

Research Progress of Acupuncture Therapy for Autism Spectrum Disorder

Meihua Li¹, Hujie Song^{2,*}

¹*Shaanxi University of Chinese Medicine, Xiayang, Shaanxi, 712046, China*

²*Xi'an Traditional Chinese Medicine Encephalopathy Hospital, Xi'an, Shaanxi, 710068, China*

**Corresponding author*

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Abstract: Autism spectrum disorder (ASD) is a severe neurodevelopmental disorder occurring in early childhood. It is characterized by social communication and interaction disorders, narrow range of interests or activities, and repetitive behaviors. At present, with the gradual increase in the prevalence of autism spectrum disorder, the combination of traditional Chinese and western medicine in the treatment of children with autism spectrum disorder has accumulated rich experience in clinical practice. However, because there is still no clear pathogenesis, clear diagnostic markers and unified treatment plan at home and abroad, Chinese acupuncture is mainly used in clinical treatment. With other kinds of rehabilitation, drugs and different sports and other treatment programs, the treatment has achieved good results. This paper summarizes a variety of acupuncture schemes in the clinical treatment of autism spectrum disorders, and briefly describes the possible theoretical mechanism of acupuncture treatment of autism spectrum disorders, hoping to provide solutions for subsequent clinical treatment and treat more patients with autism spectrum disorders.

1. Introduction

Autism spectrum disorder (Autism spectrum disorder, ASD), also known as autism, is a severe neurodevelopmental disorder that shows reduced verbal communication, social ability, sensory perception, and behavior. The core symptoms of ASD are shown in the figure 1. In recent years, the prevalence of autism spectrum disorders in China has gradually increased by [1]. There are no clear diagnostic markers and specific drugs for autism. Western medicine believes that the pathogenesis of ASD is not clear, and peridone and aripiprazole can improve agitation and irritability in patients, but they are usually accompanied by adverse effects such as weight gain, nausea, sedation and hyperglycaemia. So ASD neurobehavioral abnormalities, neurobiological alterations, and the development of novel ASD drug therapies require multidisciplinary cooperation. The "language late", "qing crazy", "ruthless" and "ruthless eyes" in childhood have many similarities with ASD. Traditional Chinese medicine believes that the disease of autism spectrum disorder is due to the imbalance of Yin and Yang, and the disorder of qi and blood, which leads to the brain, and the disease is in the brain is closely related to the heart, liver, spleen and kidney. "Ling Shu Sea" says, "The brain is the sea of marrow." Kidney is congenital, hidden essence marrow, kidney essence

deficiency. Then the brain marrow is not full, the yuan god cannot nourish and become abnormal mental activities. The adverse effects of the mother's gestation period lead to the lack of fetal innate endowment, and the brain loss is manifested by different degrees of intelligence disorder. Through the idea of "holistic thinking, syndrome differentiation and treatment", Chinese medicine uses TCM, acupuncture, massage, ear acupuncture and other characteristic therapies to improve social, verbal and cognitive functions to prevent and treat ASD [2]. By exploring the way of acupuncture treatment for ASD, the relevant studies are now reported as follows.

