

# Progress of Clinical Research on the Treatment of Hydrocephalus in Children by TCM Acupuncture

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**Abstract:** Hydrocephalus is a common clinical disease in children, which is often caused by the obstruction of the cerebrospinal fluid circulation pathway, resulting in an excessive increase of cerebrospinal fluid, and then increased intracranial pressure. At present, clinically targeted western medicine therapy can improve symptoms, but its risk often brings endless pain to children. How to effectively improve the symptoms of children has been the focus of research. The authors found that acupuncture treatment with other therapies can significantly improve the dysfunction of children with hydrocephalus, and acupuncture treatment is more suitable for mild progressive hydrocephalus and communicating hydrocephalus.

**Keywords:** Acupuncture Treatment, Hydrocephalus in Children, Needling, Intracranial Hypertension

## 1. Introduction

### 1.1. Hydrocephalus in Children

Pediatric hydrocephalus refers to a disease in which excessive cerebrospinal fluid accumulates continuously in the ventricle or subarachnoid space of children, resulting in partial or total abnormal enlargement. It is relatively common in the clinic, and progressive neurological dysfunction caused by enlargement of the head and fontanel pressure of brain tissue, increased intracranial pressure, and other factors is its typical clinical feature [1]. As birth rates and infection rates increase, developing countries face a greater burden and challenge from pediatric hydrocephalus, which is linked to more general global health challenges, such as maternal and perinatal risk factors [2]. In the face of children with hydrocephalus, it is necessary to formulate a treatment plan in accordance with the condition in time. If the condition is delayed for a long time, it will not only affect the treatment effect, but also have a poor prognosis [3, 4].

### 1.2. Diagnosis of Hydrocephalus in Children

Its diagnosis can start from three aspects: history, clinical manifestations, and auxiliary examination. In terms of medical history, it is mostly related to conditions before and after birth. The mother's history of infection during pregnancy, low birth weight, asphyxia and hypoxia, intracranial hemorrhage, post-birth bilirubin encephalopathy, head trauma, central nervous system infection and poisoning are all very easy to develop this disease. Liu Hua [5] analyzed and summarized the past medical history of 120 children, which can also be seen. In clinical manifestations, there may be enlarged skull, enlarged fontanel, subset of both eyes, nystagmus, convulsions, repeated convulsions, and even abnormal mental behavior. Common clinical manifestations are shown in Figure 1. CT examination, skull alignment examination, lumbar puncture, ventriculography, 2D skull ultrasonography are effective diagnostic methods.

