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Correlation between the Gesell Developmental Scale and the Gross Motor Scale in the Treatment of Spastic Cerebral Palsy

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Abstract: Objective: To evaluate the gross motor development of children with spastic cerebral palsy before and after treatment with integrated traditional Chinese and Western medicine by using the Gesell Development Scale and Gross Motor Scale, and to analyze the effect of early intervention. Methods: A total of 100 children with spastic cerebral palsy who were diagnosed and treated in Xi'an Hospital of Encephalopathy of Traditional Chinese Medicine from January 2020 to December 2021 were selected and treated with a real-world integrated traditional Chinese and Western medicine program for 3 months. Gesell development scale and gross motor scale were used to evaluate Before and after treatment of the children's exercise development, the development quotient before and after treatment was tested by paired test, and the Spearman correlation analysis was performed on the two scales. Results: After 3 months of treatment, retested by Gesell developmental scale, the DQ value of gross motor was increased from (36.625±20.0928) to (37.513±21.5651) before treatment, P＜0.05 by rank sum test (z=-2.697a, P =0.007), there was a significant difference in the gross motor development quotient before and after treatment; The gross motor scale was retested, and the score increased from (48.475±23.4231) before treatment to (53.111±22.9518), P<0.05 by rank sum test (z=-8.685a, P=0.000), there was a significant difference in gross motor scores before and after treatment; The correlation coefficient of curative effect rates evaluated by the two scales was r=0.197, p=0.05, indicating a significant correlation; Conclusion: Gesell development scale and gross motor scale were used in children with spastic cerebral palsy to analyze the effect of early intervention. The motor function scale for the assessment of gross motor function is of great significance for guiding exercise training in children with cerebral palsy.

1. Introduction

Cerebral palsy is a group of persistent central motor and postural developmental disorders and activity limitation syndromes that result from non-progressive damage to the developing fetal or infant brain. Motor development and postural abnormalities are core manifestations of cerebral palsy. Movement disorders in cerebral palsy are often accompanied by disturbances in sensory,

perception, cognition, communication, and behavior, as well as epilepsy and secondary musculoskeletal problems. A diagnosis of cerebral palsy and spastic increases in muscle strength can be diagnosed as spastic cerebral palsy. According to the "China Cerebral Palsy Rehabilitation Guidelines" classification, including spastic hemiplegia, spastic diplegia, spastic quadriplegia three types. People diagnosed with cerebral palsy and spastic increase in muscle strength can be diagnosed as spastic cerebral palsy, which is mostly caused by spasticity caused by damage to the vertebral tracts in the brain, accounting for up to 70% of cerebral palsy types. Various risk factors are known to exist before pregnancy, prenatal, perinatal, and neonatal and infancy, with an incidence of cerebral palsy as high as 2 to 3 per 1000 live births. Due to the early plasticity of brain structure and function, intervention and training can compensate adjacent cells to restore the function lost after nerve cell injury, so it is particularly important for early evaluation and effective early intervention in children with cerebral palsy [1-3].

2. Materials and methods

2.1. General information

The data of 100 children with spastic cerebral palsy diagnosed and treated in Xi'an Hospital of Encephalopathy of Traditional Chinese Medicine from January 2020 to December 2021 were retrospectively analyzed. The patients were treated with integrated traditional Chinese and western medicine for 3 months, and the development of the gross motor area was evaluated by the Gesell development scale and gross motor capacity. Diagnosis prerequisites: persistent central dyskinesia; abnormal movement and posture development; abnormal reflex development; Abnormal muscle tone and strength; diagnostic reference conditions: There is an etiological basis for cerebral palsy; There may be evidence of cranial imaging (52%-92%).The age range of the children was from 6 months to 72 months. There was no significant difference in general data such as gender, age, height, weight, ethnicity, vital signs, physical and chemical examinations, and high-risk factors ($P>0.05$).

2.2. Inclusion and exclusion criteria

Inclusion criteria: (1) Cases with spastic cerebral palsy as the first diagnosis or main diagnosis; (2) Spastic cerebral palsy conforming to the above definition and diagnostic criteria of Western medicine and diagnosed as five retardation and five soft diseases by traditional Chinese medicine, and the syndrome differentiation type is spleen deficiency Children with liver hyperactivity syndrome; Syndrome of spleen deficiency and liver hyperactivity: since birth, more lying down and less movement, neck strength is not soft, legs are straightened and internally rotated when picked up, limbs are rigid and contracted, rigid and apraxia, or clumsy movements, and muscles are thin. Irritability and irritability, aggravated after encountering external stimuli, and poor appetite. The tongue is fat or thin, and the tongue is white and greasy or with little coating. The pulse is thin and weak or stringy, and the fingerprints are stagnant. (3) age from 6 months to 72 months, male or female; (4) children whose legal guardian agreed to participate in this clinical trial and signed the informed consent. Exclusion criteria: (1) Patients with incomplete diagnostic data; (2) Patients and/or their family members who performed intermittent doctor's orders and could not determine the curative effect; (3) Patients with serious primary diseases such as cardiovascular, liver and kidney, and hematopoietic system.

