Clinical Study

Effect of acupuncture on improving the quality of life in children with cerebral palsy and their parents

针灸提高脑瘫患儿及家长生活质量的研究

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Abstract

Objective: To observe the spleen-strengthening and mind-regulating acupuncture method on the quality of life of children with cerebral palsy (CP) and their parents.

Methods: A total of 76 CP children were randomly allocated into a treatment group (n=38) and a control group (n=38) according to their visit sequence. The CP children and their parents in both groups received the same psychological counselling. The CP children in the treatment group were intervened with spleen-strengthening and mind-regulating acupuncture method, versus routine acupuncture method in the control group. The parents of CP children in the treatment group were intervened with three mind-regulating points, versus placebo in the control group. The developmental quotients were evaluated using the Gesell scale before and after treatment. The anxieties of parents were assessed using the self-rating anxiety scale (SAS) before and after treatment. The efficacies were evaluated using the comprehensive functional assessment of CP children.

Results: After 6 months of treatment, the Gesell scores of CP children and SAS scores of the parents were significantly improved in both groups, and there were intra-group and inter-group statistical differences (both P < 0.05). In addition, the scores of comprehensive functional assessment of CP children in the treatment group were significantly higher than those in the control group (P < 0.05).

Conclusion: The spleen-strengthening and mind-regulating acupuncture method can effectively improve the comprehensive ability of CP children, alleviate the anxiety in parents of CP children, improve the quality of life of CP children and their parents, and play an active role in rehabilitative care of CP children.

Keywords: Acupuncture Therapy; Cerebral Palsy; Rehabilitation; Anxiety; Quality of Life

【摘要】目的:观察健脾调神针刺法对脑瘫(cerebral palsy, CP)患儿及其家长的生活质量的影响。方法:将76例 CP患儿按就诊顺序随机分为治疗组和对照组,每组38例。两组患儿及家长均接受相同的心理辅导。治疗组患儿 采用健脾调神针刺法干预,治疗组患儿家长采用调神法三针组穴针刺治疗;对照组患儿采用传统针刺法,对照组 患儿家长采用安慰针刺治疗。治疗前后采用 Gesell 量表评估患儿发育商,采用焦虑自评量表(self-rating anxiety scale, SAS)评估患儿家长焦虑状态,并依据 CP 儿童综合功能评定表进行疗效评定。结果:治疗6个月后,两组患 儿 Gesell 评分均显著提高,两组家长 SAS 评分明显降低,组内治疗前后评分及组间评分差异均有统计学意义(均 P<0.05);治疗组 CP 患儿综合功能评分明显高于对照组(P<0.05)。结论:健脾调神针刺法能有效改善 CP 患儿的 综合能力,减轻 CP 患儿家长的焦虑情绪,提高患儿及家长的生活质量,对 CP 患儿康复治疗有积极意义。

【关键词】针刺疗法; 脑瘫; 康复; 焦虑; 生活质量

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Cerebral palsy (CP) is caused by abnormal development or damage to the parts of the brain. Most often the problems occur during pregnancy; however, they may also occur during childbirth, or shortly after birth^[1]. Signs and symptoms vary between people. Major clinical manifestations include movement disorder, abnormal posture, mental retardation,

epilepsy, auditory and/or visual impairment, speech problems, abnormal behavior and other abnormalities. As a result, CP greatly affects the wellbeing and quality of life (QOL) of CP children^[2]. Because of its prolonged rehabilitative care, high medical cost and low recovery rate, parents of CP children often experience mental stress and anxiety, which can affect their physical and mental health and QOL and, in turn, affect the emotion and rehabilitative effect of CP children^[3]. To encourage parents of CP children, make early intervention and

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focus on childhood development, our research team treated CP children and their parents with three points and mind-regulating and spleen-strengthening acupuncture method and compared with routine acupuncture method. The results are now summarized as follows.

1 Clinical Materials

1.1 Diagnostic criteria of CP

This was based on the diagnostic criteria and classification of cerebral palsy stipulated in the 2006 Rehabilitation Conference on Pediatric Cerebral Palsy^[4].

Diagnostic criteria: Movement disorder and abnormal postures; non-progressive brain injury that causes CP symptoms; movement disorders are associated with the brain; presence of symptoms during infancy; having complications of mental retardation, epilepsy, disturbances of sensation and perception, communication disorders, abnormal behaviors and other abnormalities.