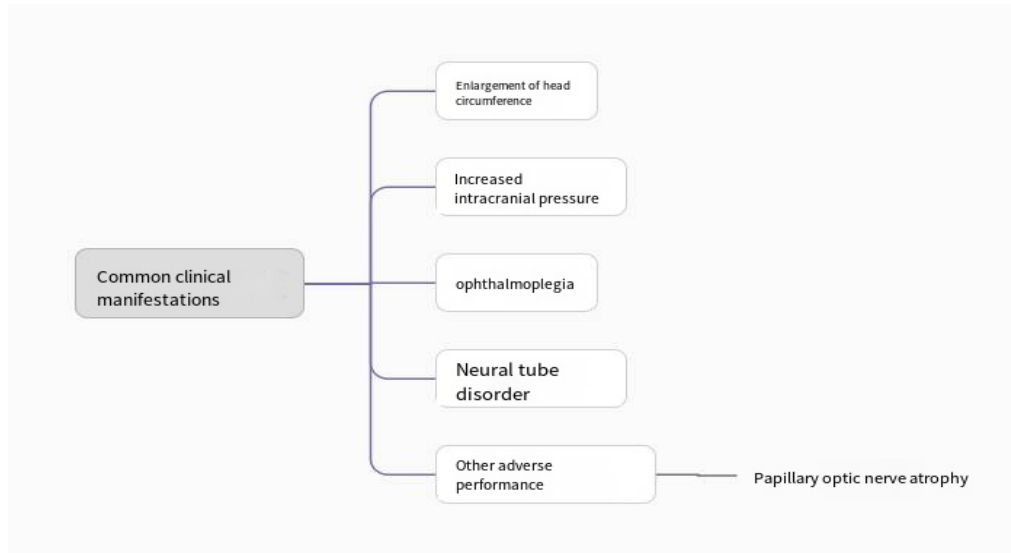


Figure 1: Common clinical manifestations

## 2. Cognition of Hydrocephalus in Chinese Medicine

The traditional Chinese medicine disease of hydrocephalus in children is called craniolysis, and its typical characteristics are summarized as enlargement of the skull, opening of the fontanel, and cranial suture. The three generations of Xiqi Wang's Jishitang academic school have different opinions on the pathogenesis. Mr. Wang Xiuchun believed that it was "stasis of brain and internal stop of water dampness", Mr. Zhang Wenhuan believed that it was "heat toxin obstructing and evil disturbing the gods", and Song Hujie believed that it was "kidney essence deficiency and spleen health loss" [6]. In the study, Liu Hua [5] grouped the closely related main factors into one type through the method of cluster analysis and revealed the cause most closely related to hydrocephalus in children. Syndrome element group is shown in Figure 2. Zhao Liang [7], through a large number of literature retrievals and research, summarized the differentiation of hydrocephalus in children into the following types: water stasis interjunction, blockage of brain orifice syndrome, Yang deficiency and water flooding syndrome, obstruction of brain orifice syndrome, loss of spleen and kidney, marrow sea insufficiency syndrome, deficiency of liver and kidney Yin syndrome, marrow deficiency and bone weakness syndrome, heat toxin obstructing syndrome, and brain orifice occlusion syndrome. Syndrome differentiation and classification of hydrocephalus in children is shown in Figure 3. And put forward the treatment of invigorating spleen and kidney, opening and clearing collaterals, removing blood stasis and water.

