

# Analysis of clinical literature on acupuncture-moxibustion for dyspepsia based on data mining

## 基于数据挖掘的针灸治疗功能性消化不良临床文献分析

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### Abstract

**Objective:** To summarize the point selection pattern and treatment method in acupuncture-moxibustion for dyspepsia through data mining of the related clinical literatures in recent two decades, and to provide reference for clinical application.

**Methods:** With data mining technology, clinical literatures related to acupuncture-moxibustion for dyspepsia published between January 1997 and July 2018 were collected from major Chinese databases, and the treatment methods, point and meridian frequencies were summarized and analyzed.

**Results:** A total of 106 studies were included. For meridians, the top 5 meridians used were the Stomach Meridian, Conception Vessel, Spleen Meridian, Liver Meridian and Pericardium Meridian. For point selection, the leading 5 points were Zusanli (ST 36), Zhongwan (CV 12), Shangwan (CV 13), Xiawan (CV 10) and Sanyinjiao (SP 6). For major and adjunct points, the 5 most significant major points were Zusanli (ST 36), Zhongwan (CV 12), Neiguan (PC 6), Sanyinjiao (SP 6) and Shangwan (CV 13); the 5 most significant adjunct points were Neiting (ST 44), Qihai (CV 6), Fenglong (ST 40), Yinlingquan (SP 9) and Tianshu (ST 25). For treatment method, the top 3 methods used were moxibustion alone, acupuncture alone and acupuncture combined with medicinal herbs.

**Conclusion:** The main meridian chosen in acupuncture-moxibustion for dyspepsia was the Stomach Meridian, and the points were mainly selected from the Stomach Meridian; treatment method was moxibustion alone, which may provide reference for clinical treatment of this disease.

**Keywords:** Acupuncture Therapy; Moxibustion Therapy; Acupuncture-moxibustion Therapy; Dyspepsia; Stomach Meridian; Bibliometrics

**【摘要】目的:** 对近二十年针灸治疗功能性消化不良的临床文献进行数据分析, 总结针灸治疗功能性消化不良选穴规律和治疗方法, 为针灸治疗功能性消化不良的临床应用提供参考依据。**方法:** 运用数据挖掘的方法, 检索1997年1月至2018年7月间国内各大中文数据库中针灸治疗功能性消化不良的临床研究文献, 并进行筛选和整理, 对所纳入文献中的治疗方法、腧穴和经络的使用频率进行归纳总结与分析。**结果:** 共纳入符合标准的文献106篇。经络使用频率前5位的依次为胃经、任脉、脾经、肝经和心包经。腧穴使用频率前5位的依次为足三里、中脘、上脘、下脘和三阴交。从腧穴配伍角度分析, 主穴使用频率前5位的依次为足三里、中脘、内关、三阴交和上脘; 配穴使用频率前5位的依次为内庭、气海、丰隆、阴陵泉和天枢。治疗方法使用前三位的依次是单纯灸法、单纯针刺和针刺加药物。**结论:** 针灸治疗功能性消化不良主要以胃经为主, 选穴亦以胃经穴位为主, 治疗方法主要以单纯灸法为主, 可为临床治疗本病提供参考依据。

**【关键词】** 针刺疗法; 灸法; 针灸疗法; 功能性消化不良; 胃经; 文献计量学

**【中图分类号】** R246.1 **【文献标志码】** A

Functional dyspepsia (FD) is a gastrointestinal condition characterized by abdominal pain, bloating and early fullness, hiccups, poor appetite, nausea and vomiting, and there is no evidence of an organic disease that can explain such symptoms<sup>[1]</sup>. Due to an epidemiology survey, FD could occur to all age groups with an incidence rate of 23.5% in China, and has become a common disease and laid great burden on patients' quality of life (QOL).

