

## Original Article

# Expert consensus on acupuncture for diabetic foot

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**Abstract:** Diabetic foot (DF), is called “foot gangrene” (gangrene) or “nerve gangrene” (gangrene of the nerve area) in traditional Chinese medicine. It is a severe complication of diabetes, whose incidence rate is high, and the consequences is serious. Acupuncture is a promising therapy, it is effective, it can alleviate symptoms, accelerate the wound healing and reduce the risk of amputation. This consensus includes clinical evidence and expert practical experience, it shows acupuncture is an effective supportive treatment methods. Its main purpose is to provide practical, standardized, and safe instructions for clinicians. It can promote the use of acupuncture in evidence-based treatment of diabetic foot ulcers. The innovation points of this consensus are: 1. Stage guidance: It includes the indications, contraindications and Wagner classification system, which adjusts the treatment measures for different conditions. 2. Integrated diagnosis: It includes modern vascular assessment, neurological examinations, and TCM syndrome, such as ankle-brachial index, arterial oxygen partial pressure and nerve conduction studies, finally formulating different treatment plans. 3. Focus on strict operating procedures: Formulating safe and controlling infection measures for patients with diabetic foot to conduct acupuncture treatment, and figuring out the risk factors.

**Keywords:** Diabetic foot, acupuncture, traditional Chinese medicine, expert consensus

## Introduction

The clinical feature of DF are foot ulcers, infections, and destruction of deep soft tissues. The causes of DF are peripheral neuropathy (PN) and peripheral artery disease (PAD). The incidence and mortality rates of DF are high, and significantly reducing the quality of life and long-term prognosis of patients [1]. It is estimated that 537 million adults have diabetes worldwide, with a global prevalence rate of 10.5%; it is notable that this disease burden is continuously increasing, and the growth is particularly significant in low-income and middle-income countries (LMICs) [2]. Epidemiological studies show that approximately one-third of diabetic patients will develop foot ulcers [3]. Although contemporary standard treatment regimens - including blood sugar control, infection control, vascular reconstruction, and specialized wound care - have improved clinical efficacy to a certain extent, a considerable

number of refractory diabetic foot patients still fail to receive satisfactory treatment outcomes [4]. In the theoretical system of traditional Chinese medicine, diabetic foot is classified as “jinju” or “zufu”. Its main pathogenesis lies in the deficiency of both qi and yin, accompanied by obstruction of meridians and blood stasis, often accompanied by the interference of pathogenic factors such as dampness, heat, toxic substances, cold congealing, and stagnation of phlegm and dampness.

Such pathological alterations predominantly target the foot vasculature and soft tissues, and are closely linked to dysfunction of the liver, spleen and kidney. Mounting clinical evidence indicates that TCM-based interventions, especially external therapeutic approaches, can effectively optimize the clinical outcomes of patients with diabetic foot ulcers [5, 6]. Guided by the meridian theory of TCM, acupuncture has been documented to regulate the flow of Qi

**Table 1.** Evidence level, description and recommendation strength

Evidence Level	Description	Recommendation Strength
A	High-quality randomized controlled trials (RCTs) or Meta-analyses	Strongly recommended
B	Well-designed cohort studies or controlled clinical trials	Recommended
C	Expert consensus and clinical experience	Conditionally recommended

and Blood circulation and restore Yin-Yang balance, making it an increasingly investigated adjunctive approach within Management methods of diabetic foot carried out in multiple disciplines [7-10].

**Consensus development methodology**

The consensus was formed by multidisciplinary team of two Third-Class Tertiary Traditional Chinese Medicine Hospital, including acupuncture, vascular surgery, endocrinology and anesthesiology experts. We reached this consensus through four rounds of discussions. Our formulation process is centered around the following three aspects: 1. A systematic review of relevant literature up to 2025 was conducted. 2. A systematic discussion was conducted on the practical issues in clinic, safety, and the management of diabetic foot.

If the quality of the evidence is relatively high, the recommendations can be classified based on the quality. In fields where clinical data is unreliable, expert consensus relies on clinical experience. All suggestions must undergo review and approval by the expert panel before they are finalized.

**Evidence grading and recommendation strength**

This consensus adopts a standardized grading framework to classify the strength levels of its clinical recommendations as shown in **Table 1**.

