

# Clinical Research Progress, Mechanism Analysis, and Application Prospect of Acupuncture and Moxibustion in Treating Diabetic Constipation

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**Abstract:** Chronic diseases like diabetes, hypertension, and coronary heart disease are becoming increasingly prevalent in Chinese ageing population due to its accelerated ageing process, which has been a serious threat to people's health. The prevention and treatment of these diseases have been increasingly emphasized in the medical field. Diabetes is a metabolic disease characterized by polydipsia, polyuria, and emaciation, in which the incidence of type 2 diabetes is much higher compared to type 1 diabetes. Diabetes causes a variety of complications during the progression of the disease. Diabetic constipation is one of the most common and harmful complications of diabetes, which can negatively impact the health of patients. There are limitations when treating these diseases using Western medicine, and there are obvious side effects associated with some drugs. The tolerance of the middle-aged and elderly towards the drugs are poor. Therefore, more and more experts and scholars have advocated the introduction of Chinese medicine into the treatment of diabetic constipation, of which acupuncture is widely used, and its efficacy has been well recognized by doctors and patients. In this study, we collated and analyzed relevant literature, reports, and studies in the past three years, and it was clear that the use of acupuncture for diabetic constipation can remarkably improve clinical symptoms, and it is efficacious and safe. Therefore, this treatment protocol has positive clinical application value.

**Keywords:** Diabetic constipation; Acupuncture; Blood glucose

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## 1. Introduction

The prevalence of diabetes mellitus (DM) has been increasing year by year, and it has become a global health problem. Research have shown that the prevalence of diabetes in China has reached 11.2% with an increasing trend <sup>[1]</sup>. Diabetic constipation is a common complication of diabetes, and its incidence is up to 60% <sup>[2]</sup>. Over the last few years, acupuncture specialties have been effective in treating diabetic constipation, including silastic acupuncture, electro-acupuncture, moxibustion, acupuncture point embedding, acupuncture point application, and auricular pressure. Most of them have been proven to improve patients' conditions when used in combination with clinical practice, but there are few clinical studies on the characteristics and responsiveness of acupuncture when it comes to treating diabetic constipation. There is still a lack of research on its specific mechanism, short-term, and long-term efficacy and application prospects, so it is very necessary to carry out this kind of research, which can help guide the treatment of this complication. The clinical studies of acupuncture and moxibustion in treating diabetic constipation in

the past three years are summarized below.

## **2. Understanding of Diabetic constipation in traditional Chinese medicine**

### **2.1. Etiology and pathogenesis of traditional Chinese medicine**

Diabetic constipation belongs to the category of “diabetes” and “constipation” in traditional Chinese medicine<sup>[3]</sup>. Constipation is known as “difficulty in defecation” and “discomfort after defecation” in *Yellow Emperor’s Classic of Internal Medicine*. There are more than ten names for this condition such as “spleen contraction,” “intestinal knot,” “difficulty in defecation,” and “dry stool” in other ancient documents<sup>[4]</sup>. It is mentioned in the Criteria for Syndrome and Treatment · Diabetes Volume than Sanxiao means three urinary deficiencies, and one of them are manifested as prodigious production of urine, which causes constipation, which is the first mention of the relationship between diabetes and constipation is mentioned<sup>[5]</sup>.

Diabetes is due to yin deficiency and is characterized by dryness and heat, while the key pathogenesis of diabetic constipation is due to yin deficiency and intestinal dryness<sup>[6]</sup>. The location of the disease is the large intestine and is closely related to the kidney, spleen, stomach, lungs, and other viscera, which is a syndrome of deficiency in origin and excess in superficiality<sup>[7]</sup>. The pathogenic mechanism of diabetic constipation is complicated. It is written in “Dry Stool” (*Dabianjiezao men*) in the *Secret Book Kept in Chamber (Lanshi micang)* that hunger, damage of the stomach qi due to excessive exertion, and eating spicy and rich-tasting food causes fire evil to fall on the blood, dissipating the true yin, and leaving the body with insufficient fluids.” Therefore, constipation knot indicates improper diet, resulting in wasting the qi of the spleen and stomach and the dissipation true yin. A deficiency of body fluids leads to symptoms of diabetic constipation such as thirst and constipation<sup>[8-9]</sup>. Secondly, negative emotions, indulgence, and other factors can cause dryness, heat, and injury to the fluid. Over time, this can cause dysfunction of the internal organs, which leads to loss of intestinal function and finally constipation<sup>[10-12]</sup>.

### **2.2. Characteristics of acupoint selection for acupuncture therapy**

Modern doctors often treat diabetic constipation from the spleen. Therefore, the acupoints of the spleen meridian and kidney meridian, bladder meridian, and large intestine meridian are often chosen, in combination with dialectical and disease differentiation with shallow needling<sup>[13-14]</sup>. The lesion site can be directly stimulated through local acupoints like abdominal acupoints or stimulated indirectly through the distal acupoint along the meridian<sup>[15]</sup>. The commonly used acupoint selection schemes are either a single acupoint or specific acupoint groups, including Tianshu, Changshu, Shangjuxu, Zusanli and other acupoints; the most commonly used acupoint groups are Hefei acupoint, and Yu Fupai acupoint<sup>[16]</sup>. The acupoints can also be selected according to the condition of the organs, meridians, qi, blood, and body fluid<sup>[17]</sup>.

