnormal gastrointestinal motility, visceral hypersensitivity, and psychological conditions [5]. Current clinical treatments for FD primarily rely on pharmacotherapy, such as prokinetic agents, acid suppressants, and antibiotics. While these treatments provide some benefits, they are often associated with side effects, dependency issues, and high recurrence rates [6].

Traditional Chinese medicine (TCM) has demonstrated notable efficacy in treating functional gastrointestinal disorders, with warm acupuncture emerging as a promising treatment for FD due to its unique therapeutic effects and minimal side effects. By integrating acupuncture with moxibustion, warm acupuncture exerts dual effects, effectively alleviating FD symptoms caused by spleen-stomach deficiency and liver Qi stagnation while regulating gastrointestinal function. This paper reviews recent research on the application of warm acupuncture in FD treatment, explores its potential mechanisms of action, and aims to provide a scientific basis for its further clinical application and research.

## 2. Traditional Chinese Medicine (TCM) Perspective on Functional Dyspepsia (FD)

### 2.1 Etiology and Pathogenesis

In TCM, FD is categorized under "Pi Man" (distension and fullness) or "Wei Tong" (gastric pain). The primary causes include irregular diet, emotional disturbances, external pathogenic invasion, or spleen and stomach deficiency. While the stomach is the primary affected organ, dysfunctions of the liver and spleen are also critical contributing factors [7].

According to TCM theory, the liver governs the smooth flow of Qi, regulating the Qi dynamics and maintaining the ascending and descending functions of the spleen and stomach. Emotional distress, such as depression or anger, may impair liver Qi circulation, leading to Qi stagnation and disrupted spleen and stomach function. This results in impaired transportation by the spleen and poor downward movement of the stomach, ultimately causing gastric distension and discomfort. When the spleen and stomach are weakened, Qi and blood circulation are compromised, preventing the spleen from lifting pure essence and the stomach from descending turbid substances, thereby exacerbating fullness and bloating symptoms.

Classical texts provide valuable insights into this pathogenesis. Clinical Guide to Medical Cases states, "The spleen thrives when it ascends, and the stomach harmonizes when it descends." Plain Questions: Yin-Yang and the Correspondence with Phenomena notes, "When clear Qi is below, it leads to diarrhea; when turbid Qi rises, it results in bloating." These principles highlight the central pathogenesis of FD as spleen and stomach deficiency combined with liver-spleen disharmony.

### 2.2 Treatment Principles and Methods

The key to treating FD in TCM lies in regulating the spleen and stomach while soothing the liver and promoting Qi circulation to restore their normal ascending and descending functions. The spleen governs the ascension of clear Qi, transporting refined nutrients to the heart and lungs for nourishment, whereas the stomach governs the descent of turbid substances, facilitating the downward movement of food residues for excretion. When these functions work in harmony, Qi circulation remains unimpeded, and digestion operates smoothly.

Since the liver plays a crucial role in Qi circulation, emotional stress and psychological pressure can lead to liver Qi stagnation, further impairing spleen and stomach functions. Therefore, the treatment of FD should focus on strengthening the spleen and stomach while simultaneously soothing the liver and regulating Qi. By restoring the balance of ascending and descending Qi, digestive function is normalized, and symptoms such as distension and discomfort are alleviated.

### 3. Overview of Clinical Studies on Warm Acupuncture for FD

#### 3.1 Efficacy Verification of Warm Acupuncture

As a distinctive traditional Chinese medicine (TCM) therapy, Warm Acupuncture has been confirmed by multiple clinical studies to regulate spleen and stomach function and exhibit significant efficacy in treating FD. Lin Qiuyi's study [8] demonstrated that patients receiving Warm Acupuncture showed superior effectiveness, symptom relief, and TCM symptom score improvements compared to the control group, with no significant adverse reactions. Chen Jinyu [9] compared the therapeutic effects of Warm Acupuncture with Mosapride Citrate tablets and found that Warm Acupuncture not only significantly alleviated dyspeptic symptoms in FD patients with spleen-stomach deficiency and cold syndrome but also outperformed the control group in reducing TCM syndrome scores, improving quality of life, and alleviating anxiety. These findings indicate that Warm Acupuncture can effectively relieve major FD symptoms and enhance patients' overall health status.