**Diagnostic and grading criteria**

*Diagnostic criteria*

We referred to Guidelines on the Prevention of Foot Ulcers in Persons with Diabetes (IWGDF 2023 update) [11] and Advanced Strategies for the Management of Patients with Diabetic Foot Ulcers: A Comprehensive Review [12], we have established the diagnostic criteria for diabetic foot.

A confirmed diagnosis of diabetes mellitus was made.

1. There are or currently exist conditions such as foot ulcers, gangrene, symptoms of peripheral vascular disease, peripheral neuropathy, and lower limb infections (excluding lesions caused by other causes).

2. Evidence of peripheral neuropathy, indicated by reduced nerve conduction velocity or abnormal findings on electrophysiological examinations (including electromyography and somatosensory evoked potentials of the lower extremities).

3. The abnormal findings in the sensory examination include: impaired or absent sensation of temperature, weakened or absent sensation in the 10-centimeter monofilament test, abnormal vibration perception, and/or absence of ankle reflex.

4. When at rest, the ankle-brachial index (ABI) is lower than 0.9, or when at rest the ABI is greater than 0.9 but accompanied by lower limb discomfort during exercise, and the decrease in ABI after exercise is 15%-20%, or there is imaging evidence of arterial stenosis.

5. Vascular imaging modalities (including color Doppler ultrasonography, computed tomography angiography, lower extremity angiography, and magnetic resonance angiography) support the diagnosis.

The diagnosis of diabetic foot needs to meet standard 1 and standard 2, and also needs to meet at least one of standards 3 to 7.

*Grading criteria*

Precise classification is the key basis for clinical decision-making and prognosis. This consensus adopts the Wagner classification system [13], which is one of the commonly used grading tools in clinical practice research [14-

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**Table 2.** Wagner classification of diabetic foot

Grade	Description
0	Intact skin; high-risk foot (deformities, impaired perfusion, sensory loss)
1	Superficial ulcer (no infection)
2	Deep ulcer involving muscle, with infection (no osteomyelitis)
3	Deep ulcer with tendon/ligament destruction, abscess, or osteomyelitis, secretions, and necrotic tissue
4	Localized gangrene with bone destruction or pseudarthrosis
5	Whole-foot gangrene (ankle/calf involvement)

**Table 3.** Acupuncture mechanisms, effects and evidence level by Wagner grade

Mechanism	Biological Effect	Relevance to Wagner Grade	Evidence Level
Systemic Metabolic Regulation	Enhances metabolic function	Grade 0 (preventive)	B
Microcirculation & Nerve Function	Promotes blood flow and nerve repair	Grades 0-1 (neuropathic/ischemic symptoms)	B
Molecular Signaling Modulation	Influences tissue regeneration	Grades 1-2 (tissue repair)	B
Analgesic Effects	Alleviates rest pain and intermittent claudication	All grades (symptom management)	A

**Table 4.** Acupuncture indications and evidence level by Wagner grade

Wagner Grade	Clinical Indications	Recommendation	Evidence Level
0	Peripheral neuropathy and/or peripheral vascular disease without ulceration, with symptoms like numbness, cold sensation, or paresthesia	Strongly recommended as preventive therapy	A
1	Superficial foot ulcers without clinical signs of infection	Recommended as adjunctive therapy	A
2	Deeper ulcers involving subcutaneous tissues, without severe ischemia or deep infection	Recommended after infection control	B
3-5	Deep ulcers with abscess/osteomyelitis or gangrene	Conditionally recommended as supportive/preoperative therapy only	C

16]. This system divides diabetic foot ulcers into six types, and the criteria are based on the depth of the ulcer and the range of tissue necrosis [17].

The Wagner classification method is simple, but it has its limitations. This method does not regard as a key indicator of peripheral neuropathy or peripheral artery disease (PAD), so it is unable to effectively distinguish the infectious and ischemic lesions [18]. The Wagner grade is shown in **Table 2**.

### Mechanistic rationale for acupuncture

The mechanism of acupuncture lies in its ability to regulate the key physiological pathways. By acting on blood vessels, nerves and the immune system, it can improve local microcirculation, restore peripheral nerve function, and regulate inflammatory responses. Both clinical and experimental studies have confirmed its beneficial effects in relieving pain, alleviating neuropathic symptoms, and accelerating wound healing, with the most significant

improvements seen in early-stage disease (Wagner grades 0-2). In advanced stages, its role shifts primarily to adjunctive and supportive care [19-22]. The summary of the mechanism is shown in **Table 3**.