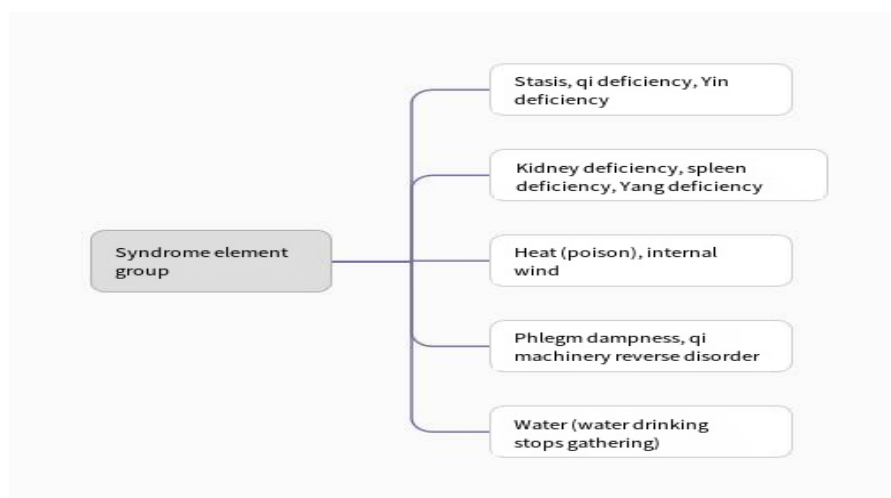


Figure 2: Syndrome element group

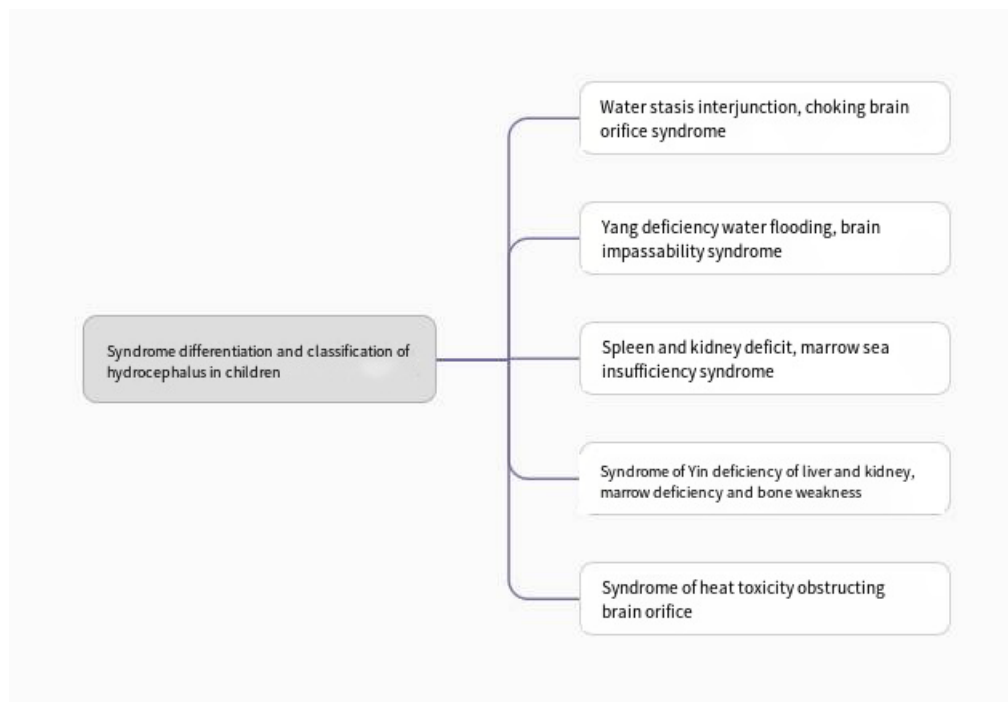


Figure 3: Syndrome differentiation and classification of hydrocephalus in children

### 3. Mechanism of Acupuncture Treatment of Hydrocephalus in Children

In the treatment of hydrocephalus in children, a ventriculoperitoneal shunt is currently recommended in China, which connects the lateral ventricle and the abdominal cavity to achieve drainage and decompression. However, although surgery can achieve significant results, the consequences and potential risks brought by the shunt, such as excessive or insufficient shunt, stimulation of the gastrointestinal tract by drainage tubes, postoperative infection and other aspects, will bring endless pain to children. Increase the conflict between doctors and the families of the children [8]. However, numerous domestic studies have shown that acupuncture and moxibustion can stimulate the human nervous system and then secrete more neurotrophic factors to improve the nervous system [9]. Xu Ning et al. [10] combined the traditional Chinese medicine theory of "the brain is the sea of marrow" and "the head is the meeting of Yang", and believed that acupuncture treatment could transmit the information during acupuncture to the brain through the action of acupoints, thus stimulating the potential or even existing functions in the brain of children. Zhou Huimin et al. [11] even found in the treatment of clinical cases that the diameter of the acupoint area around the abnormal meridians often increased significantly, and the resistance of the skin was also likely to decrease. When acupuncture was performed on these acupoints with abnormal contrast, the enlarged acupoint area could be reduced, and the clinical symptoms could occasionally be temporarily improved. It can be seen that acupuncture treatment of hydrocephalus in children is relatively perfect on the basis of theory and practice.

### 4. Research Progress of Acupuncture Treatment of Hydrocephalus

#### 4.1. Acupuncture Point Selection

Yu Mengjin et al. [12] innovatively adopted the "Jin Three needles therapy" and selected four Shen needles, three Zhi needles, three temporal needles, three brain needles, three body needles combined with three hand needles, three hand needles, three foot needles and three foot needles. Song Hujie et al. [13] summarized the pathogenesis of hydrocephalus as "blood stasis, blocking collage, brain obstruction, and water dampness stopping accumulation" during acupuncture, so acupuncture treatment was divided into two groups. The first group selected points mainly to promote blood circulation and collage, such as Yanglingquan and Blood sea. The second group selected points mainly to Tongnaoqiao, Shenmen, Sishencong, and so on. The two groups of acupoints were used alternately every other week in order to improve the symptoms of children. Zhuang Minghua et al. [9] mainly selected the points of