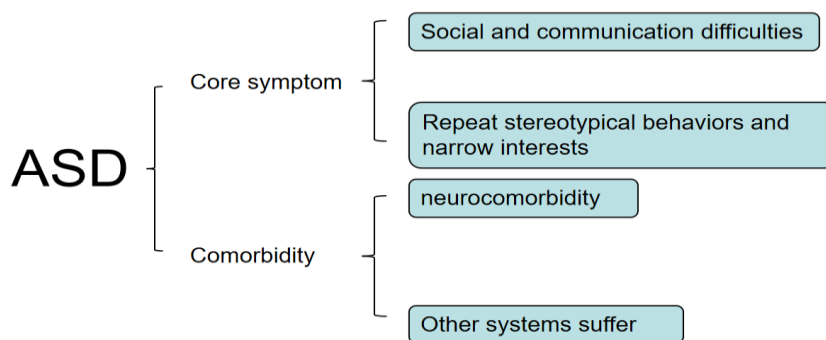


Figure 1: The core symptoms of ASD

2. Acupuncture Treatment ASD

2.1 Acupuncture Treatment

Chen Zhirui [3] by selecting du pulse point through the dialectical point and needle treatment four treatment results show treatment group in imitation, hand-eye coordination, cognitive understanding, cognitive expression than the control group has significant progress, but also found that tongue needle treatment can improve children with sleep disorders, partial food, hyperactivity and inattention of comorbidity problems. It shows that acupuncture can improve the supply of qi and blood in the brain, promote the blood circulation in the brain, improve the language ability, and give patients a higher therapeutic effect. Guo Kai [4] et al. chose to give head needle treatment, and the points were Baihui, sishen needle, shenting, benshen, inferior parietal anterior oblique 2 / 5, and the order of bilateral iguan, Zusanli, hanging bell and kidney shu. The results showed that the CARS score of the study group was significantly lower than that of the control group. Since the acupoints on the head are mostly located in the frontal lobe, temporal lobe and parietal lobe, acupuncture on the head can improve the blood transport of the head and increase the function of the frontal lobe, so as to improve the treatment effect of patients. Lin Yong [5] and other experimental group selected Jin three acupuncture therapy to take Baihui, fixed god needle, temporal three needles, four magic needles, wisdom three needles, brain three needles with dialectical acupuncture selection, combining acupuncture treatment and rehabilitation training. The results showed that the Autism Treatment Assessment Scale (autism treatment evaluation checklist, ATEC) score and the Pediatric Autism Rating Scale (CARS) score were lower than the control group. This indicates that acupuncture can significantly improve the pediatric autism spectrum disorders. In [6] and other observation groups, combined with acupuncture treatment with Baihui and Sishen needles, the total effective rate reached 100%. Yan Yongyi [7] 50 children with ASD were included, and 25 cases from the control group and the experimental group. The control group selected the head court, god, four god cong, speech area 1, speech area 2, speech area 3 and visual area 7 needles, and the experimental group added umbilical cord for treatment. The results showed that the CARS integral of the experimental group was lower than that of the control group. In

conclusion, acupuncture stimulates brain functional activity and blood flow and nerve fiber growth, thus improving the symptoms of children with ASD. However, its mechanism of action still needs further discussion.

2.2 Tongue Needle Treatment

Guo Kai [8] and other control group gave head acupuncture, viscera massage, rehabilitation training, and the observation group gave three injections in the control group (1 inch on Shanglianquan point, 0.8 inches to the left, and Shanglianquan 0.8 inches to the right). The effective rate of the observation group was 89.66%. Lian Quan belongs to the pulse, acupuncture Lian Quan can benefit pharynx. The three injections of the tongue may improve the language function of children through this principle of action. He Jinhua used clinical experiments to prove that after 6 months of treatment, the head tongue needle (jinjin, jade liquid) two points can improve the lonely behavior of children; Improve children's language skills [9]. Jinjin and Yujing, also known as Lian Quan, are located on both sides of the tongue with a large number of nerves and blood vessels. Acupuncture on this acupoint can stimulate nerves, accelerate the blood flow rate and stimulate the repair of nerve cells, so as to treat ASD patients. In addition, Jinjin and jade liquid belong to the external strange point, and traditional Chinese medicine believes that Jinjin jade liquid, enlightened, so it can be considered that acupuncture on Jinjin and jade liquid can stimulate the brain to release excitement, so as to treat ASD.

2.3 Acupuncture is combined with Practice Therapy

Ying Yajing [10] randomly divided 120 children with ASD into treatment groups and controls, 60 each. The control group selected the head point as the main point for acupuncture treatment. This study focuses on acupuncture treatment, behavior modification treatment, language training, pronunciation and organ training, and sensory integration training. The results show that the experimental group can significantly improve the intelligence level of the children and promote the development of sensory integration ability. Liu Tingting [11] used clinical trials to find that the intelligence scale score of children in the observation group was higher than that of the control group, suggesting that acupuncture combined with rehabilitation training to treat children with autism spectrum disorders can promote the intellectual recovery of children. Thus, it is proved that acupuncture points can stimulate the corresponding functions in the functional areas of the brain, increase blood perfusion, improve the local blood flow of brain tissue, improve brain function, induce language, and repair the damaged brain cells, so as to improve the neurotransmitter of children with ASD and enhance the intelligence and sensory integration ability of children. In addition, rehabilitation training can be well treated for patients with ASD.

3. Other Therapies

Liu Annan [12] found that alternative medicine (traditional Chinese medicine treatment, acupuncture, and massage) with physical and mental therapy and natural product therapy can effectively prevent and treat ASD, but the lack of experimental proof. Zhou Congxiao [13] experiment proved that the spleen massage method can also improve the symptoms of ASD. It can indicate that TCM has great advantages in treating patients with ASD.

4. Possible Theoretical Mechanism of Acupuncture Treatment for ASD

The pathogenesis of ASD in children may be related to the excessive functional activity of left

leucocarp. It is associated with excessive synchronization and coordination of spontaneous neuronal activity, abnormal enhancement of local functional connectivity, and decreased functional activities in the right inferior temporal gyrus, left fusiform gyrus, bilateral central sulcus tegmental, left posterior central gyrus, right medial and accessory cingulate gyrus. Poor synchrony and coordination of spontaneous neuronal activity and weak local functional connectivity are all brain regions that have obvious correlation with ReHo.