### Scope of application

Important note: Acupuncture is an adjuvant treatment method and should not delay necessary treatments, such as debridement, the use of antibiotics, or vascular reconstruction. And acupuncture cannot replace the standard treatment for diabetic foot.

Acupuncture may be considered in the following contexts based on the Wagner classification (**Table 4**).

Considerations for advanced disease (Wagner Grades 3-5): (1) Acupuncture will be considered for patients with stable overall conditions only after a comprehensive multidisciplinary team assessment. The use of such related drugs is limited to supportive or palliative treatments

aimed at alleviating symptoms (such as reducing pain), and such intervention measures must not delay the necessary final surgical procedures. (2) Puncturing the affected foot locally is prohibited in acupuncture. When using acupuncture clinically, proximal acupoints (such as the lower limb area near the knee joint) can be selected, and needling should also be performed cautiously. (3) Monitoring: Patients require close monitoring for signs of worsening infection, progressive ischemia, or systemic deterioration [12].

### Treatment principles and goals

#### *Treatment principles*

The following are several core principles guiding the clinical application of acupuncture for diabetic foot: 1. Meanwhile, for primary aspect and secondary aspect: The main therapeutic goal is to enhance qi and blood. During the acute stage, the intervention measures focus on secondary aspect, that is, eliminating the pathogenic factors, such as eliminating internal heat toxins and detoxifying. During the remission stage, the treatment focus lies in primary aspect, that is, stimulating true qi, nourishing yin fluids, and maintaining the balance of qi and blood. 2. Diagnosis: The selection of acupoints should be based on clinical standards and the individualized traditional Chinese medicine (TCM) disease types of the patient, including conditions such as dampness accumulation, heat syndrome, toxin accumulation, qi deficiency combined with blood stasis, and yang deficiency accompanied by cold coagulation. 3. Comprehensive application of multiple therapies: Acupuncture can be combined with various traditional Chinese external treatment methods (such as filiform needle therapy, moxibustion, acupoint injection, and electroacupuncture) to enhance the therapeutic effect. 4. The first issue to consider is safety: Given that diabetic foot patients have weakened foot sensation and their skin tissue is fragile and prone to damage, all clinical procedures must prioritize safety. We must adhere strictly to clinical indications and standard operating procedures. We are committed to minimize the local infections or bleeding. More attention should be given to patients with poor blood sugar control. 5. Multidisciplinary cooperation: We need multidisciplinary experts jointly discuss the clinical treatment, including endocrinologists, va-

scular surgeons, wound care and acupuncture experts.

#### *Treatment goals*

The core therapeutic goals of acupuncture for the clinical management of diabetic foot ulcers are outlined below: (1) Alleviate Pain: Mitigate neuropathic and ischemic pain [23]. (2) Improve Circulation: Optimal tissue perfusion through enhanced blood and lymphatic flow. (3) Regulate Nerve Function: Promote the recovery of peripheral nerve sensory and motor functional status. (4) Wound Healing: Enhance peripheral blood circulation and regulate local immune responses to accelerate ulcer healing and tissue repair. (5) Inflammation Control: Reducing local inflammatory activity to support tissue regeneration. (6) Quality of Life: Improving functional mobility, sleep, and daily living conditions. (7) Prevention: Decreasing the risk of ulcer progression, recurrence, and potential amputations.

### Acupuncture point selection

Acupoint selection should be determined by disease stage, lesion location and individualized TCM syndrome patterns, with a rational combination of principal and adjunctive acupoints.

#### *Primary points (Reference)*

The following acupoints are commonly recommended (**Table 5**).

#### *Syndrome differentiation-based point selection*

Treatment should be tailored to the TCM syndrome differentiation (**Table 6**).

#### *Staging and local treatment*

Interventions ought to be individualized according to disease stage (per the Wagner classification), with priority given to safety and infection control rather than the cosmetic appearance of the wound (**Table 7**).