Du vein, Ren vein, and bladder channel. At the same time, depending on the different conditions of children, such as: salivation, night terrors, diarrhea, language development delay, hearing impairment, upper and lower limb movement disorders, etc., add or reduce points to improve symptoms accordingly. Chen Xuenan et al. [14] divided acupuncture points into two groups and used one group every day. The first group selected points mainly by Tong, Sanjiao, and Li waterway, such as: water, Yin, Jiao, waterway, etc. The second group selected points mainly from the stomach and kidney, such as Waiyu, Weizhong, Hung Zhong, etc. Zhao Liang et al. [15] believed that traditional acupuncture and moxibustion used acupuncture points on the limbs as the starting point to stimulate meridians, and only after repeated treatment could the disease be stable. Considering the traditional Chinese medicine theory of "treatment must be based on the original" and "specimen consideration", abdominal acupuncture therapy was innovated to enhance the organic connection between viscera, meridians and local areas, and combined with the pathogenesis characteristics of hydrocephalus. Overall conditioning, toning deficiency and drainage, dredging of the whole body for Qi and blood, smoothing of channels and water removal. Zhang Yimin et al. [16] adopted head acupuncture therapy, choosing four Shenshen needles, three temporal needles, three brain needles, and three Zhi needles to comprehensively stimulate the circulation of qi and blood in the brain, which was in line with the traditional Chinese medicine theory of "bad blood means water" and "smooth blood means water". They believed that the matching of various points could not only reduce the intracranial pressure but also improve the blood circulation in the brain, to improve the nerve function.

#### ***4.2. Retention Time of Acupuncture***

In terms of retention time, there is no relevant literature showing the difference in efficacy caused by different retention times. At present, the retention time of various scholars varies according to different theories, ranging from no retention time to 1h. However, considering that the retention time of different ages should be slightly adjusted, and the coordination degree of children's young age is poor, the retention time should be shortened, and the degree of qi should be reduced.

#### ***4.3. Acupuncture Method***

The operation of body acupuncture is mainly direct acupuncture, and the technique is flat reinforcing and flat draining. Chen Xuannan et al. [14] used the catharsis method to quickly prick Fengfu and Fengchi in the early stage of acupuncture. After the child ADAPTS, keep needles in the acupoints of the limbs, and tap the plum blossom needle on the back Jiaji point before each acupuncture, tap from top to bottom in order to skin flushing, and add or subtract points of the disease. Zhao Liang et al. [15] advocated cannula insertion, believing that the trocar could not only relieve patients' tension, but also meet the standard of sterility. Most of the head needles choose about 1 inch flat stab, paying attention to avoid the fontanel.

#### ***4.4. Acupuncture Treatment***

Hydrocephalus is a chronic disease, and the treatment time of children is relatively long, so the patients and their families should have great patience and adhere to long-term treatment. The course of treatment is mostly 30-50 times for a course of treatment, and the interval is 10 days before continuing the treatment.

### **5. Scope of Application of Acupuncture in Hydrocephalus in Children**

Yu Mengjin et al. [12] discussed the indications for the treatment of hydrocephalus with surgery, conservative therapy, and acupuncture. They believed that current western shingle surgery can effectively extract cerebrospinal fluid and reduce intracranial pressure quickly and quickly, which is suitable for cases with rapid increase of intracranial pressure, especially for cranial hypertension crisis. However, conservative treatment has a smaller range of hypotension than surgery and is not suitable for long-term use. Considering that the essential basic treatment for children with hydrocephalus is inhibition of cerebrospinal fluid secretion, dehydration and diuresis, nutritional support treatment, etc., conservative treatment is considered suitable for short-term treatment of hydrocephalus accompanied by increased intracranial pressure. The effect of acupuncture therapy on reducing intracranial pressure is mild, and the treatment takes a lot of time, and the treatment can stabilize the condition and balance the secretion and absorption of cerebrospinal fluid. Therefore, it is

suitable for mild progressive hydrocephalus, or children with motor emotional intelligence disorders. Three kinds of treatment for hydrocephalus in children are shown in Figure 4. Chen Xuenan et al. [14] attributed the pathogenesis of hydrocephalus in children to "congenital deficiency of kidney qi or acquired dystrophy, resulting in the emptiness of the pulp and brain and the flooding of water with dampness", and selected points on the principle of regulating the governor, regulating the stomach and kidney, and channeling the sanjiao channel. At the same time, through clinical observation, different treatment methods should be taken for communicating and obstructive hydrocephalus. Most children with obstructive hydrocephalus are young and develop rapidly, so the effect of acupuncture is not significant and it is difficult to achieve progressive results. Surgery should be the main treatment. Most of the children with communicating hydrocephalus made obvious progress in intelligence and motor development within 1-3 months after acupuncture, and acupuncture treatment of old communicating hydrocephalus was better.