Clinical subtypes: Spastic, involuntary movement, ankylosing, ataxia, hypotonia, and mixed.

1.2 Inclusion criteria

Those who met the above CP diagnostic criteria; boys or girls aged between 4 months and 5 years; and the

guardian were willing to participate in this study and sign the informed consent.

1.3 Exclusion criteria

Those who didn't meet the above diagnostic and inclusion criteria; progressive diseases-related central movement disorder and normal temporary hypoevolutism in motor development; having unclear consciousness or speech difficulty; and having complications of mental disorders.

1.4 Statistical method

The SPSS 12.0 version software was used for data analysis. The *t*-test was used for measurement data of grouping data and paired data. The Chi-square test was used for enumeration data and the *Ridit* for analysis of ranked data. Based on α =0.05, a *P* value of less than 0.05 indicated a statistical significance.

1.5 General data

A total of 76 CP children treated in our department between March 2014 and October 2015 as well as an immediate family member were recruited in this study. They were randomly allocated into a treatment group and a control group by their visit sequence. There were no between-group statistical significances in comparing baseline data (P > 0.05), (Table 1).

Item		Treatment group (n=38)	Control group (<i>n</i> =38)	Statistical value	P value
Com lon (coord)	Male	22	24	0.220 ¹⁾	0.639
Gender (case)	Female	16	14		
-	4-12 months	10	11		
	1-2 years	11	13		
Age group (case)	2-3 years	12	11	0.7911)	0.940
	3-4 years	3	2		
	4-5 years	2	1		
Mean age ($\overline{x} \pm s$, month)		28.6±13.7	28.5±14.1	0.32 ²⁾	0.853
-	Spastic	22	20		0.861
Clinical trans (2000)	Hypotonia	5	6	0.752^{1}	
Clinical types (case)	Ataxia	3	5	0.755	
	Involuntary movement	8	7		
	Mental retardation	34	36		0.552
Associated symptoms	Epilepsy	5	5	$2 \cos(1)$	
(case)	Microcephaly	6	2	2.090	
	Visual/hearing impairment	12	10		

Table 1. Between-group comparison in baseline data of children with CP

Note: 1) x^2 value; 2) t value

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2 Intervention Methods

The CP children and parents in both groups received the same psychological interventions. These included listening to their request and discomfort and explaining the etiology, management and cautionary notes to help them better understand CP, resolve their negative emotions and frustrations and increase mutual trust through constructive communication. It's also important to educate the public about CP and attract social concern and support.

2.1 Treatment group

2.1.1 Children in the treatment group

Three groups of mind-regulating scalp acupuncture points: Sishenzhen [4 points: 1.5 cun anterior, posterior, left and right to Baihui (GV 20)]; three temporal needles (3 points: the first point is located 2 cun directly above the ear apex; the other two points are 1 cun anterior and posterior to the first point, a total of 6 points on both sides); three brain needles [Naohu (GV 17) and bilateral Naokong (GB 19)] and three intelligence needles [Shenting (GV 24) and bilateral Benshen (GB 13)].

Spleen-strengthening points: Hegu (LI 4), Neiguan (PC 6), Shousanli (LI 10), Zusanli (ST 36), Taixi (KI 3), Gongsun (SP 4), Zhongwan (CV 12), Tianshu (ST 25), Guanyuan (CV 4), Pishu (BL 20), Weishu (BL 21) and Dachangshu (BL 25).

Method: Locations of the points are based on the *Nomenclature and Location of Acupuncture Points* (GB/T 12346-2006). With a sitting position of the CP children, disposable filiform needles of 0.30 mm in diameter and 25 mm in length were used to puncture the points on the abdomen and back and remove immediately upon arrival of qi. Even reinforcing-reducing manipulation was applied to the rest of the points. The needles were retained 40 min. The treatment was conducted once every morning and 5 times a week. The children were treated for a total of 120 times (a course of treatment).

2.1.2 Parents of CP children in the treatment group

Three mental regulation points: Yintang (GV 29), Neiguan (PC 6) and Shenmen (HT 5).

Method: Acupuncture was applied to parents in a supine lying position once every afternoon, followed by even reinforcing-reducing manipulation. The needles were retained 30 min and 5 times a week. The parents were treated for a total of 120 times (a course of treatment).