### Recommended combined therapies

#### *Acupuncture combined with Chinese herbal fumigation and washing*

(1) Rationale: Herbal fumigation and foot bathing effectively alleviate clinical manifestations,

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**Table 5.** Core acupoints, meridians, efficacy and evidence level

Acupoint	Meridian	Therapeutic Effects	Evidence Level
Zusanli (ST36)	Stomach	Regulates spleen and Qi, promotes circulation, supports immunity	B
Sanyinjiao (SP6)	Spleen	Modulates liver, spleen, and kidney functions	C
Guanyuan (CV4)	Conception Vessel	Warms Yang and tonifies Qi	C
Qihai (CV6)	Conception Vessel	Tonifies Qi and provides systemic support	C
Taixi (KI3)	Kidney	Nourishes kidney Yin	C
Bafeng (EX-LE10)	Extra	Activates foot meridians	C
Back-Shu points	Bladder Meridian	Regulation of visceral function	C

**Table 6.** TCM syndrome differentiation and acupuncture prescriptions with evidence level

Syndrome Type	Clinical Manifestations	Treatment Principle	Prescription	Evidence Level
Qi Deficiency and Blood Stasis	Limb numbness, cold sensation, intermittent claudication, delayed healing, fatigue, pale/dark tongue	Tonify Qi, activate blood	Zusanli (ST36), Guanyuan (CV4), Qihai (CV6), Xuehai (SP10), Pishu (BL20), Geshu (BL17)	B
Qi-Yin Deficiency	Pale red granulation, non-healing ulcers, sallow complexion, dizziness, pale tongue	Tonify Qi, nourish Yin	Zusanli (ST36), Sanyinjiao (SP6), Xuehai (SP10), Guanyuan (CV4), Qihai (CV6)	C
Excessive Dampness-Heat Toxin	Red, swollen, hot, painful foot	Clear heat, drain dampness, detoxify	Quchi (LI11), Hegu (LI4), Yinlingquan (SP9), Fenglong (ST40), Weizhong (BL40)	B
Yin Deficiency with Stasis-Heat	Burning pain, redness/ulceration, dry mouth, red tongue	Nourish Yin, clear heat, resolve stasis	Taixi (KI3), Ganshu (BL18), Shenshu (BL23), Geshu (BL17), Sanyinjiao (SP6)	C
Yang Deficiency and Cold Congelation	Cold limbs, pain aggravated by cold, pale/purple skin, dull wounds	Warm Yang, disperse cold, activate blood	Mingmen (GV4), Shenshu (BL23), Shenque (CV8), Guanyuan (CV4), Yongquan (KI1)	C
Phlegm-Stasis Intermingling	Swollen/numb foot, sticky exudate	Resolve phlegm, dredge collaterals	Fenglong (ST40), Yinlingquan (SP9), Zhongwan (CV12)	C

**Table 7.** Acupuncture therapies, key points, contraindications and evidence level by Wagner grade

Wagner Grade	Allowed Methods	Key Points	Contraindications	Evidence Level
0	Body acupuncture, electroacupuncture, moxibustion	Points along arterial pathways; mild moxibustion at Zusanli, Yongquan	None specific	A
1-2	Surrounding needling, distant points, mild moxibustion	Needles inserted 0.5-1cm from ulcer edge, 15-30° angle toward base	Direct needling of ulcers/pus cavities	A
3-5	Distal points, ear acupuncture	Focus on systemic regulation and pain relief	Local needling/moxibustion on affected foot; infected areas	B

improve local vascular perfusion and peripheral nerve function, and accelerate ulcer healing in patients with Wagner grade 0-1 diabetic foot ulcer, with no elevated risk of adverse events. The active ingredients in herbal formulations function as adjuvant therapeutics by exerting antibacterial, anti-inflammatory and antioxidant effects, while also stimulating angiogenesis and tissue repair [24] (Level B evidence).

(2) Methods: Decoctions were prepared and used in a fumigation device. The foot temperature was maintained at 40-45°C. The affected foot is fumigated and then soaked for 15-30 minutes once the solution reaches an appropriate temperature.

(3) Contraindications: Suitable only for closed wounds or ulcers with effective infection control measures. When there are heavy bleeding, severe infection, high fever or serious cardiovascular diseases, the use of this drug should be avoided. Therefore, a careful assessment is necessary.