The pathogenesis of FD remains unclear. Current Western medicine treatment advocates using gastrointestinal motility facilitating and gastric mucosa protection agent, and acid inhibitor, anti-*helicobacter pylori* (HP), antianxiety agent and antidepressants for treating FD, while the adverse event is common after long-term use. Acupuncture-moxibustion can relieve a wide scope of symptoms in FD patients without causing adverse reactions. It has a bi-directional, multi-approach regulation on the body and can treat mental and physical problems at the same time, and thus can produce satisfactory treatment efficacy in the treatment

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and prevention of FD<sup>[2-5]</sup>. Hence, we collected the relevant literatures to analyze the features in point-selection and treatment methods in acupuncture-moxibustion for FD based on bibliometrics, with a hope to provide references for clinical application.

## 1 Subjects and Methods

### 1.1 Resources

The target databases included Chinese Biomedical Literature Database (CBM), China National Knowledge Infrastructure (CNKI), Wanfang Academic Journal Full-text Database (Wanfang) and Chongqing VIP Database (CQVIP). All included documents were journal articles, but not master or doctor theses, conference articles or articles from newspapers. The retrieve words were 'Acupuncture' OR 'Moxibustion', OR 'Electroacupuncture' OR 'Acupuncture-moxibustion' AND 'Functional Dyspepsia' AND ('Clinical Observation' OR 'Clinical Study'). The range of time for retrieve was between January 1997 and July 2018.

### 1.2 Inclusion criteria

Clinical studies on various acupuncture-moxibustion methods in treating FD; acupuncture-moxibustion methods, including acupuncture, moxibustion, electroacupuncture, acupuncture-moxibustion and warm-needling acupuncture; the diagnostic and evaluation criteria were all based on the latest international or domestic general standards; the meridian and point-selection all met the standards formulated by the State Administration of Traditional Chinese Medicine; only included one article among all with similar contents and same authors; same meridians or points that appeared in one article were counted only once.

### 1.3 Exclusion criteria

Clinical research with sample size below 30 in each group (2 groups) or 20 (3 groups); only adopted treatment methods such as bloodletting, cupping, thread-embedding, acupoint/point injection or plum-blossom needle alone.

### 1.4 Data mining

Eligible literatures were categorized and put into Microsoft Excel 2018 according to the treatment methods, publishing time, publishing amount, meridian or point selections were analyzed.

## 2 Results

### 2.1 Summary of the included literature

A total of 504 literatures were retrieved. According to the exclusion criteria, 128 articles of literature review, conference articles or academic dissertations, 92 animal experiment articles, 89 articles on other treatment methods or experience introduction, and 67 clinical studies with a small sample size were excluded. Finally,

106 articles were recruited according to the inclusion criteria.

### 2.2 Frequency of meridian selection<sup>[6-15]</sup>

Of all the 106 articles, 11 meridians were involved. The frequency of meridians from high to low were the Stomach Meridian (93 times), Conception Vessel (73 times), Spleen Meridian (58 times), Liver Meridian (47 times), Pericardium Meridian (33 times), Large Intestine Meridian (28 times), Heart Meridian (22 times), Lung Meridian (19 times), Gallbladder Meridian (13 times), Triple Energizer (9 times) and Kidney Meridian (5 times).

### 2.3 Frequency of point selection<sup>[15-25]</sup>

Of all the 106 articles, 149 points were involved. The top 10 points used were Zusanli (ST 36) (99 times), Zhongwan (CV 12) (82 times), Shangwan (CV 13) (70 times), Xiawan (CV 10) (59 times), Sanyinjiao (SP 6) (43 times), Weishu (BL 21) (37 times), Pishu (BL 20) (32 times), Hegu (LI 4) (27 times), Taichong (LR 3) (18 times) and Neiguan (PC 6) (13 times).