#### 3.2 Acupoint Selection in Warm Acupuncture

Acupoint selection plays a crucial role in Warm Acupuncture treatment, directly influencing its efficacy. Different studies have adopted various acupoint selections, reflecting the diversity of clinical practice. Liu Yue lu [10] observed the clinical efficacy of Warm Acupuncture on the Back-Shu points for FD patients with spleen-stomach deficiency and cold syndrome, selecting bilateral Pi shu (BL20) and Wei shu (BL21). The results showed significant improvements in FD symptoms. Xu Bi lin et al. [11] conducted a study on FD patients with spleen-stomach Qi deficiency, selecting Zhong wan (CV12), Zu san li (ST36), and San yin jiao (SP6) as primary acupoints, employing an alternating moxibustion method to enhance efficacy. Xie Xiu jun et al. [12], through data mining analysis of moxibustion treatment for FD, found that acupoint selection in Warm Acupuncture varied across studies, but commonly used acupoints such as Zhong wan and Zu san li were frequently applied. This suggests that while specific acupoint choices may differ, the core acupoints have been consistently recognized across studies, providing a basis for the standardization of acupoint selection in future Warm Acupuncture treatments.

#### 3.3 Treatment Frequency

The efficacy of Warm Acupuncture is closely related to treatment frequency, and different studies have proposed varying optimal treatment regimens. Wu Taixin [13] suggested that the optimal treatment plan involves sessions every two days, with two moxa cones per session, forming a

three-session treatment cycle, with a total of two cycles yielding significant results. Zhao Li [14] proposed a daily Warm Acupuncture treatment with two moxa cones per session for one month, which proved effective for FD patients with spleen-stomach Qi deficiency syndrome. Sheng Gang [15] reported that conducting Warm Acupuncture every two days for a total of six sessions was sufficient to achieve noticeable effects, highlighting the importance of dose-effect relationships. Currently, clinical Warm Acupuncture treatments are tailored based on individual patient differences, and there is no standardized frequency or treatment course. Future research should explore the optimal treatment frequency for different FD subtypes to achieve personalized treatment approaches.

### 4. Possible Mechanisms of Warm Acupuncture in Treating FD

According to the Rome III/IV diagnostic criteria for FD, the disease can be classified into three subtypes: epigastric pain syndrome (EPS), characterized by epigastric pain or burning sensation; postprandial distress syndrome (PDS), primarily presenting as postprandial fullness or early satiety; and an overlapping type that exhibits symptoms of both. In recent years, with advancements in mechanistic research and the use of high-end diagnostic instruments, numerous studies have confirmed that the pathogenesis of FD is mainly associated with multiple factors, including dysregulation of the brain-gut axis, gastrointestinal motility disorders, visceral hypersensitivity, and duodenal mucosal damage.

#### 4.1 Regulation of Brain-Gut Axis Dysfunction

The brain-gut axis refers to the bidirectional communication system between the brain and the gut, involving complex interactions among the nervous, endocrine, and immune systems. It not only participates in the digestive process but also plays a crucial role in emotional regulation, mental health, and various physiological functions. Dysfunction of the brain-gut axis is considered one of the pathogenic mechanisms of FD, highlighting the close connection between gut health and brain function. Warm Acupuncture can regulate both the central and autonomic nervous systems, helping to restore the balance of the brain-gut axis and thereby alleviating FD symptoms.

This process involves multiple mechanisms. Firstly, acupuncture at specific acupoints can promote the release of neurotransmitters, enhancing intestinal motility and secretion functions. Secondly, by regulating the autonomic nervous system, Warm Acupuncture improves blood flow and nutrient supply to the intestines, optimizing the overall state of the gastrointestinal tract. Liu et al. [16] used modern imaging techniques to identify structural changes in the cerebral cortex of FD patients, which were closely related to the severity and duration of the disease. This discovery reveals the impact of brain structural changes on digestive function while also suggesting the potential role of Warm Acupuncture in relieving FD symptoms. Koloski NA et al. [17] found that local lesions in the gut can affect the brain's emotional regulation system through the brain-gut axis mechanism. This finding provides a biological basis for the common co-occurrence of anxiety and depression in FD patients. It

indicates that gastrointestinal health not only directly influences digestive function but is also closely related to mental well-being.

In summary, research on the brain-gut axis offers new insights into the understanding of Warm Acupuncture in FD treatment. As an effective intervention, Warm Acupuncture can improve symptoms by modulating this system. Future studies should further explore the specific mechanisms by which Warm Acupuncture regulates the brain-gut axis, providing a stronger scientific foundation for its clinical application.

#### 4.2 Regulation of Gastrointestinal Motility

Disorders of gastrointestinal motility are a key pathogenic mechanism of FD, manifesting as delayed gastric emptying and dysfunction of gastrointestinal smooth muscle. These issues not only impair digestion and absorption but also often lead to uncomfortable symptoms such as postprandial fullness, early satiety, and abdominal pain, significantly affecting patients' quality of life. The occurrence of gastrointestinal motility disorders stems from multiple factors, including neural dysregulation and emotional influences. Modern medical research suggests that communication between the central nervous system and the gut may be disrupted in FD patients, leading to weakened gastric emptying function. Vanheel et al. [18] found that among 533 FD patients, 22.9% exhibited delayed gastric emptying, indicating the significant role of gastrointestinal motility dysfunction in the pathogenesis of FD.