2.3. Treatment methods

Chinese medicine treatment: Governing method: soften the liver and strengthen the spleen, relax the tendons and relieve spasm. Oral medicine: main recipe: Ginseng, Atractylodes, Poria, Licorice, dried tangerine peel, Paeonia lactiflora, Uncaria, Gastrodia elata, Caulis Spatholobi; Chinese patent medicine: Jingtankang capsule, Lu qiNaoqiaotong capsule; Acupuncture treatment: scalp acupuncture, body acupuncture, acupuncture methods, acupoint allocation and symptomatic acupoint selection; massage treatment: massage treatment of head, face, back, limbs, and accompanying diseases; traditional Chinese medicine bathing treatment; traditional Chinese medicine along the meridian sticking treatment; Western medicine Treatment: (1) Drug therapy: including sedative drugs, antispasmodic drugs, neurotrophic drugs: such as botulinum toxin, baclofen, brain inosine peptide, ganglioside, acetylglutamine, etc.; (2) rehabilitation technology treatment : Treatment of gross motor dysfunction: such as comprehensive limb training for cerebral palsy, balance function training, isokinetic muscle strength training, mobility training, goal-directed activity movement integration, treadmill training and partial weight loss, treadmill training To train children's walking function to enrich the environment arrangement.

2.4. Evaluation indicators and efficacy judgment criteria

Evaluation of clinical efficacy: Observation indicators include respiration, body temperature, heart rate, blood, urine routine, electrocardiogram, liver and kidney function (examined and recorded once before and after treatment); The gross motor function before and after treatment was evaluated by the Gesell Developmental Scale and the Gross Motor Function Scale. The assessment content identifies observed behavioral patterns against normal behavioral patterns. The professional medical staff who evaluate the scale have undergone standardized training, and have a common understanding and understanding of the content, meaning and scoring requirements of the scale, and have good reliability and validity. Efficacy rate = (post-treatment score - pre-treatment score)/total score (%).

2.5. Statistical methods

The general information of 100 patients, the data of the developmental quotient of the large motor area of the Gesell development scale, and the evaluation data of the gross motor function scale were sorted and entered. SPSS26.0 was used for analysis. Measurement data the measured sample data is expressed as mean ± standard deviation ($\chi \pm s$), and the nonparametric test of two related samples is used. When $P<0.05$, the analysis results are considered to be statistically significant; Correlation analysis was carried out on the count data, when $P<0.05$, the two were considered to have significant correlation.

3. Results

Gesell score comparison and gross motor scale score comparison: After 3 months of treatment, the Gesell developmental scale was retested, and the gross motor DQ value increased from (36.625±20.0928) before treatment to (37.513±21.5651), $P<0.05$ by rank sum test (z=-2.697a, P=0.007), the gross motor development quotient was significantly different before and after treatment; The gross motor scale was retested, and the score increased from (48.475±23.4231) to (53.111±22.9518) before treatment, $P< 0.05$ (z=-8.685a, P=0.000), there was a significant difference in gross motor scores before and after treatment, as shown in Table 1;The correlation study of two scales: the correlation coefficient of curative effect rates evaluated by the two scales

r=0.197, p=0.05 , showing a significant correlation, as shown in Table 2;

Table 1: Comparison of the score of the gross motor function scale and the score of the Gesell Development Scale in children with cerebral palsy before and after treatment (x ±s, points)

Group	Gesell Scale Gross Motor Energy Area	Gross Motor Function Scale
before therapy	36.625±20.0928	48.475±23.4231
after treatment	37.513±21.5651	53.111±22.9518
z	-2.697a	-8.685a
P	0.007	0.000

Table 2: Correlation analysis of curative effect rate between the scores of the Gesell Development Scale and the gross motor function scale

Item	Curative effect rate A, curative effect rate B
number of cases	100
r	0.197
p	0.050

4. Discussion

The Gesell Developmental Scale is the Gesell Developmental Measurement Scale, which is the main measurement tool for the development of the nervous system in preschool children. This study assessed the large motor energy area to identify early whether there are defects in the neuromuscular or sensory system. There are developmental abnormalities that can be treated [4-5]. The Gross Motor Function Scale is a commonly used exercise scale, which evaluates the reflexes, postures and movement patterns of different body positions and comprehensively evaluates the gross motor function [6-7]. Behavior originates from the brain and sensory and motor systems. Behavioral development is an ordered process and can be diagnosed. The timely appearance and refinement of behavior at one age can predict behavior at the next age.

The spastic cerebral palsy described in this plan belongs to the disease categories of "five delays", "five softs" and "five hards" in traditional Chinese medicine. Five late, five soft, and five hard disease syndromes can appear alone or coexist at the same time. Most doctors believe that the main cause is the lack of congenital endowment. In addition to the lack of innate endowments, exogenous evil poisons, injuries from medicinal stones, and internal injuries from the seven emotions are also important influencing factors [8-12]. In the treatment, the main prescription is modified with Yigong Powder, and Chinese medicines are combined with acupuncture and massage therapy to achieve the effect of softening the liver and strengthening the spleen, relaxing the tendons and relieving spasm. In Western medicine, for children with spastic cerebral palsy who are eligible for surgery, it is recommended to perform spinal nerve block surgery, etc., and need drug treatment, mainly nutritional nerve drugs, and cooperate with individualized exercise rehabilitation programs to treat motor deficits symptomatically [13-15]. This study follows the law of physical development of children, and has certain significance for early intervention and improvement of motor dysplasia in children with spastic cerebral palsy.

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