## **3. Clinical study on acupuncture and moxibustion treatment of diabetic constipation**

### **3.1. Acupuncture**

Yan *et al.* demonstrated through clinical observation that acupuncture of a single point and the Hegu point were both effective when treating diabetic constipation, with acupuncture of the Hegu point being more effective than the single point<sup>[18]</sup>. The study showed that acupuncture combined with moxibustion remarkably enhanced the patients’ defecation and promote their quality of life, and its long-term effect was also ideal, which fully confirmed the efficacy of acupuncture in treating diabetic constipation. Acupuncture was shown to patients’ clinical symptoms by stimulating relevant acupoints, and improvements in the symptoms led to a better quality of life. At the same time, it was also shown that acupuncture treatment can not only improve patients’ symptoms rapidly, but also achieve a good long-term effect, i.e., it is unlikely for patients to relapse after treatment. 46 elderly patients with diabetic constipation were treated with the

Zusanli acupuncture using the “burning mountain fire” hot toning method combined with levator ani exercises instead of abdominal massage alone <sup>[19]</sup>. Besides, the fasting blood glucose (FBG), glycated haemoglobin (GHb) and 2-hour postprandial blood glucose (2hPBG) levels of patients with diabetic constipation can also be improved with conventional abdominal massage combined with the Zushi “burning mountain fire” technique combined with levator ani exercises. Long-term adherence to this treatment is effective in improving patients’ bowel function and stabilizing blood glucose levels. It has been suggested that this method can restore the regularity of digestive tract function, promote diet regularity, and maintain the stable operation of the endocrine system, thus regulating the the bodily functions of patients and cure both the symptoms and root causes. Wang and Yu studied the effects of acupuncture on two groups of acupoints <sup>[20]</sup>. The first group of acupoints included Tianshu, Daheng, Zhongwan, Fujie, Qihai, Guanyuan, Zusanli, Shangjuxu, Taichong, and Zhigou; the second group included Dachangshu, Shenshu, Pishu, Weishu, Baihui. Mosapride tablets (oral administration at night) were administered along with the acupuncture treatment for 10 consecutive times, and improvements of gastrointestinal symptoms were observed.

### 3.2. Electroacupuncture therapy

Electroacupuncture therapy has been widely used in clinics. In electroacupuncture, a small amount of electricity is transmitted to the needles to increase the stimulation, thereby achieving twice the effect. Zhao *et al.* indicated that electroacupuncture can modulate the functional areas of the brain associated with the gut, thus effectively improving intestinal sensitivity and enhancing bowel movements <sup>[21]</sup>. Besides, electroacupuncture stimulates the sympathetic and parasympathetic nerves in the body, which regulates the intestinal environment and results in a therapeutic effect. Wu Yuanrong treated 74 patients with diabetic constipation <sup>[22]</sup>. Patients in the treatment group who underwent transcutaneous electrical stimulation of acupoints achieved good results. The patients in the treatment group indicated better efficiency and improvement in constipation symptoms than the control group, which received conventional treatment alone, indicating that electroacupuncture remarkably improved the patient’s condition. This is mainly because electroacupuncture increases acupoint stimulation, which can effectively improve the patient’s blood circulation and rapidly improve their symptoms. Xing *et al.* used electroacupuncture at the Tianshu, Feosanli, and Zhongbei, acupoints, combined with the prescription of oral mosapride tablets, and a higher efficacy was shown compared to the control group <sup>[23]</sup>. Single-drug treatment has some disadvantages, such as slow effects, poor curative effects, side effects, and so on. On the other hand, electroacupuncture at Tianshu, Zusanli, Zhongwan, and other acupoints improve the patient’s condition in terms of etiology and pathology. The Tianshu acupoint, which is at the stomach meridian, can recuperate the stomach and aid defecation. Zusanli is also an acupoint at the stomach meridian, which can enhance immunity, replenish qi and blood, and improve the function of the spleen and stomach. Zhongwan acupoint is located in Renmai. Electroacupuncture stimulation of this acupoint is helpful in treating various gastrointestinal diseases. Su *et al.* treated 49 cases of diabetic constipation with electroacupuncture combined with mosapride tablets and the control group with mosapride citrate tablets <sup>[24]</sup>. In a study done by Li, the treatment group received electroacupuncture at the “specimen matching acupoints” combined with drug administration <sup>[25]</sup>, where Zusanli and Guanyuan acupoints were selected to nourish the spleen and stomach and cure the root causes. Zhongwan and Fenglong were selected as the “standard acupoints” to treat symptoms by activating meridians and dispelling pathogens. The results indicated that the total effective rate of the treatment group (95.83%) was remarkably higher compared to the control group (76.00%). Meanwhile, it has also been suggested that the combination of these four acupuncture points can be combined with tonics and concoctions to further improve the clinical symptoms and physical condition of patients with diabetic constipation. This treatment plan strengthens the spleen and stomach through the meridians, treating both