Warm Acupuncture has been shown to effectively improve gastrointestinal motility. Its fundamental principle lies in using acupuncture to stimulate local nerve endings, combined with the warming effect of moxibustion, to regulate autonomic nervous system function, thereby restoring normal gastrointestinal movement. By stimulating specific acupoints (such as Zusanli [ST36] and Zhongwan [CV12]), Warm Acupuncture can promote the contraction and relaxation of intestinal smooth muscles, enhance intestinal peristalsis, and accelerate gastric emptying. This not only provides an effective relief strategy for patients but also lays the foundation for further research on the application of Warm Acupuncture in digestive disorders. Further exploration of the mechanisms underlying Warm Acupuncture will enhance the understanding of its potential in regulating gastrointestinal motility. Future studies should investigate factors such as the selection of different acupoints, stimulation intensity, and treatment frequency to optimize its therapeutic effects, providing more scientific evidence for clinical applications.

#### 4.3 Regulation of Visceral Hypersensitivity

Visceral hypersensitivity is one of the common pathological characteristics of FD, referring to an excessively heightened response of the visceral organs to mechanical, chemical, or thermal stimuli [19]. This phenomenon is particularly prominent in FD patients, as their digestive tract exhibits a significantly higher sensitivity to stimuli compared to healthy individuals. Studies have found [20] that some FD patients show heightened reactivity to chemical stimuli such as acid, lipids, bile acids, and capsaicin. When acid is introduced into the stomach or duodenum of both FD patients and healthy

controls, FD patients experience significantly more severe dyspeptic symptoms than the control group. This indicates a positive correlation between visceral sensitivity and the severity of FD symptoms, suggesting that visceral hypersensitivity is not only a crucial component of FD pathogenesis but also a potential target for clinical intervention. Sun Zhangyin et al. [21] explored the mechanisms of acupuncture in treating FD based on visceral hypersensitivity and discovered that acupuncture can regulate the peripheral nervous system, central nervous system, enteric nervous system, and other serum markers, thereby alleviating visceral hypersensitivity in FD patients and achieving effective treatment outcomes. Vanheel et al. assessed FD patients using manometry and found that 37.4% exhibited hypersensitive responses to gastric distension, with female patients being more prone to hypersensitivity. These findings contribute to a deeper understanding of FD and provide new therapeutic targets for its management.

#### 4.4 Duodenal Mucosal Damage

FD patients often exhibit mild inflammation in the duodenum, characterized by infiltration of mast cells and eosinophils, as well as impaired barrier function, suggesting a possible association between these factors and the pathogenesis of FD. The primary manifestations include damage to duodenal mucosal integrity and an increased number of mast cells and eosinophils in the mucosa. Wang Xiaohong et al. [22] conducted a quantitative evaluation of duodenal eosinophils and mast cells in FD patients and healthy controls, finding that the eosinophil count and degranulation rate in the duodenum were significantly lower in the healthy control group compared to the FD patient group. These findings indicate that intestinal inflammation and the activation of immune molecules are key factors in the development of FD.

### 5. Summary

Functional dyspepsia (FD) is a recurrent and widely prevalent digestive disorder, posing significant challenges in clinical treatment due to its complex etiology and variable pathophysiological mechanisms. As a traditional Chinese medicine therapy, warm acupuncture has been widely applied in FD treatment because of its remarkable regulatory effects on spleen and stomach functions. Therefore, warm acupuncture holds great clinical potential and research value as an intervention for FD.

Although warm acupuncture has demonstrated promising clinical efficacy in FD treatment, several unresolved issues remain due to the intricate pathophysiology of FD. For instance, there is currently no standardized protocol for acupuncture therapy, leading to variations in needle type, insertion depth, retention time, and treatment frequency across different studies, which reduces the comparability of efficacy results. Additionally, existing studies have not sufficiently considered variables such as gender, age, and dietary habits, which may significantly influence the therapeutic effects of warm acupuncture.

Future research should further explore the mechanisms underlying warm acupuncture's effects on FD, including its regulatory role in the brain-gut axis, gastrointestinal motility,

and visceral hypersensitivity. Moreover, rigorous randomized controlled trials should be designed in accordance with evidence-based medicine principles to further evaluate the efficacy and safety of warm acupuncture in FD treatment, especially its differential effects among various patient groups. By establishing standardized treatment protocols and conducting multicenter clinical trials, warm acupuncture has the potential to become an effective therapeutic option for FD, providing patients with personalized treatment strategies.

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