### 2.4 Number and frequency of major and adjunct points<sup>[26-48]</sup>

Of all the 106 articles, a total of 129 points were involved with a total frequency of 899. Eighty-nine major points were used for 528 times, and forty-two adjunct points used for 271 times, and 23 major and adjunct points were repeated and used for 229 times. In their ranking order, the top 10 major points included (without repetition of adjunct points) Zusanli (ST 36) (89 times), Zhongwan (CV 12) (76 times), Neiguan (PC 6) (65 times), Sanyinjiao (SP 6) (51 times), Shangwan (CV 13) (44 times), Xiawan (CV 10) (39 times), Weishu (BL 21) (33 times), Pishu (BL 20) (29 times), Taichong (LR 3) (21 times) and Qihai (CV 6) (17 times). The top 10 adjunct points included (without repetition of major points) Neiting (ST 44) (37 times), Qihai (CV 6) (32 times), Fenglong (ST 40) (27 times), Yinlingquan (SP 9) (23 times), Tianshu (ST 25) (18 times), Liangmen (ST 21) (15 times), Hegu (LI 4) (11 times), Quchi (LI 11) (9 times), Yanglingquan (GB 34) (6 times) and Dachangshu (BL 25) (5 times).

### 2.5 Treatment methods<sup>[49-60]</sup>

Of the 106 articles, moxibustion alone was used for 27 times, including conventional moxibustion for 13 times, warm-needling acupuncture for 7 times, herb-partitioned moxibustion for 5 times, heat-sensitive moxibustion of 2 times; acupuncture alone for 17 times, including acupuncture alone for 9 times and electroacupuncture alone for 11 times; acupuncture plus medicinal herb for 16 times, moxibustion plus medicinal herb for 6 times; acupuncture plus psychotherapy for 6 times; moxibustion plus point sticking for 6 times; electroacupuncture plus medicinal herb for 4 times, moxibustion plus other therapy for 4 times, including moxibustion plus diet intervention for 1 time, moxibustion plus auricular acupuncture for 1 time,

moxibustion plus electro-therapy for 1 time and moxibustion plus point injection for 1 time.

### 3 Discussion

FD falls under the category of stomachaches or Pi (distention and fullness) syndrome in Chinese medicine. The main pathogenesis includes liver qi stagnation and disharmony of spleen-stomach transportation and transformation. The external factors include depressed or stressful emotion and improper diet, which can lead to liver qi stagnation and the subsequent qi movement disorder, or liver qi invading the stomach and further damaging the stomach and spleen and causing qi movement dysfunction. The internal factors are constitutional insufficiency and innate weakness of spleen and stomach, which cause improper transportation and digestive dysfunction, and end up as stomach distention, diarrhea, fullness and loss of appetite<sup>[61-63]</sup>. FD is mainly caused by dysfunction of the liver and spleen, which can lead to qi stagnation and movement dysfunction. It is often triggered by an improper diet and mental stress and mainly caused by abnormal spleen and stomach transportation. Consequently, in addition to tonifying spleen and stomach, and fortifying the spleen to promote digestion, the treatment strategies should lay stress on soothing the liver and regulating qi to treat both the internal and external pathogen factors<sup>[64-67]</sup>.

For meridian selection, we found that the top 5 meridians in FD treatment were Stomach Meridian, Conception Vessel, Spleen Meridian, Liver Meridian and Pericardium Meridian. The stomach governs receiving. Stimulating points on the Stomach Meridian can facilitate stomach and intestinal movement, improve gastrointestinal motility, reduce visceral sensitivity and thus has a positive adjustment function on gastrointestinal disorder. Conception Vessel is the sea of all yin meridians and runs in the middle of the abdominal region. Stimulating points on the Conception Vessel can treat abdominal diseases. The spleen governs transportation and transformation. Stimulating points on the Spleen Meridian can facilitate spleen transportation and promote transformation of essence in food. The liver governs free coursing and dredges qi movement. Stimulating points on the Liver Meridian can regulate qi flow, which is beneficial to relieving depression. The pericardium connects the heart, and heart governs the spirit. Stimulating points on the Pericardium Meridian can effectively adjust emotions and dredge qi flow.