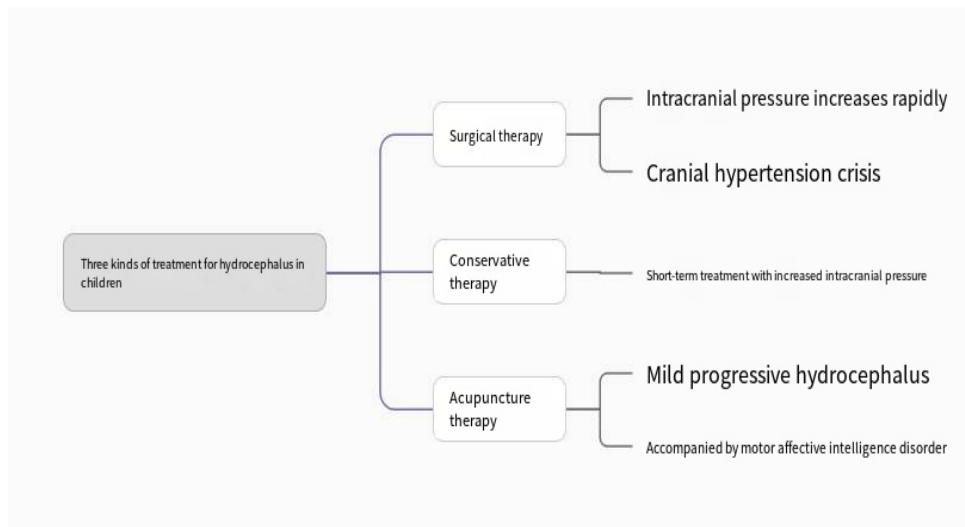


Figure 4: Three kinds of treatment for hydrocephalus in children

## 6. Acupuncture Therapy Combined with other Treatments

The effect of single acupuncture therapy on children with hydrocephalus is not significant, and most scholars combine with other traditional Chinese medicine treatments in clinical treatment, in order to obtain the maximum therapeutic effect. Yu Mengjin et al. [12] combined warm moxibustion with acupuncture alternately, in the selection of points of Ren pulse, stomach meridian point, Du pulse, and bladder meridian points, the way of warm moxibustion to improve the symptoms of children. Professor Song Hujie [13] Combined with massage treatment, hand and foot acupoints, Du pulse and back Shu point were mainly kneaded downward in turn. It believes that acupuncture and massage treatment can improve the function of zang-fu organs, relax tendons and dredging collaterals, so as to achieve the purpose of activating qi and blood, opening and benefiting water. Zhuang Minghua et al. [9] Combined with massage and symptomatic rehabilitation therapy. Select the back, abdomen, soles, earlobes, and other parts of the massage site and ask parents to massage the child once a day. Rehabilitation treatment methods include Bobath method, guided education method, and so on. In order to improve the children's language, limb dysfunction. Meng Qingping et al. [17] adopted the method of combining acupuncture and medicine. In addition to applying acupuncture prescription, they also applied Liuwei Dihuang Decoction and Wuling SAN, and at the same time external application of traditional Chinese medicine such as Ganshui and Euphorbia in the fontanel of children, and the effect was significantly higher than that of simply applying acupuncture. Acupuncture therapy combined with other therapies are shown in Figure 5.