the symptoms and the root causes of the disease, coupled with the strong stimulation of electroacupuncture. It can improve the patient's condition in a short time. 156 cases of diabetic constipation with yin deficiency and blood stasis were treated with electroacupuncture combined with acupressure by Cui [26]. The treatment group selected Weiwan Xiashu, Geshu, Shangjuxu, Xiajuxu, Xuehai, left outer waterway, left external return and Tianshu acupoints, using continuous wave, combined with acupoint application of Shenque acupoint therapy, and the control group was only prescribed with mosapride citrate tablets. The results were that the treatment group showed a better improvement in terms of symptoms and quality of life compared to the control group. Therefore, it is clear that there are limitations to single-drug therapy when treating diabetic constipation. Electroacupuncture and acupressure are scientific treatments based on the theory of meridians and the five elements of yin and yang in Chinese medicine. Electroacupuncture is mainly used to stimulate acupuncture points and regulate bodily functions. Acupoint plasters allows the drugs to act directly on the corresponding acupoints through the skin, and the effect of the drug is targeted and rapid. The combination of electroacupuncture and acupoint plasters are complementary, and the clinical effect can therefore be maximized. In Guo's study, electroacupuncture was used to treat 40 cases of diabetic constipation [27]. Qihai, Tianshu (double), Fujie (double), Zhongwan (double), Shangjuxu (double), Zhigou (double), and Zhaohai (double) were selected in the treatment group. A thermoelectric acupuncture equipment was connected to the acupuncture needles of the abdomen and lower limbs, and continuous and dense waves sent to the lower limbs and the abdomen. Meanwhile, the control group was only prescribed with mosapride citrate pills. The results indicated that the total effective rate of the treatment group (100%) was higher than that of the control group (80%), which fully reflected the superiority and effectiveness of electrothermal acupuncture therapy. Electrothermal acupuncture therapy not only performs the role of ordinary electroacupuncture and moxibustion treatments, but also allows the selection of waves based on the patient's condition.

### 3.3. Moxibustion therapy

Li used thunder-fire moxibustion combined with mirabilite navel patch to intervene in diabetic constipation [28]. In this method, the mirabilite navel patch was applied for 6 hours after 20 min of moxibustion at the Shenque acupoint. It was found that the overall effective rate was higher in the treatment group (91.3%) than in the control group (71.74%), and that the treatment group outperformed the control group in terms of constipation severity score, time of first bowel movement, and improvement in quality of life. It has been suggested that thunder-fire moxibustion combined with mirabilite navel patch has a definite and rapid effect when treating diabetic constipation. Thunder -fire moxibustion can promote blood circulation and remove blood stasis, warm deficiency, warm yang, and dredge collaterals, which coincide with the symptoms of patients. Mirabilite navel patches have a good cathartic effect, which can increase intestinal fluid, which in turn moisten the intestines and loosen the stool. Gao *et al.* randomly classified 82 diabetic patients with constipation into two groups [29]. The control group was treated with Zengye decoction, and the treatment group was treated with gourd moxibustion at Shenque, Guanyuan, Tianshu, Qihai, and other acupoints. After one course of treatment, the total effective rate of the treatment group was 92.68%, which was remarkably better compared to the control group (70.73%). Clinical studies have shown that combining internal and external treatment effectively enhances the benefits of TCM, reduces the symptoms, and improves the patients' health. 60 cases of diabetic constipation were treated by Yuan Min with moxibustion at the Shenque acupoint [30]. The control group was cured with [30] the routine diabetes treatment and health education. The treatment group was treated with moxa strip moxibustion at the Shenque acupoint based along with routine treatment, and mild and rotary moxibustion was performed. The results indicated that the total effective rate of the treatment group was 90.006%, which was higher compared to the control group (66.67%). The reason why moxa strip moxibustion at Shenque acupoint can achieve a better effect

when treating diabetic constipation is mainly because that stimulating Shenque acupoint can improve digestive function, strengthen the spleen and stomach, transport the pure and moist Yang and excrete dampness and phlegm turbid, while moxibustion itself has the effect of promoting qi, dredging channels and collaterals, and so on.

### **3.4. Other acupuncture therapies**

**3.4.1. Acupoint plasters** 40 patients with diabetic constipation were treated with acupressure based on the symptoms<sup>[31]</sup>. It was found that after the application of acupoint plasters, the constipation and quality of life of patients with diabetic constipation were greatly improved. Therefore, acupoint plasters can improve the efficiency of clinical treatment through the dialectical use of medicine. Acupressure is a TCM treatment method that allows for rapid access to the body and rapid therapeutic effects. This treatment is targeted, therefore resulting in an ideal curative effect. In Gao's study, 30 patients with type 2 diabetic gastroparesis and constipation were treated with acupoint plasters along with oral mosapride citrate tablets<sup>[32]</sup>. The results indicated that this method could successfully reduce the symptoms of gastroparesis constipation. Li applied herbal acupoint plasters combined with TCM prescriptions for the treatment of constipation in diabetic patients<sup>[33]</sup>. According to the method of meridian flow injection, the plasters were applied at Shenque, Zhongwan and Tianshu points, and a hot compress was placed in the Shenque and Zhongwan acupoints. The results indicated that acupoint plasters combined with a TCM prescriptions can effectively improve the symptoms of abdominal distension. Chen *et al.* used acupressure combined with acupressure to intervene in 30 patients with diabetic constipation. The acupressure was applied to the Shenque point, and the Zhonghua (left side of the body), Zusanli, Qihai, and Hegu (right side of the body) acupoints were massaged<sup>[34]</sup>. According to the results, the improvement of clinical symptoms and patient satisfaction of the treatment group was better than the control group. 60 cases of diabetic constipation were treated with Shenque acupoint plaster in a study by Chen<sup>[35]</sup>. The clinical effect of acupoint plasters at Shenque is better than Paidu Yangyan capsules, which could successfully relieve the symptoms of constipation and enhance the patients' quality of life. A study by Zheng *et al.* after two courses of treatment with hot compresses applied to the navel and ear acupressure seeds, there was a significant improvement in bloating and constipation in patients with diabetic constipation and they were also less likely to develop abnormal gastrointestinal function<sup>[36]</sup>, which enhanced the quality of life of the patients. The curative effect of this treatment scheme is better, mainly because *Cornus officinalis* has the functions of warming, dispelling cold and descending qi, invigorating the spleen yang, and regulating the stomach and intestine. Hot compresses on the navel allow the medicine to reach the gastrointestinal tract and thus improve the symptoms of constipation. Ear acupressure seeds stimulate the points in the ear associated with gastrointestinal function and further improve the patient's gastrointestinal function.