2.2 Control group

2.2.1 Children in the control group

Routine acupuncture therapy was applied to CP children in the control group. The point selection was based on the *Science of Acupuncture and Moxibustion*^[5].

The frequency and course of treatment were identical to that of the treatment group.

Major points: Dazhui (GV 14), Shenzhu (GV 12), Fengfu (GV 16), Sishencong (EX-HN 1), Xuanzhong (GB 39) and Yanglingquan (GB 34).

Adjunct points: Zhongwan (CV 12), Pishu (BL 20) and Zusanli (ST 36).

Method: Locations of the points and specifications of needles were identical to that of the treatment group. With a sitting position of the CP children, needles to the abdomen and back were removed immediately upon arrival of qi. Even reinforcing-reducing manipulation was applied to the rest of the points. The needles were retained 40 min. The treatment was conducted once every morning and 5 times a week. The children were treated for a total of 120 times (a course of treatment).

2.2.2 Parents of CP children in the control group

Points: Identical to the treatment group.

Method: With a supine lying position, the points were stimulated once every afternoon using a toothpick. The toothpicks were immobilized using medical adhesive plasters and retained for 30 min, 5 times a week. The parents were treated for a total of 120 times (a course of treatment).

3 Results Observation

3.1 Observation items

3.1.1 Gesell scale^[6]

The Gesell scale was used to assess the developmental quotient before and 1 course after the treatment. The Gesell scale mainly assesses the children's adaptive skills, large motor skills, language/ comprehension, fine motor skills and self/social behavior. There are a maximum of 100 points, \geq 86 points: normal; 75-85 points: suspected CP; 52-74 points: mild CP; 36-51 points: moderate CP; 20-35 points: severe CP; and \leq 20 points: extremely severe CP.

3.1.2 Self-rating anxiety scale (SAS)^[7]

The SAS scores of parents of CP children were evaluated before and 1 course after the treatment. The SAS contain a total of 20 items and a maximum score of 100 points. A higher score indicates a more severe anxiety. Using 50 points as the boundary value, 50-59 points: mild anxiety; 60-69 points: moderate anxiety; and \geq 70 points: severe anxiety.

3.2 Efficacy criteria

The 'Comprehensive Functional Assessment for Children with Cerebral Palsy' was used to scale clinical symptoms of CP children^[8], including five domains: cognition, language, motor skills, self-care and social adaptation. Each domain contains 10 items, 2 points for each item. The maximum score is 100. Each item is graded from 0 to 2 (0, 0.5, 1, 1.5 and 2). A lower score indicates a more severe disability. The efficacy criteria were made according to the changes of symptom scores.

The improvement rate of symptom scores =(Post-treatment score — Pre-treatment score) \div Pre-treatment score \times 100%.

Marked effect: The improvement rate \geq 20%.

Improvement: The improvement rate \geq 1%, <20%.

Failure: The improvement rate remained unchanged or decreased.

3.3 Results

3.3.1 Between-group comparison in baseline data of parents before and after treatment

Before treatment, there were no statistical significances in comparing the gender, age and SAS scores between parents in the two groups (P>0.05), indicating that the two groups were comparable. Before treatment, most parents in both groups experienced moderate or severe anxiety. After intervention, the SAS score in the treatment group was significantly

decreased (P < 0.05); and there was between-group statistical difference in SAS score (P < 0.05). This indicates that both protocols can alleviate anxiety of the parents of CP children; however, mind-regulating and spleen-strengthening protocol obtained better efficacy than routine acupuncture protocol (Table 2).

3.3.2 Between-group comparison of Gesell scales before and after treatment

There were intra-group statistical significances in Gesell developmental quotient (P < 0.05) before and after treatment. After treatment, there was a betweengroup statistical difference in curative efficacy (P < 0.05), (Table 3).

3.3.3 Between-group comparison in treatment effect

The total effective rate in the treatment group was 93.3%, versus 65.6% in the control group, showing a statistical significance (P < 0.05) and indicating a better efficacy in the treatment group than that in the control group (Table 4).

