

Treatment of Pediatric Cerebral Palsy from the Theory of "Tongdu"

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Abstract: Pediatric cerebral palsy (CP) is a syndrome characterized by persistent motor development disorders and postural abnormalities, and is classified as one of the "five softnesses", "five hardnesses" and "five delays" syndromes in Chinese medicine. The DU Meridian is one of the eight extraordinary meridians, and one of the fourteen meridians, known as the "sea of yang", and has a close relationship with the brain. The DU Meridian is commonly used in the clinical treatment of pediatric cerebral palsy, such as acupuncture and acupressure, which can help children recover motor and cognitive functions. This article analyzes the etiology and pathogenesis of cerebral palsy, sorts out routes of DU Meridian, demonstrates the feasibility of treating cerebral palsy from the theory of "Tongdu" in terms of the relationship between the DU Meridian and the internal organs and meridians as well as the modern medical research of the DU Meridian, and summarizes the clinically applied traditional Chinese medicine treatments related to the DU Meridian based on the literature of the past few years in order to broaden the therapeutic ideas for cerebral palsy.

1. Introduction

Pediatric cerebral palsy refers to a group of persistent syndromes caused by non-progressive brain injury in developing fetuses or infants, including central motor and postural developmental disorders, activity limitations, etc., which are mainly manifested by persistent motor developmental disorders and postural abnormalities [1]. According to its clinical manifestations, this disease can be categorized under the categories of "five softnesses", "five hardnesses" and "five delays" in Chinese medicine [2]. The DU Meridian is known as the "sea of Yang vein", which belongs to the brain and is connected to the internal organs and meridians, so the DU Meridian meridian points are often used in the treatment of cerebral diseases. In this paper, we review the current status of research on the treatment of pediatric cerebral palsy related to the DU Meridian, and summarize the connotation and clinical application of the theory of "Tongdu", with a view to providing a reliable and objective

basis for new treatment ideas, improving the clinical rehabilitation efficacy and quality of life of children with cerebral palsy, and reducing the burden on the society and the family.

2. Cause and Pathogenesis of Cerebral Palsy

Cerebral palsy is mainly located in the brain, which is related to many organs such as kidney, liver and spleen, and the key to the disease mechanism lies in the damage of the brain complex. Ancient medical doctors believed that "five softnesses", "five hardnesses" were caused by insufficient endowment of the parents and lack of nourishment in child's Infancy and early childhood. The "young integrated - fetal disease theory" said: "This is all fetal endowment of the disease, with its visceral qi and seek." The Medical Zong Jinjian: "The disease of five delays in children is mostly due to the weakness of parents' qi and blood, and congenital deficiencies, resulting in children being born with weak tendons and bones, difficulty in walking, lack of rapid growth of teeth, and inability to sit steadily, which are all due to insufficiency of the kidney qi." To sum up, cerebral palsy is mostly due to the parents' weak physique, insufficient sperm, or external evil disrupting the fetus and other reasons, resulting in the child's congenital lack of temperament, brain network damage, and kidney qi loss. In addition, improper maintenance, spleen and stomach damage, insufficient air source, insufficient medulla oblongata, bone nutrition loss, manifested as weak bones. It can be seen that children's activities are limited, growth and development are delayed, and brain pore nutrition is lost, which is manifested as slow response and cognitive impairment.