*Acupuncture combined with external herbal ointment in acupoint*

(1) Acupoint Selection: Primarily Back-Shu points (Pishu BL20, Shenshu BL23), Shenque (CV8), and Yongquan (KI1). Additional points were chosen based on the syndrome type [25].  
 (2) Method: Medicinal paste was shaped into

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**Table 8.** Acupuncture techniques, indications, safety and evidence level

Technique	Indications	Key Safety Precautions	Evidence Level
Filiform Needle	All stages with appropriate indications	Avoid damaged areas; routine disinfection; 20-30 min retention	B
Electroacupuncture	Neuropathic pain, circulatory impairment	2-5 Hz frequency; avoid ulcerated/insensate areas; adjust intensity	A
Warm Acupuncture	Cold limbs, decreased temperature	Avoid direct scarring moxibustion; no application on sole; monitor burns	B
Acupoint Injection	Neurotrophic support	0.5-1 mL per point; avoid wounds/sensory deficits; no Vit B12 + lidocaine mix	C
Pricking and Cupping	Local blood stasis, intact skin	Avoid ulcerated/infected/ischemic areas; minimal blood release	B

1-2 cm diameter cakes (approx. 0.3 cm thick), was applied to selected points and secured. The duration of using this method is usually 2 to 6 hours. At the same time, there will be mild heat and redness, but it is necessary to be careful to avoid burns [26]. (3) Close observation: If an allergic reaction occurs (such as itching, redness, swelling or blisters), stop using immediately and provide appropriate symptomatic treatment. (4) Recovery phase: During the healing process of the ulcer, warm and blood-activating ointment will be applied to the acupoints such as Kunlun (KI1), Sanyinjiao (SP6), and Zusanli (ST36), and the application will last for 4 to 6 hours each day.

### Operational guidelines, and safety

Operational guidelines for specific techniques (Table 8).

#### General safety and contraindications

Absolute contraindications: In any of the following circumstances, acupuncture is not used: (1) Severe gangrene (Wagner Grades 4-5) requiring urgent surgery. (2) Uncontrolled severe infections (deep abscesses and osteomyelitis). (3) Severe lower limb ischemia (ABI <0.4 or TcPO<sub>2</sub> <30 mmHg) without revascularization. (4) Patients with severe conditions that are unstable or who do not cooperate with treatment.

Relative contraindications: (1) Acute inflammation, skin damage, or ulceration at the needling site. (2) Lower-extremity venous thrombosis. (3) Unstable severe cardiovascular disease or pregnancy; (4) Severe high blood sugar (> 13.9 mmol/L) or recurrent low blood sugar.

Key safety measures: (1) Strict aseptic operation: Use disposable sterile acupuncture needles and follow standardized, strict skin disin-

fection procedures. (2) Wound Integrity: Acupuncture, moxibustion, or cupping should never be applied directly on open wounds or within 2 cm of inflamed areas. (3) Adverse Event Monitoring: Observe for syncope, increased pain, or spreading erythema. Treatment will be stopped immediately if adverse events occur.

#### Patient education

Patients should be fully aware of the supplementary therapeutic nature of acupuncture and the potential risks involved. Before undergoing the treatment, they must obtain a formal written informed consent document. All diabetic patients must strictly follow the continuous standard treatment plan, including strict blood sugar control, smoking cessation, and daily self-monitoring of their feet.

#### Clinical decision flowchart

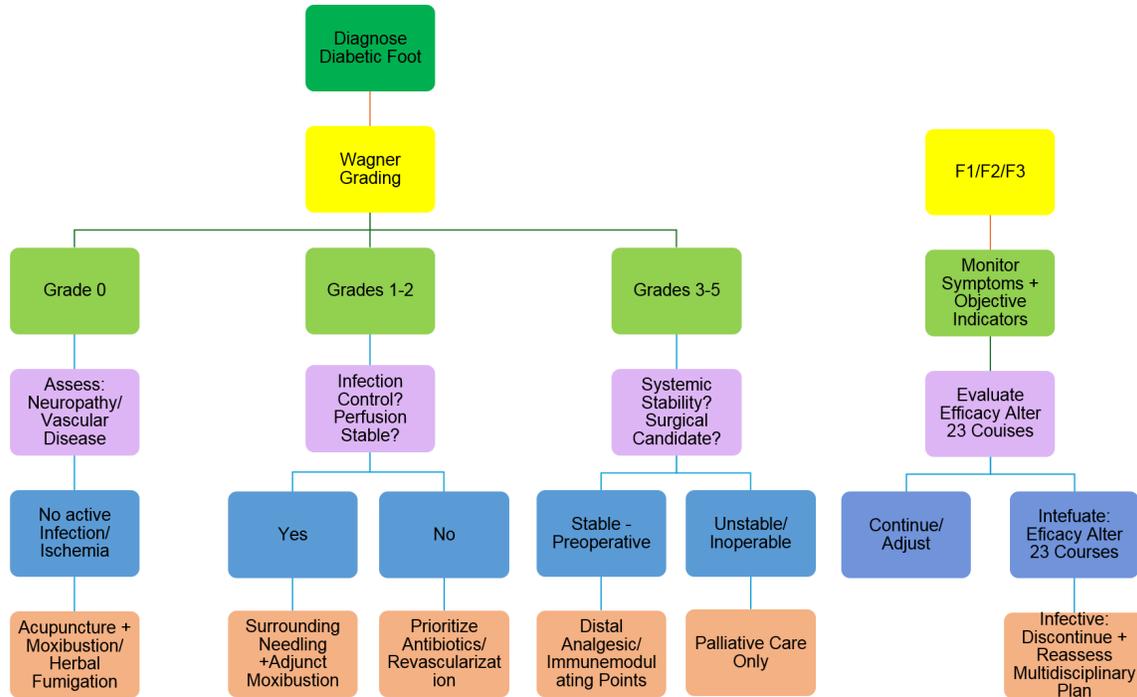
Acupuncture treatment decision process for diabetic foot (Figure 1).