4.1 Release of the Creatine Kinase Enzyme

Creatine kinase (creatine kinase, CK) is widely found in skeletal muscle, cardiac muscle, and brain tissue, and it is an enzyme related to energy metabolism [14]. Clinically, serum CK and serum creatine kinase (CK-MB) are usually used together as laboratory indicators of myocardial injury. Some studies have found that CK and CK-MB in children with ASD may exclude myocardial injury [15]. However, Li Wenying [16] found that the treatment group used head acupuncture and body acupuncture (the main acupoints were Sishencong, arm, qu chi, outer pass, Fengchi) and Zusanli acupoint injection. Using enzyme-linked immunosorbent test, it was found that the level of CK, CK-MB, and brain Sodium peptide was reduced. The above studies have proved that head acupuncture can increase the microcirculation of the cerebral ischemic area, increase the cerebral blood flow, and also repair the damaged nerve fibers, thus promoting the recovery of nerve function. The head needle takes "god court, hundred hui, four gods", the body needle takes "wind pool, arm, Yangling quan, ring jump, qu chi, outer pass" and other points have the effect of regulating the pulse, tonifying qi and blood, awakening the brain and intelligence, and stimulating the Yang qi of the human body. Acupuncture can regulate the pulse, dredge the meridians, and stimulate local cerebrovascular expansion, improve microcirculation, thereby increasing cerebral blood flow, more conducive to the recovery of nerve function, improve the therapeutic effect of treatment.

4.2 Release of Oxytocin (Oxytocin, OT)

OT is a peptide hormone produced by the hypothalamus. The abnormal tactile response in ASD patients may affect social function [17] through the regulatory mechanism of this pathway through a series of information processing in OT. Su [18] et al found that acupuncture could further promote the synthesis of endocannabinoids by regulating the release of hypothalamic OT, thus affecting ASD and achieving therapeutic effect.

4.3 Release of the Arginine Vasopressin

Arginine vasopressin arginine vasopressin (AVP), also known as antidiuretic hormone, is a highly conserved neuropeptide secreted by the hypothalamus supraoptic nucleus or paraventricular nucleus, which can regulate the physiological functions of human stress, cognition, social interaction and intimate relationships. Zheng Ping [19] used enzyme-linked immunosorbent test (ELISA) and found that OT levels in children with ASD decreased, while plasma AVP levels increased, indicating that changes in plasma oxytocin and AVP levels may be related to the onset of ASD. Some studies have found that acupuncture can stimulate the mRNA level and promote the protein expression of upregulated OT-AVP, accompanied by the significant increase of serum AVP and the increase of prosocial [20]. Zhang [21] found that acupuncture can increase the brain arginine-vasopressin (AVP) and oxytocin (OXT) level, the above studies proved that acupuncture head acupoints can stimulate the hypothalamus release OT and AVP release, so as to improve the children with stress, cognitive, social, intimate ability, but its specific mechanism also need to be further explored.

4.4 Regulate the Central Nervous System

A large amount of excitation-inhibition (excitatory-inhibitory, E-I) in the central nervous system caused by glutamatergic and GABA is documented, which may be one of the important mechanisms in the pathogenesis of ASD [22]. Ruan Xiaodi, through animal experiments on mice and water maze experiments, found that acupuncture could improve the cognitive ability of rats with cerebral ischemia and hypoxia. Through TTC staining, Golgi staining, protein immunoblotting and other methods, it was found that acupuncture could improve the excitation of glutamate and regulate the central nervous system, thus playing a role in learning memory and spatial thinking [23]. Sun zhongren found that acupuncture can strengthen the hippocampal learning and memory process through synapse; acupuncture stimulates brain-derived neurotrophic factors to improve cognition [24]. The above studies proved that acupuncture stimulates synapse-related active substances to participate in synaptic remodeling; improve the structure and function of synapse to inhibit the over-excited cortex, influence E-I and play a protective effect on neurons. However, the specific mechanism of action still needs a lot of research to prove and discover.

5. Summary and Outlook

Autism spectrum disorder, also known as autism spectrum disorder, is a kind of neurodevelopmental disorders occurring in the early stage of development, including social communication disorder, communication disorder, narrow interest and rigid behavior mode. Most children have intellectual developmental disorders. The main performance of [25] is withdrawn, self-isolation, communication barriers, little language, speechless, murmur, rigid and repetitive movements, and narrow interests. When clinical diagnosis to ask family history and personal history, observation of clinical performance, refer to the Diagnostic and Statistical Manual of Mental Disorders (5th edition) (DSM-V) diagnostic criteria, screening scale can be used: ①autism behavior scale (ABC scale), ②autism behavior scale (CABS scale), autism evaluation scale (CARS scale) [25], auxiliary examination, etc. At present, the incidence of ASD is gradually increasing, and there is no clear treatment plan for the treatment of ASD, and the pathogenesis is not clear. At present, the main research direction of this disease is to intervene or block the key signal molecular transduction involved in the pathogenesis of ASD. In the process of treatment of children with ASD, acupuncture can stimulate the signaling pathway and release neurotransmitters, thus affecting the children with ASD and improving the condition. However, further studies are needed to prove the treatment mechanism of acupuncture in children with AS. It is expected that acupuncture can expand the research on the prevention and control of ASD in the future, and accelerate its transformation of clinical treatment, and improve the clinically effective prevention strategies on the basis of elucidating the fundamental pathogenesis of ASD.

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