3. Rationale for the Treatment from the "Tongdu" Theory

3.1. The DU Meridian passes through the Spine and Belongs to the Kidneys and Enters the Brain

The connection between the DU Meridian and the brain is very close, and there has been a saying that "if the disease is in the brain, the DU Meridian is the first thing to be taken"[3]. *The Classic of Difficulties twenty-eight difficult*: "The DU Meridian goes through the spine, reaches up to Fengfu, and belongs to the brain". "Its branches run around the buttocks to reach the shao yin meridian, pass upward to the medial posterior femur, go through the spine and belong to the kidney." The ancient sayings indicate that the DU Meridian follows the spine to Fengfu and enters the brain, is tightly connected with brain and its branches enter and belong to the kidneys."Chinese Medicine and Western Medicine "Record: "the brain for the sea of marrow, is the gathering of marrow place, not the birth of the marrow place, the origin, from the true yin and true yang qi in the kidney , brewing and synthesized, and rise along the DU Meridian finally enter the brain." The brain is the sea of the marrow, the house of the spirit, dominates all the activities of the mind, and connects the kidneys and the brain, and transfers qi, blood, and essence up to the brain orifices. The fullness of the medulla oblongata depends on the nourishment of kidney essence, but also closely related to the smoothness of the DU Meridian. If the Yang Qi of the DU Meridian is too weak to transport subtle substances, or the Vessel is clogged, then the essence cannot reach the brain orifices, the medullary sea is empty, the spirit is not nourished, so the brain may lose some of it's function, as a result, cerebral palsy will be developed as a disease[4]. Therefore, the treatment of cerebral disease can be started from the principle of 'Tongdu'.

3.2. The DU Meridian is Connected to Other Organs

"Su Wen - Bone Empty Treatise" recorded: "the DU Meridian, starting in the lesser abdomen

below the central bone crosses with the Bladder meridian of foot-taiyang at the inner eye canthus, and crosses the top of the brain on the forehead into the brain goes up and around the lips, last end in the center of the lower part of both eyes. " One of the branches of the DU Meridian is "up through the heart", and the DU Meridian is the confluence of all the yang, which can stimulate the role of the heart yang in warming and promoting the heart's blood flow through the veins. The Spiritual Pivot - Meridian: "Liver meridian of foot-jueyin..... wil cross DU Meridian at the top of head." The DU Meridian and the liver meridian will meet at the top of head, so that DU Meridian can help the liver meridian to dredge the qi, regulate qi and blood, and coordinate the body's spiritual activities[5].

3.3. The DU Meridian is Connected to the Meridians

The constitution of the child is young and yin and yang, and yang is the meaning of the newborn yang, which needs to be enriched and leaded into the internal organs to promote the development of life [6]. It is said that: "Sufficient yang energy can nourish both the spirit and the tendons." DU Meridian is known as the "sea of yang", which converge the three Yang meridians of the hands and feet in the Dazhui points, the Bladder meridian of foot-taiyang runs alongside the DU Meridian, so The DU Meridian can regulate the yang qi of the whole body and maintain the yuan yang of the whole body. By directing the Qi of the DU Meridian, the DU Meridian can bring together the Yang Qi of the child, promote its circulation and return to its position, and promote the development of the body. The Back-Shu Points of the Bladder meridian of foot-taiyang are acupoints on the back where the qi of the internal organs and meridians converge, have the function of regulating viscera [7]. Therefore, almost all the organs and meridians are directly or indirectly connected with the DU Meridian

3.4. Modern Medical Research on the DU Meridian

Zhang Xichun in the "Chinese Medicine and Western Medicine -On the treatment of cerebral anemia and atrophy syndrome" mentioned: "The DU Meridian is also the root of the cerebral nerve." From the perspective of Western medicine, the spinal cord, as the body's central nervous system, is responsible for conducting sensory and motor nerve impulses and participating in the regulation of motor functions. From an anatomical point of view, where the DU Meridian passes through the core of the human body's lumbar-pelvic-hip joints as well as the muscle groups attached to them, it has the ability to maintain a certain degree of stability when the body's movement, and play a role in transmitting power and force generation and force reduction [8]. The DU Meridian runs along the spine. So by stimulating the DU Meridian and invigorating and guiding the Dui Yang, it can enhance the strength of the spine, coordinate the stability of the spine and stimulate the yang qi of the peripheral meridians, which in turn promotes the motor and intellectual development of children with cerebral palsy [9].