### **3.4.2. Acupoint catgut embedding therapy**

Zeng Ke proposed that acupoint catgut embedding can restore the ascending and descending functions of the spleen, stomach, and intestines in patients with diabetic gastrointestinal dyskinesia<sup>[37]</sup>. Therefore, the acupoint catgut embedding therapy was carried out alternately at Guanyuan, Pishu, Housanli, Zhongwan, Qihai point, and Tianshu acupoints. The results indicated that the blood glucose in the treatment group was well controlled and could successfully enhance the gastrointestinal motor function of diabetic patients. Acupoint catgut embedding can continuously stimulate acupoints, so the short-term and long-term effects are ideal. In addition, the selection of acupoints was suitable, and they are all important acupoints related to digestive function, so the stimulating effect was naturally better.

### 3.4.3. Auricular point pressing bean therapy

147 patients with diabetic constipation were classified into two groups by Shao *et al* [38]. The control group underwent conventional treatment, and 74 patients in the treatment group were cured with auricular point pressing combined with lifestyle interventions. After a clinical intervention, the therapeutic effect of the treatment group was better compared to the control group (97.26% vs 91.89%). 40 patients with diabetic constipation were treated with auricular point pressing combined with acupoint plasters in a study by Yin [39]. In Yin's study, the acupoints of the binaural, rectum, large intestine, lungs, and Sanjiao, constipation, Shenmen, sympathetic, and subcortical points were pressed at auricular points, and acupoint plasters were applied at Shenque, bilateral Tianshu, and Guanyuan points. The results indicated that the total effective rate of the treatment group was 95.24%, which was remarkably higher compared to the control group (76.19%), and the treatment group was better than the control group in terms of improvement of constipation symptoms. Liu *et al.* concluded that stimulating ear points can regulate the secretion and release of hormones and digestive fluids in the human body, and then regulate the function of the gastrointestinal tract [40], which can in turn improve the constipation of patients with diabetes to a certain extent. Wang *et al.* indicated significant results when treating constipation caused by type 2 diabetic nephropathy in the elderly with auricular needle acupuncture combined with acupoint plasters at the Shenqui point [41], which had been proven to improve the digestive tract function of patients and lowering blood glucose levels. Zhou treated diabetic constipation with acupoint massage combined with auricular points pressing beans [42]. Acupoints such as Zusanli, Zhongwan, Tianshu, and Qihai were massaged by finger pressing and kneading methods, and acupoints such as stomach, spleen, liver, Shenmen, sympathetic, and endocrine were massaged using auricular points pressing beans. The results indicated that the total effective rate of 43 patients was 88.37%, which was remarkably higher compared to the control group (69.77%). Besides, the safety index was high, and the possibility of side effects and recurrent attacks was low. Yuan *et al.* used ear seeds combined with Chinese medicine navel patches to treat constipation in type 2 diabetes. The observation group used ear seeds combined with a Chinese medicine navel patch based on routine basic care [43]. The results indicated that this method could increase the peristalsis of the gastrointestinal tract, dredge the viscera, regulate the balance of yin and yang of human viscera, and therefore treat type 2 diabetic constipation. Fan *et al.* studied the effect of repeatedly pushing and rubbing the colon area and pressing Tianshu, Daheng, Fujie, Qihai, and Guanyuan points to treat senile diabetic constipation [44]. The results indicated that the total effective rate was 92.11%. Therefore, it is clear that this method can promote the recovery of intestinal function and enhance constipation, effectively improve the clinical cure rate of diabetic constipation, and confirmed the rationality and pertinence of the selected acupoints [45]. Acupoint massage combined with acupoint plasters were used to treat senile diabetic constipation. The control group was treated with a simple Maren soft capsule, while the treatment group was cured with circular massage of Zhongwan, Qihai, bilateral Tianshu points, combined acupoint plasters at Shenque. In the treatment group, constipation symptoms were relieved to a greater extent and the patients' quality of life improved more compared to the control group after four weeks of treatment. The purpose of acupoint plasters is to enhance the gastrointestinal function of patients. Circular massage at these acupoints can accelerate gastrointestinal peristalsis, accelerate the digestion and excretion of food, which then improve the symptoms of constipation.

### 3.5. Comprehensive therapy

In the study of Xu [46], the control group underwent routine treatment, and the treatment group was treated with Xiaoyao decoction combined with massage on the basis of routine treatment. The total effective rate of the treatment group (90.6%) was higher compared to the control group (66.6%). In addition, the improvement of clinical symptoms in the treatment group was better compared to the control group.