#### Treatment course and frequency

(1) Acute/active ulcer stage: Treatment is recommended to be administered daily or every other day. The standard treatment course consists of 5 to 7 treatments, with an interval of 2 to 3 days between each treatment. The treatment frequency should be adjusted according to the individual's clinical response (Level C evidence).

(2) Overall Course: Individualized regimens are advised. In general, at least 2-3 courses are required to observe therapeutic efficacy. After wound healing, session intervals may be extended or switched to maintenance therapy (e.g., 1-2 sessions per week) to prevent ulcer recurrence (Level C evidence).

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**Figure 1.** This flowchart is a simple clinical decision-making pathway, showing the Wagner classification method, assessment of infection and ischemia, and the selection of appropriate treatment options.

## Efficacy evaluation

### Primary endpoints

Clinical symptoms: Degree of pain (using the Visual Analogue Scale [27, 28] or Numerical Rating Scale), numbness, skin temperature, ulcer area and depth, as well as the condition of granulation tissue.

### Secondary endpoints

The assessment of quality of life employed validated general assessment tools as well as disease-specific assessment tools, such as the SF-36 and scales related to diabetic foot.

The assessment of activities of daily living (ADL) is conducted using the Barthel Index method, which is a validated assessment tool for acute or rehabilitated patients [29-32].

### Efficacy grading

Clinical cure means that all clinical symptoms disappear, all objective indicators return to normal, and all ulcers are completely healed.

Effect is remarkable: Significantly alleviates symptoms (symptom score reduced by 70% or

more), there are significant improvements in nerve conduction velocity and ankle-brachial index, and the ulcer area decreases by 70% or more.

The adverse conditions include: no significant improvement in the condition, worsening of symptoms and signs, and a reduction in ulcer area of less than 30% (and even it may expand).

## Conclusion

Acupuncture is a unique treatment method in traditional Chinese medicine. As an auxiliary intervention for the management of diabetic foot, it has significant clinical potential, especially in alleviating pain, improving local blood circulation, and enhancing peripheral nerve function disorders. The use of acupoint must base on the standardized indications, operating procedures, and strict safety measures. It can be regarded as a supplementary treatment rather than the main treatment. We must master the pathophysiology of diabetic foot, the diagnostic and therapeutic approach of TCM, standardized operation procedures, and the risk management strategies of acupuncture techniques. We must formulate individualized treatment strategies, closely monitor the ef-

fects and safety. We must focus on the overall health of patients and achieve the best clinical outcomes for diabetic foot patients. Diabetic foot is caused by many factors, including nerve damage, vascular diseases, and infections. In severe cases, it can lead to foot ulcers, infections, even disability and death for diabetic patients.

In future, we should focus on the following areas: (1) The stimulation time and frequency of acupuncture; (2) Comparative studies with sham acupuncture; (3) The length of hospital stay; (4) The large-scale, multi-center international clinical trials; (5) The mechanism research, and promoting the development of comprehensive prevention and management strategies for diabetic foot finally.

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### Disclosure of conflict of interest

None.

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