4. Studies on the Treatment of Cerebral Palsy Based on the "Tongdu" Principle

4.1. Clinical Application of “Tongdu” Acupuncture in the Treatment of Pediatric Cerebral Palsy

Xu Yanyan [10] collect 70 effective cases to observe the effect of acupuncture combined with acupressure in the treatment of pediatric cerebral palsy is shown in Table 1. In the control group, conventional rehabilitation therapy combined with Chinese massage therapy was used, while the treatment group was given the acupuncture method of "Xingnao Tongdu" on the basis of the control

group (the main acupoints were selected: Shenting, Benshen, Shenmen, Sishenchong, Baihui, Fengfu, Dazhui, Shenshu, Yaoyangguan and Jiaji points). After 8 weeks of continuous treatment, it was found that the PedsQL-CP, GMFM score and ACA and BA blood flow velocity of the treatment group were significantly higher than those of the control group, and the modified Ashworth spasticity scale grading was lower than that of the control group. It is thus proposed that "Xingnao Tongdu" acupuncture can improve cerebral blood perfusion, which can reduce muscle spasm and improve muscle strength, and can also improve cerebral blood circulation and promote the compensatory development of the central nervous system. Wu Dingzong [11] et al. found that electroacupuncture at the acupoints of the DU Meridian could significantly strengthen the activity of 5-hydroxytryptaminergic neurons in the middle suture nucleus group of the brainstem, and also increase the content of 5-hydroxytryptamine and 5-hydroxyindoleacetic acid in the substantia nigra, caudate nucleus, medial nucleus of the thalamus group, and the hypothalamus, and that 5-hydroxytryptamine exerts a generalized inhibitory and stabilizing effect on the high-level parts of the brain. In a study by Sun Hong [12] et al, the use of electroacupuncture to stimulate two acupoints of "Da Shi" and "Bai Hui" confirmed the neuroprotective effect of acupuncture treatment on epileptic rats.

4.2. Clinical Application of "Tongdu" Massage in Treating Pediatric Cerebral Palsy

Fang Xi [13] et al. divided 160 children with spastic cerebral palsy into two groups, the control group used conventional exercise therapy, and the observation group used the "Yindai Daodu" massage method combined with exercise training, which was mainly used to point and press the Jiaji points and the acupoints of Bladder meridian of foot-taiyang, and to hold the belt vein, which establishes a holistic connection with the Kidney meridian of foot-shaoyin, the DU Meridian and belt veins in the lumbar pathway of qi. After 3 months of treatment, it was found that spastic cerebral palsy treated by "Yindai Daodu" massage method was more effective than the traditional exercise therapy in improving the gross motor function. The Jiaji points are located at the place where the meridian qi of the DU Meridian and the Bladder meridian of foot-taiyang overlap and cover, and it has the function of regulating the DU Meridian and the Bladder meridian of foot-taiyang as a hub, which is not only the hub of the sensory and motor nerves, but also the key part of qi and blood circulating, which can harmonize yin and yang [14]. It is not only the hub of sensory and motor nerves, but also a key area for the flow of qi and blood, which can harmonize yin and yang. Wang Jialiang [15] The "Six kinds of Massage Manipulation on Back" (6-MMOB) proposed by Prof. Wang Xuefeng is applied to the treatment of children with five delays, five hardnesses and five softnesses, mainly through pushing the spine, pinching the spine, pointing the spine, knocking the spine, patting the spine and closing the spine to stimulate the DU Meridian, the Bladder meridian of foot-taiyang and the Jiaji points that circulate in the back, in order to regulate the functions of the internal organs and stimulate the positive qi of the organism. The 6-MMOB can enhance the stability of the core spinal muscles of children with cerebral palsy, and improve the crawling and kneeling, standing position and walking ability of children with spastic cerebral palsy, and improve the standing position and walking ability of children with hypotonic cerebral palsy.

4.3. Other "Tongdu" Therapies

Ma Yanli [16] selected 36 children with spastic cerebral palsy on the basis of multimedia sensory integration training and goal-oriented training, and carried out moxibustion treatment on the Shenting, Dazhui, Zhiyang, Mingmen and bilateral Fuang acupoints (treatment group), and made a control observation with the 36 children who used multimedia sensory integration training and goal-oriented training alone (control group). The results showed that the scores of the treatment

group on prolongation of sleep latency and total score of Children's Sleep Habit Questionnaire were lower than those of the control group in the same period, suggesting that moxibustion acupuncture points on the DU Meridian can correct sleep disorders and improve the sleep quality of children. Zhang Yan [17] et al. observed the clinical efficacy of giving Thread Embedding on DU Meridian points on spastic cerebral palsy. The acupuncture points of the DU Meridian, such as Shenting, Baihui, Dazhui, Naohu, Mingmen, Shendao, and Yaoyangguan, and the points in the prescription corresponded to the anatomical parts of the brain, cervical medulla, thoracic medulla, lumbar medulla, and cauda equina, etc. The results showed that giving Thread Embedding at the acupoints of the DU Meridian could prolong the retention time of the needles, strengthen the persistent stimulation of the acupoints, and be more adept at sustained improvement of spasticity, abnormal postures, and motor functions, and the improvement of children's muscle tone and spasticity was more significant. Besides, giving Thread Embedding at DU Meridian acupoints might enhance central interference, inhibition of afferent excitation from pathological stimuli.