Therefore, it is suggested that this method can fundamentally enhance patients' clinical symptoms and quality of life. Li *et al.* treated diabetic patients with craniocerebral injury with self-made Shenqi Zhuyao decoction combined with abdominal acupoint massage<sup>[47]</sup>. Compared to the control group, the observation group had significantly better clinical curative effects. The incidence of constipation within 7 days after treatment in the observation group was remarkably lower. Therefore, it is clear that the treatment scheme of the observation group can not only enhance the symptoms of patients with diabetes mellitus complicated with craniocerebral injury, but also control the level of blood glucose and improve the quality of life. Chen *et al.* randomly divided 60 elderly patients with type 2 diabetes with constipation into two groups<sup>[48]</sup>. The control group, which consisted of 30 patients, were treated with western medicine alone, whereas the treatment group was treated with self-made decoction combined with an electromagnetic wave and auricular point pressure bean method. After 1 month of treatment, the total effective rate of the treatment group was 90%, which was better compared to the control group (50%). The clinical symptoms of diabetic constipation patients in the treatment group were effectively relieved, and their fasting blood glucose (FBG), blood sugar (2h-PBG), and fructosamine (FA) levels were remarkably lower than those before treatment. Li randomly divided elderly patients with diabetic constipation into two groups<sup>[49]</sup>. The control group was treated with conventional western medicine, and the treatment group was treated with Xiaoke Runchang decoction combined with electromagnetic waves and auricular point pressure beans. The results indicated that the total effective rate of the treatment group was higher, and the patients' FBG, 2h-PBG, chronic constipation severity score (CSS), self-rating life quality scale score (PAC-QOL), and other indicators were remarkably lower.

#### **4. Mechanisms of acupuncture and moxibustion in treating diabetic constipation**

According to modern medicine, acupuncture acts on the local acupoints and is transmitted to the corresponding organs then to the brain through the meridian system, thus regulating the functional state of the body<sup>[50]</sup>. Its mechanism involves nervous system regulation, physiology, pathology, morphology, molecular biology, and other fields, with multi-link, multi-target, multi-level comprehensive regulation characteristics<sup>[51]</sup>. During diabetic constipation treatment, the central nervous system, sympathetic nervous system, parasympathetic nervous system, and enteric nervous system are regulated, thus preventing or alleviating the symptoms<sup>[52]</sup>. During acupuncture, localized acupoints stimulate the lesion directly, mainly because the projection of the acupuncture area is the same as the body surface, close to the internal organs, and the acupuncture needles are inserted in a certain direction and distance, directly to the center of the lesion<sup>[53]</sup>. Jin Jianfeng's research found that the intestine is regulated by the central nervous system and he suggested that the emotional regulation of diabetic constipation patients should be emphasized<sup>[54]</sup>. For example, acupuncture at head acupoints such as Baihui and Dazhui can adjust the mental and psychological state of patients, which can lead to a new train of thought and direction for the clinical treatment of diabetic constipation with anxiety or depression.

#### **5. Summary and prospects**

At present, the etiology and pathology of diabetic constipation have not been fully understood by western medicine. There are no unified and standardized treatment for this disease. Clinically, the main treatment strategy is symptomatic treatment, which is effective in the short term but tends to recur. In short, the long-term effect of western medicine on diabetic constipation needs to be improved.

Decoctions are often used in TCM to treat diabetic constipation, but the first-pass effect of the liver and the gastrointestinal tract are inevitable, and some patients might experience adverse side effects, so the clinical application is limited. Comprehensive acupuncture treatments can relieve the symptoms of constipation in diabetics and can also regulate the patient's blood sugar levels. Acupuncture has fewer

adverse reactions and less stimulation to the gastrointestinal tract compared to decoctions. For patients with long-term chronic constipation, different acupuncture treatments can be selected according to their different functional states, to fully stimulate a variety of regulatory systems in the body in order to maximize the therapeutic effect.

Western medicine has advocated proper diet and behavioral and physical therapy in the prevention and treatment of diabetic constipation, which is in line with the idea of “treating the untreated” in TCM. Traditional Chinese medicine emphasizes the combination of the Four Diagnostic Methods of TCM for syndrome differentiation and treatment, rather than a standardized treatment of the disease. Further popularization of acupuncture could remarkably improve clinical outcomes and reduce the patients’ sufferings.

In summary, there are many ways in which acupuncture can be used to treat constipation complicated by diabetes, and it is widely used in clinical practice. It has been clinically recognized and has become a promising and potential method for the clinical intervention of diabetic constipation. However, there are still some limitations in the clinical application of acupuncture, such as differences in the techniques and needles, and the lack of effective indicators and criteria for evaluating efficacy. There is a range of subjectivity in the selection of acupuncture points by clinicians based on the different dynamic mechanisms governing the typing and treatment of symptoms. Besides, there are also differences in the selection of the frequency, waveform, and degree of stimulation of electroacupuncture. In addition, for long-term chronic patients, if the course of treatment and interval is not considered carefully, “needle resistance” may occur. In future clinical treatment, there is an urgent need for scientific and standardized operation and unified diagnosis and treatment standards that can be used to guide clinical practice. The clinical treatment plan needs to be further optimized to explore more effective treatment methods and provide more optimized diagnoses and treatment plans.