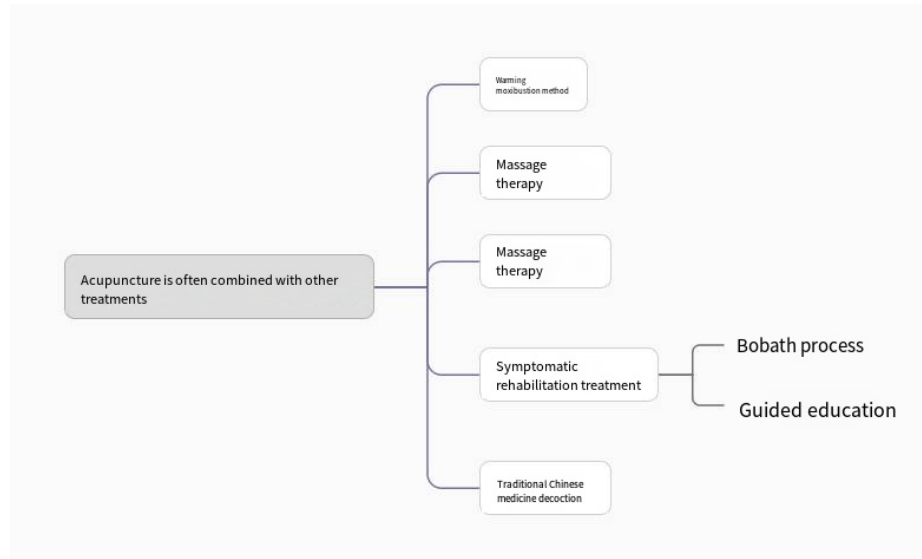


Figure 5: Acupuncture therapy combined with other therapies

## 7. Conclusion

Clearly, acupuncture takes into account that the age of patients is generally small, the early diagnosis is more complicated, and the cooperation of children shows its unique advantages in the treatment of pediatric hydrocephalus, but through analysis, we found that there are still limitations in the evaluation of pediatric hydrocephalus efficacy. (1) The tolerance of children is poor, and the long acupuncture treatment time is likely to delay the treatment time, prolong the treatment time, and miss the best treatment opportunity. (2) The patients are children. In most cases, because they cannot accurately express their inner feelings, there is a certain impact on the observation of the efficacy and adjustment of treatment plans, resulting in a certain bias in the final data results. Considering that in clinical research and observation, the inclusion and exclusion criteria for the course of treatment and duration of illness are relatively strict, and the age difference is different. The different degree of illness, the uncertain duration of treatment, and other aspects of the impact will inevitably have a large difference in the judgment of the efficacy. (3) There are some differences in acupuncture point selection and acupuncture methods among scholars, which can be traced to the different TCM theories and evaluation criteria behind the principles of acupuncture point selection. In clinical research, some scholars focus on personal experience and other issues, and the depth of acupuncture mechanism is not enough, which hinders the further study of hydrocephalus in children, coupled with the ambiguity and irregularity of its curative effect evaluation, greatly affecting the persuasive effect of its treatment. In the face of the above problems, the clinical research of acupuncture treatment of hydrocephalus in children should make breakthroughs in the following aspects: (1) Based on the clinically observed data, combined with ancient medical records and books, in-depth study of its etiology and pathogenesis, integration of all data, screen out more comprehensive acupuncture methods, methods, and point selection criteria, to enhance the clinical guiding value of acupuncture; (2) There is no unified standard point selection principle in acupuncture and moxibustion, which can be attributed to the lack of comprehensive, detailed and accurate criteria in dialectical classification, so the gaps in dialectical classification criteria should be improved as soon as possible; (3) Some scholars have not established strict inclusion criteria and exclusion criteria in clinical research and observation, and reasonable and effective evaluation criteria should be established according to the functional evaluation methods of modern medicine, and strictly included and excluded cases. (4) Although acupuncture has played a great role in children's hydrocephalus, it is not difficult to find that there are few cases of treating children's hydrocephalus with acupuncture alone, and many scholars work together with other therapies in clinical practice. From the clinical effect point of view, the combination of massage, symptomatic rehabilitation treatment, traditional Chinese medicine, medicine-burning moxibustion treatment, etc., has more significant effects, but its collocation, still lack of norms and rigor, only based on clinical experience, lack of theoretical support, but also lack of large sample support. Large sample multicenter clinical trials should be carried out as far as possible, and randomized control and blind methods should be applied in the study to greatly improve the credibility of the article. (5) At the level of experimental design, a more solid theoretical basis is proposed for acupuncture techniques, stimulation duration,

acupuncture depth, and acupuncture strength, and all operations are standardized. (6) The prognosis assessment of hydrocephalus in children is somewhat difficult, because with the development of physical function of children, it will mislead the prognosis of the situation at that time, so it is also essential to improve the follow-up case tracking, establish follow-up records of each stage, and clearly divide the long-term effect, which will have a more intuitive display of the effect of treatment methods. And provide more reliable data for clinical research. In short, through the detailed discussion of all aspects of the research progress of acupuncture treatment of hydrocephalus, this paper has clarified the reliable curative effect of acupuncture treatment for hydrocephalus in children, and provided a relatively considerable basis. As clinical staff, we should pay more attention to the study of acupuncture techniques, acupuncture depth, acupuncture duration, and other aspects in the future, further explore the mechanism of acupuncture for children's hydrocephalus, give full play to the role of acupuncture and carry forward the traditional Chinese medicine culture.

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