Table 1: Clinical application of “Tongdu” theory in the treatment of pediatric cerebral palsy

Literature sources	Research methodology (control group)	Research methodology (treatment group)	Findings
Effects of Xingnao Tongdu acupuncture combined with massage on children with cerebral palsy	Conventional Rehabilitation Therapy Combined with Traditional Chinese Medicine massage Therapy	Control group treatment method + Xingnao Tongdu acupuncture	Xingnao Tongdu acupuncture can improve cerebral blood perfusion, reduce muscle spasm, improve muscle strength, and improve cerebral blood circulation, promote the central nervous system compensatory development
Effect of Yindai Daodu Massage Combined with Exercise Training on Gross Motor Function of Children with Spastic Cerebral Palsy	Conventional exercise therapy	Control group treatment method + "Lead and Supervise" Tui Na Method	The efficacy of "Yindai Daodu" massage therapy in treating spastic cerebral palsy is better than that of traditional exercise therapy in improving gross motor functions
Clinical research on the application of the "Six Methods of Spine and Back" proposed by Prof. Wang Xuefeng to the five delays, five softnesses and five hardnesses.	Routine Rehabilitation Training (PT, OT, normal limb massage therapy for the control group)	Control group treatment method + "Six Methods of Chiropractic" massage therapy	The 6-MMOB can enhance the stability of the core spinal muscles of children with cerebral palsy, and improve gross motor functions such as crawling and kneeling, standing position, and walking ability.
Moxibustion on Du Meridian and Fuyang Acupoint Combined with Multimedia Sensory Integration Training in Treating Spastic Cerebral Palsy with Sleep Disorders	Multimedia Sensory Integration Training, Goal Oriented Training	Control group treatment method + Moxibustion Treatment on the Governor's Points and Bilateral Tarsal Points	Moxibustion on Du Meridian and Fuyang Acupoint can correct sleep disorders and improve the quality of sleep of affected children
Effect of Thread Embedding at Governor Vessel Points plus Rehabilitation Training on Spastic Cerebral Palsy	Bobath Therapy and Vojta Therapy Rehabilitation	Control group treatment method + Vertical Acupuncture Point Embedding Therapy	giving Thread Embedding at DU Meridian acupoints is better at improving the spasticity, abnormal posture and motor function in a sustainable way.

5. Conclusions

The DU Meridian is one of the eight extraordinary meridians, and one of the fourteen meridians, the DU Meridian passes through the medulla oblongata into the brain, and its branches belong to the kidneys and the heart, connecting the internal organs and meridians of the whole body through the pathway, and transferring the essence of the successive heavens to the brain orifices to fill up the medulla oblongata. At present, the clinical application of acupuncture, massage, moxibustion, buried treatment, etc., and the efficacy of precise, through the Chinese medicine techniques to stimulate the DU Meridian points, dredge and stimulate the DU Meridian qi, lead to the kidney essence upward, so that the spirit of the spirit of nourishment, limbs can be used. As the DU Meridian is the sea of yang vein, invigorating its yang qi can lead yang into yin, harmonize yin and yang of the whole body, unobstructed qi and blood, improve cerebral blood circulation, protect cerebral nerves, so as to alleviate muscular spasm, improve muscle strength and core stability, and improve the motor function and cognitive ability of the children with cerebral palsy. In conclusion, the theory of "Tongdu" can provide new ideas for the treatment of pediatric cerebral palsy, which can improve the efficacy of cerebral palsy and is worth to be popularized in the clinic. However, fewer controlled studies have been conducted on the acupuncture points of the DU Meridian, and further studies are needed to clarify the mechanism of action.

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