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## **References**

- [1] Sangnes DA, Lundervold K, Bekkelund M, et al., 2021, Gastrointestinal Transit and Contractility in Diabetic Constipation: A Wireless Motility Capsule Study on Diabetes Patients and Healthy Controls. *United European Gastroenterology Journal*, 9(10): 1168–1177. <https://doi.org/10.1002/ueg2.12169>
- [2] Sang M, Wu T, Sun Z, 2021, Pathogenesis and Clinical Management of Diabetes-related Gastrointestinal Symptoms. *Chinese Journal of Diabetes Mellitus*, 13(5): 513–516. <https://doi.org/10.3760/cma.j.cn115791-20200730-00471>
- [3] Deng X, Chen S, Chen L, et al., 2019, Based on the Theory of Huangdi Neijing, A Preliminary Study on The Treatment of Type 2 Diabetes by Filling and Cultivating Five Organs. *Journal of basic Chinese Medicine*, 25(5): 683–684.
- [4] Cao H, 2011, *Evidence-Based Clinical Practice Guidelines for Chinese Medicine*, China Press of Traditional Chinese Medicine, Beijing.
- [5] Gao Y, Huan P, Cui L, et al., 2019, Treatment Mechanism of Diabetic Constipation from Spleen



- Deficiency Base on Intestinal Micro-Ecology. *Information of Traditional Chinese Medicine*, 36(6): 25–27. <https://doi.org/10.19656/j.cnki.1002-2406.190167>
- [6] Wei J, Bai L, Wei F, 2019, Discussion on “Xiaoke” Disease and Diabetes Mellitus. *World Science and Technology/Modernization of Traditional Chinese Medicine and Materia Medica*, 21(1): 54–58. <https://doi.org/10.11842/wst.2019.01.010>
- [7] Cao W, Xiang P, Sun H, et al., 2021, Effect of Yangyin Hewei Fang on Gastrointestinal Motility in Patients with Diabetic Constipation. *Journal of Changchun University of Chinese Medicine*, 37(1): 80–83. <https://doi.org/10.13463/j.cnki.cczyy.2021.01.022>
- [8] Zhang L, Zhi J, Chen X, 2021, Clinical Effect of Huangzhi Capsule in Treatment of Diabetic Constipation with Intestinal Dryness, Yin Insufficiency, and Stasis: An Analysis of 30 Cases. *Journal of Anhui University of Chinese Medicine*, 40(3): 21–25. <https://doi.org/10.3969/j.issn.2095-7246.2021.03.007>
- [9] Li S, Du S, 2019, Clinical Study on Diabetic Constipation Treated with Ganju Erdong Decoction. *Journal of Guangzhou University of Traditional Chinese Medicine*, 36(8): 1133–1136. <https://doi.org/10.13359/j.cnki.gzxbtcm.2019.08.003>
- [10] Wang Y, Mao X, 2018, Yinchen Zhizi Dahuang Decoction in the Treatment of Diabetic Constipation: Clinical Effect. *Chinese Journal of Coloproctology*, 38(5): 42–43. <https://doi.org/10.3969/j.issn.1000-1174.2018.05.016>
- [11] Liu J, Huang Y, Hu P, et al., 2021, Efficacy of Auricular Pressure Beans in The Treatment of Elderly Patients with Diabetes Mellitus with Constipation. *Journal of Frontiers Medicine*, 11(14): 168–169.
- [12] Zhao D, Zhao J, 2018, Comparison of Chang Run Tong and Forlaxin Treatment of Constipation in Elderly Diabetic Patients. *The Journal of Alternative and Complementary Medicine: Research on Paradigm, Practice, and Policy*, 24(5): 472–480. <https://doi.org/10.1089/acm.2018.0052>
- [13] Qiu T, Xiong Y, Wu H, 2020, Factors Contributing to Constipation in Elderly Patients with Type 2 Diabetes and The Impact of Hip-lifting Intervention. *Chinese Journal of Gerontology*, 40(23): 4940–4944. <https://doi.org/10.3969/j.issn.1005-9202.2020.23.005>
- [14] Liu Y, Chen G, Zhu Y, et al., 2018, Progress in The Study of Chinese Medicine Treatment of Diabetic Constipation. *Lishizhen Medicine and Materia Medica Research*, 29(3): 683–685. <https://doi.org/10.3969/j.issn.1008-0805.2018.03.059>
- [15] Dou Y, Wang X, Xu Q, et al., 2018, Anorectal Kinetic Characteristics and Influencing Factors in Elderly Patients with Diabetic Constipation. *Chinese Journal of Gerontology*, 38(21): 5169–5171. <https://doi.org/10.3969/j.issn.1005-9202.2018.21.020>
- [16] Liang H, Li R, Yao J, et al., 2021, Mechanism of Shouhui Tongbian Capsules in Treating Constipation Based on Network Pharmacology and Molecular Docking. *China Journal of Chinese Materia Medica*, 46(3): 511–519. <https://doi.org/10.19540/j.cnki.cjcmm.20201117.406>
- [17] Zhang L, Zhi J, Chen X, 2021, Clinical Effect of Huangzhi Capsule in Treatment of Diabetic Constipation with Intestinal Dryness, Yin Insufficiency, and Stasis: An Analysis of 30 Cases. *Journal of Anhui University of Chinese Medicine*, 40(3): 21–25. <https://doi.org/10.3969/j.issn.2095-7246.2021.03.007>
- [18] Yan B, Liu X, Yang M, et al., 2018, Randomized Controlled Study on The Effect of Single Acupoint and He-mu Acupoints on Diabetic Constipation. *Liaoning Journal of Traditional Chinese Medicine*, 45(9): 1944–1946. <https://doi.org/10.13192/j.issn.1000-1719.2018.09.048>
- [19] Zhu T, 2020, Effects of Acupuncture Method of Mountain-Burning Warming on Zusanli combined

with Anal Lifting Exercises on the Digestive and Endocrine System in Elderly Patients with Diabetic Constipation. *Nursing Practice and Research*, 17(1): 149–150. <https://doi.org/10.3969/j.issn.1672-9676.2020.01.060>