For point-selection frequency analysis, the top 5 were Zusanli (ST 36), Zhongwan (CV 12), Shangwan (CV 13), Xiawan (CV 10) and Sanyinjiao (SP 6). Zusanli (ST 36) is the He-Sea point and also the key point of the Stomach Meridian. Stimulating Zusanli (ST 36) can lift stomach qi

and dry dampness and strengthen spleen. Zhongwan (CV 12) is the Front-Mu point of the Stomach Meridian and the Influential point of Fu organs. Stimulating Zhongwan (CV 12) can alleviate stomach pain effectively. Shangwan (CV 13) and Xiawan (CV 10) locate on the Conception Vessel. Stimulating these two points can warm the middle Jiao, downbear the counterflow, and promote spleen transportation to improve digestion. Sanyinjiao (SP 6) is the crossing point of the three foot meridians. Stimulating Sanyinjiao (SP 6) can regulate qi and fortify the spleen, harmonize the stomach and blood.

For major and adjunct points, Neiguan (PC 6) is the Luo-Connecting point of the Pericardium Meridian and one of the Confluent Points of the Eight Extraordinary Meridians. Stimulating Neiguan (PC 6) can tranquilize and calm spirit, activate blood and promote qi movement. Neiguan (PC 6) plus Zusanli (ST 36) and Zhongwan (CV 12) can treat stomachache, nausea and vomiting. Neiting (ST 44) is the Ying-Spring point of the Stomach Meridian, Neiting (ST 44) plus Sanyinjiao (SP 6) can clear stomach fire and dredge bowel turbid<sup>[32,36]</sup>. Qihai (CV 6) plus Tianshu (ST 25) and Zusanli (ST 36) can dredge meridians, promote bowel movement and disperse qi stagnation<sup>[46-47]</sup>. Fenglong (ST 40) is the Luo-Connecting point of the Stomach Meridian. Fenglong (ST 40) plus Zhongwan (CV 12) can downbear stomach turbidity and dredge collaterals<sup>[56-58]</sup>. Yinlingquan (SP 9) is the He-Sea point of the Spleen Meridian. Yinlingquan (SP 9) plus Taichong (LR 3) and Zusanli (ST 36) can fortify the spleen and drain dampness, and also clear the three Jiao. Tianshu (ST 25) is the Front-Mu point of the Large Intestine Meridian. Tianshu (ST 25) plus Shangwan (CV 13) can regulate gastrointestinal function and qi to remove stagnation<sup>[62-64]</sup>.

The analysis of treatment methods showed that the most frequently used methods in the treatment of FD was moxibustion therapy alone. Since most FD patients are of deficiency pattern, moxibustion alone can produce satisfactory efficacy for FD, as it can tonify spleen and stomach, stop diarrhea and pain, with advantages of low-cost, convenient operation and minor adverse effects<sup>[10-11]</sup>.

### 4 Summary

Point-selection frequency analysis showed that the Stomach Meridian was the most commonly used meridian for FD, and the used points were mainly from the Stomach Meridian. It is supported by large amount of clinical and experimental studies that acupuncture-moxibustion is effective for FD, and it is also guided by theories of meridians and Zang-fu organs. However, the standardization of meridian and point selections is not unified, and the mechanism of acupuncture-moxibustion

treatment remains unclear. Current treatment methods were not unified and thus hard for popularization. Therefore, multi-center randomized controlled trials (RCTs) with large sample size are required for further understanding the mechanism of the acupuncture-moxibustion treatment.

Current point-selections are mainly based on pattern differentiation or along meridians. Major and adjunct point-selection conforms to the pattern differentiation principle. Stimulating certain points can alleviate gastrointestinal distention, reduce visceral sensitivity and positively regulate gastrointestinal disorder.

For treatment method analysis, the most frequently used method was moxibustion lone. Although most studies have proved its effectiveness, the moxibustion operation details, moxibustion duration time, points and treatment facilities lack standardization. Therefore, targeted clinical research is needed in this field to form consensus, which is crucial for achieving better therapeutic efficacy in FD treatment.

To conclude, syndrome differentiation, pattern differentiation, treatment method, meridian and point selection, prescription and time of treatment still require further investigation. Therefore, studies with strict standardization of the acupuncture-moxibustion treatment are of great importance, with the hope of obtaining milestone achievements.

#### Conflict of Interest

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

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