Table 2. Between-group comparison in baseline data of the parents of children with CP

Group	n	Gender (case)		Mean age	SAS score ($\overline{x} \pm s$, point)		Statistical	
		Male	Female	$(\overline{x} \pm s, year)$	Before treatment	After treatment	value	P value
Treatment	38	20	18	29.2±6.3	64.74±9.51	36.24±7.78	18.206 ²⁾	0.000
Control	38	17	21	29.4±5.9	63.26±9.77	50.81±7.64	7.697 ²⁾	0.000
Statistical value		0	.474 ¹⁾	0.053 ²⁾	0.666 ²⁾	8.244 ²⁾		
P value		0	.491	0.958	0.507	0.000		

Note: 1) x^2 value; 2) t value

Table 3. Between-group comparison in Gesell scale before and after treatment ($\overline{x} \pm s$, point)

Group	п	Before treatment	After treatment	t value	P value
Treatment	38	60.32±11.74	71.42±11.20	5.779	0.000
Control	38	59.61±11.16	65.58±10.26	4.859	0.000
t value		0.270	2.371		
P value		0.788	0.020		

Table 4. Between-group comparison in therapeutic effects (case	e)
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Group	n	Marked effect	Improvement	Failure	Total effective rate (%)
Treatment	38	5	29	4	93.3
Control	38	2	23	13	65.6
χ^2 value					6.743
P value					0.034

4 Discussion

In Chinese medicine, pediatric CP falls under the category of 'five retardations', 'five flaccidities' and 'five stiffnesses'. CP is a group of permanent disorders of the

development of movement and posture attributed to non-progressive disturbances that occurred in the developing fetal or infant brain. Clinical practice has proven that scalp acupuncture is the first option for pediatric CP^[9]. As a result, this study employed 5 groups of acupuncture points (4 mental points, 3 intelligent points, 3 temple points on both sides and 3 brain points) to match with five directions and five Zang organs and refresh the mind. Dysfunctions of the Zang-fu organs may disturb the five tissues, emotions, liquids and mental activities. In addition, pathologies of the Zang-fu organs and meridians may induce or aggravate brain conditions. Since children have tender, incompletely developed organs, it's essential to regulate Zang-fu organs, supplement anti-pathogenic qi and promote growth and development for pediatric CP.

So far there is no specific therapy for pediatric CP. Treatment of CP is a lifelong process and requires close cooperation from the family and society. Many treatment methods are available for CP and all these methods have their strong and weak points^[10]. Acupuncture has shown a distinctive advantage in the treatment of CP; however, there is no standard in point selection, needling technique and curative efficacy criteria^[11]. Dr. Yu Hai-bo in this research team integrated the academic experience of Prof. Jin Rui and years of his clinical practice and proposed the method of 'three groups of acupuncture points' that acts to regulate the spleen and stomach, harmonize vin and vang, unblock meridians and tranquilize the mind^[12]. Research findings have suggested that scalp acupuncture stimulation via three groups of points can effectively increase the blood supply to the cerebral cortex, improving the oxygen-carrying capacity of the brain tissue, accelerate the repair and regeneration of impaired neurons and thus compensate for the cerebral lesion. The spleen-strengthening body points can alleviate muscle tone, improve muscle strength, boost intelligence and increase the motor function and cognition of CP children^[13-14]. This study has proven that the developmental quotient in Gesell scale was higher than pre-treatment results and that in the control group, indicating that the spleen-strengthening and mindregulating protocol is superior to routine acupuncture protocol.

At present, CP affects 1.2‰-2.7‰ children in China^[15]. As a permanent disability disease, CP greatly affects the children and their family. Anxiety is commonly seen in parents of CP children because of the high disability rate, high medical cost, slim chance of recovery and long-term hospitalization. Most parents find it hard to accept the fact that their children are diagnosed with CP. Along with the huge mental stress, these patients become anxious and their QOL are greatly affected^[16-19]. Studies have proven that anxiety may significantly impair the somatic and social functions and compromise the immune system and disease-defending ability^[20-23]. In this study, mindregulating acupuncture has greatly improved the negative anxiety in parents of CP children and adjusted their attitude towards CP. After treatment, the anxiety severity of parents in the treatment group was significantly lower than that in the control group (P < 0.05).

CP recovery requires multi-dimensional and comprehensive measures. Acupuncture is beneficial to rehabilitation and treatment of CP. With confidence and mental regulation, parents can become positive in the care of CP children. This can, in turn, obtain better clinical effect.

Conflict of Interest

There was no conflict of interest in this article.

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Statement of Informed Consent

Informed consent was obtained from all children's guardian included in this study.

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