- [20] Wang F, Yu X, 2018, A Case of Diabetic Constipation Treated by Dr. Yu Xiulan. *Asia-Pacific Traditional Medicine*, 14(11): 126–127. <https://doi.org/10.11954/ytctyy.201811045>
- [21] Zhao P, Liu Z, Lu G, et al., 2020, Observation of the Bidirectional Regulatory Effect of Electroacupuncture on Functional Bowel Disease Based on Back-Shu and Front-Mu Acupoint Grouping Theory. *Shanghai Journal of Acupuncture and Moxibustion*, 39(9): 1099–1103. <https://doi.org/10.13460/j.issn.1005-0957.2020.09.1099>
- [22] Wu Y, 2018, Transcutaneous Acupoint Electrical Stimulation for Diabetes-related Constipation. *Chinese General Practice*, 21(22): 2741–2745. <https://doi.org/10.3969/j.issn.1007-9572.2018.00.253>
- [23] Xing L, Huang S, Lin H, et al., 2021, Clinical Observation of Gui-tao Maziren Pills in Treating Constipation of Type 2 Diabetes in Elderly. *Clinical Journal of Chinese Medicine*, 13(18): 65–67 + 75. <https://doi.org/10.3969/j.issn.1674-7860.2021.18.024>
- [24] Su Z, Zhou Y, 2019, A Study of Targeted Nursing Interventions in Elderly Patients with Diabetic Hypotonic Constipation. *Electronic Journal of Clinical Medical Literature*, 6(55): 86–87. <https://doi.org/10.16281/j.cnki.jocml.2019.55.067>
- [25] Li T, Miao Y, Wang Y, et al, 2018, Treatment of Senile Diabetic Constipation with Modified Sini Powder. *Yunnan Journal of Traditional Chinese Medicine and Materia Medica*, 39(4): 104–105. <https://doi.org/10.3969/j.issn.1007-2349.2018.04.045>
- [26] Cui S, 2020, Clinical Observation on The Treatment of Constipation Caused by Type 2 Diabetic Gastroparesis with Shouhuo Laxative Capsules Combined with Mosapride Citrate Tablets. *China's Naturopathy*, 28(17): 79–81. <https://doi.org/10.19621/j.cnki.11-3555/r.2020.1738>
- [27] Guo C, 2018, Effectiveness of Specific Care in Elderly Diabetic Patients with Hypotonic Constipation. *Nursing Practice and Research*, 15(20): 29–31. <https://doi.org/10.3969/j.issn.1672-9676.2018.20.010>
- [28] Li R, Li B, Huang Y, et al., 2020, Effect of Thunder Fire Moxibustion Combined with Glauber's Salt Navel Application in the Treatment of constipation in patients with diabetes mellitus. *Journal of Qilu Nursing*, 26(3): 101–104. <https://doi.org/10.3969/j.issn.1006-7256.2020.03.033>
- [29] Gao Y, Zhang Y, Wu H, et al., 2020, 41 Cases of Diabetic Constipation Treated with Zengye Decoction and Gourd Moxibustion. *Jiangxi Journal of Traditional Chinese Medicine*, 51(7): 60–62.
- [30] Yuan Min, 2019, Effect of Prospective Comprehensive Nursing on Constipation in Patients with Acute Myocardial Infarction Complicated with Diabetes. *Diabetes New World*, 22(8): 1–2 + 5. <https://doi.org/10.16658/j.cnki.1672-4062.2019.08.001>
- [31] Fu L, Hu Z, Huang S, 2018, Therapeutic Observation of Syndrome Differentiation-based Acupoint Sticking Therapy for Constipation in Diabetes. *Shanghai Journal of Acupuncture and Moxibustion*, 37(4): 373–377. <https://doi.org/10.13460/j.issn.1005-0957.2018.04.0373>
- [32] Gao Y, Lu C, Liu F, 2018, Clinical Observation of Acupressure Combined with Mosapride Citrate Tablets in The Treatment of Constipation in Type 2 Diabetes Mellitus with Mild Gastric Paralysis. *Hebei Journal of Traditional Chinese Medicine*, 40(3): 367–370. <https://doi.org/10.3969/j.issn.1002-2619.2018.03.010>
- [33] Li J, 2019, The Efficacy of Herbal Acupressure with Chinese Medicine Sealing Package to Prevent Constipation in Diabetic Foot Patients Based on The Midnight-Noon Ebb-flow Point Selection Theory. *World Latest Medicine Information*, 19(26): 288 + 292. [16](https://doi.org/10.19613/j.cnki.1671-</a></p></div><div data-bbox=)

3141.2019.26.180

- [34] Chen J, Zeng Q, Peng X, 2019, Effectiveness of Acupressure with Acupuncture Points in The Treatment of Diabetic Patients with Constipation. *Chinese General Practice Nursing*, 17(13): 1577–1579. <https://doi.org/10.12104/j.issn.1674-4748.2019.13.016>
- [35] Chen X, 2018, A Study on The Application of Acupressure on Shen Que Point in Diabetic Patients with Constipation. *Diabetes New World*, 21(17): 45–46. <https://doi.org/10.16658/j.cnki.1672-4062.2018.17.045>
- [36] Zheng S, Zou X, 2021, Effect of Hot Compress with Fructus Evodiae Combined with Nursing of Auricular Acupoint Pressing with Beans on Abdominal Distension and Gastrointestinal Function of Patients with Diabetes Mellites Complicated with Constipation. *New Chinese Medicine*, 53(16): 182–185. <https://doi.org/10.13457/j.cnki.jncm.2021.16.047>
- [37] Zeng K, 2019, A Community Intervention Model in Patients with Diabetic. Constipation. *Chinese General Practice Nursing*, 17(19): 2411–2413. <https://doi.org/10.12104/j.issn.1674-4748.2019.19.044>
- [38] Shao C, Jin C, Wang S, 2020, Observation on Clinical Effect of Auricular Point Sticking Therapy Combined with Lifestyle Intervention for Diabetic Patients with Constipation. *Journal of Clinical Nursing in Practice*, 6(10): 136–138. <https://doi.org/10.11997/nitcwm.202010029>
- [39] Yin J, 2019, Efficacy of Auricular Acupressure with Acupressure in The Treatment of Diabetic Constipation. *Xinjiang Journal of Traditional Chinese Medicine*, 37(6): 44–45.
- [40] Liu L, Zhang Y, Yang D, et al., 2020, Study on Mechanism of Auricular Acupoint Stimulation to Prevent and Treat Functional Gastrointestinal Disorders. *Clinical Journal of Chinese Medicine*, 12(27): 20–24. <https://doi.org/10.3969/j.issn.1674-7860.2020.27.010>
- [41] Wang L, Sun B, Bao J, et al., 2021, Clinical Observation on Auricular Point Sticking-Pressure Combined Shenque Point (CV8) Application in Treating Constipation in Elderly Patients with Type 2 Diabetic Nephropathy. *Journal of Guangzhou University of Traditional Chinese Medicine*, 38(1): 85–90. <https://doi.org/10.13359/j.cnki.gzxbtcm.2021.01.017>
- [42] Zhou Z, 2018, Treatment of Diabetic Colonic Transmission Disorder Constipation with Xiaopi Yichang Decoction. *Journal of Practical Traditional Chinese Medicine*, 34(3): 283–284. <https://doi.org/10.3969/j.issn.1004-2814.2018.03.010>
- [43] Yuan S, Chen Y, Chen W, et al., 2019, Clinical Study of Nursing Combined with Acupoint Therapy for Diabetic Constipation. *Heilongjiang Medicine Journal*, 32(4): 987–988. <https://doi.org/10.14035/j.cnki.hljyy.2019.04.113>
- [44] Fan M, Chang L, Yang X, 2020, Clinical Study of Abdominal Tuina for Senile Patients with Diabetic Constipation. *Journal of New Chinese Medicine*, 52(16): 141–144. <https://doi.org/10.13457/j.cnki.jncm.2020.16.039>
- [45] Zhu S, 2019, The Intervention Effect of Acupressure with Patching on Diabetic Constipation in the Elderly. *Chinese Journal of Basic Medicine in Traditional Chinese Medicine*, 25(7): 985–987.
- [46] Xu B, 2018, Effect of Personalized Care on Constipation in Patients with Acute Myocardial Infarction Combined with Diabetes Mellitus. *Electronic Journal of Practical Clinical Nursing Science*, 3(13): 12–13. <https://doi.org/10.3969/j.issn.2096-2479.2018.13.011>
- [47] Li Q, Hui L, Bai F, 2018, Clinical Study on Shenqi Shuyao Decoction Combined with Abdominal Acupoint Massage in the Prevention of Constipation of Patients with Diabetes and Craniocerebral Injury. *World Chinese Medicine*, 13(7): 1592–1596. <https://doi.org/10.3969/j.issn.1673-7202.2018.07.008>

- [48] Chen F, Sun F, Wu Q, et al., 2019, Xiaoke Runchang Decoction Combined with Electromagnetic Wave and Ear Acupuncture in Treatment of Elderly Diabetic Constipation. *Acta Chinese Medicine*, 34(3): 625–628. <https://doi.org/10.16368/j.issn.1674-8999.2019.03.147>
- [49] Li Y, 2020, Xiaoke Runchang Decoction Combined with Electromagnetic Wave and Ear Acupuncture to Treat Elderly Diabetic Constipation. *Guide of China Medicine*, 18(16): 180–182.
- [50] Wang W, Chen H, 2019, Clinical Observation on the Treatment of Diabetic Constipation with Heat and Yin Deficiency by Zengye Chengqi Decoction Modified. *Electronic Journal of Clinical Medical Literature*, 6(69): 166.
- [51] Li X, Wang R, Zhang Y, 2021, Analysis on Acupoint Selection and Methods Rules for Diabetic Gastroparesis. *World Chinese Medicine*, 16(24): 3670–3677. <https://doi.org/10.3969/j.issn.1673-7202.2021.24.020>
- [52] Liu K, Jiang J, Lu S, 2021, Effect Characteristics and Mechanism of Acupuncture in Autonomic Nerve Regulation. *Acupuncture Research*, 46(4): 335–341. <https://doi.org/10.13702/j.1000-0607.200665>
- [53] Zheng Z, Wen C, 2018, Preliminary Study on “Lesions Points” and “Functional Points” in Modern Acupuncture. *Journal of Clinical Acupuncture and Moxibustion*, 34(3): 74–78. <https://doi.org/10.3969/j.issn.1005-0779.2018.03.020>
- [54] Jin J, Liu J, He Y, 2019, An Investigation of the Effectiveness of Qirong Tongbian Decoction in the Treatment of 83 Patients with Diabetes Mellitus Complicated by Constipation. *Contemporary Medical Symposium*, 17(7): 204–205.

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