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Exploration on the Rehabilitation Effect of Swimming Teaching Intervention on Autistic Children

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Abstract: *With the increasing number of autistic children, it has become a serious social problem. Around the problem of autism, although researchers have tried to explore effective intervention and solution strategies through a variety of disciplines, they have not clearly studied the causes of the onset of autism children. At present, only scholars have proved that the intervention through sports can alleviate and improve the symptoms of autistic patients, and it can also improve the abilities of other aspects of autistic children at the same time. This study intends to use some means and methods of swimming exercise to exercise intervention on autistic children, study the impact of swimming exercise on autistic children's sports ability, in order to promote the development of autistic children's sports ability, and contribute to the physical health and happiness of autistic children.*

Keywords: *swimming teaching, autistic children, intervention*

1. Introduction

The population base of China is relatively large, so the number of autistic children is also very large in China. However, the attention and help to the disadvantaged group of autistic children is not enough. The state and society do not pay enough attention to the physical fitness of autistic children[1]. Most autistic children are accompanied by obesity and sensory integration disorders, which will also bring a series of other complications. Imperfect development of sensory integration in autistic children will also affect the development of their motor ability. In many theoretical studies, most of them discuss the mechanism of emotional training on autistic children from the perspective of sensory integration ability, while there are few empirical studies on intervention methods and specific implementation processes. With the development of society, at present, in many big cities, such as Beijing, Shanghai, Guangzhou, Shenzhen, etc., autistic children can receive rehabilitation training in special schools or professional rehabilitation institutions for autistic children with the help of social welfare foundation - Autistic Children Assistance Association and other institutions[2]. However, at present, the intervention training in the domestic autism intervention institutions mainly tends to intervene in the psychology and behavior of autistic children. They do not pay enough attention to the sports ability and physical health of autistic children. There are few training methods that incorporate sports means into rehabilitation training [3]. Schools, institutions and families lack methods and means to improve sports ability when conducting emotional training. The intervention of sports has proved to be one of the effective auxiliary means. Through the intervention of sports, the symptoms of autistic patients can be alleviated and improved. The improvement of autistic children's sports ability not only means the improvement of their physical fitness and sports skills, but also can improve their other abilities at the same time, it is a process of mutual promotion of physical and mental development[4].

Swimming teaching refers to a teaching mode that arranges daily behaviors and activities on land into water. Different from the behavior on land, swimming is a multi sensory stimulation environment for everyone. In a strange, blocked and unbalanced environment, swimming teaching requires higher physical activity ability, sensory integration ability, psychological endurance and other aspects of the human body; at the same time, for participants, swimming consumes more energy than land activities, and the effect after participating in activities is more effective than land activities. Compared with other sports, swimming is more diversified, simpler and suitable for all ages. For autistic children with language communication and physical behavior difficulties, it is more practical and easy to operate. Therefore, in foreign countries, swimming is especially popular with all ages and different people, and it is also a popular, active and effective intervention for autistic children.

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2. Related work

Relevant experts and scholars at home and abroad have conducted a lot of research and experiments on the rehabilitation effect of sports intervention on autistic children. Yuan stated in the Influence of Sports Game Intervention on Autistic Children's Sports Ability that (1) sports game intervention can play a positive and effective role in promoting the development of autistic children's sports ability. (2) The interestingness of sports game intervention has a positive effect on cultivating the autistic children's sports interest, promoting their sports participation, improving their physical health, and promoting their physical quality and sports ability development. (3) Due to the arrangement of school teaching, the time of sports game intervention for autistic children in this experiment is relatively short, only 3 months[5]. However, according to the results of the study, it can be inferred that long-term sports game intervention will significantly promote many aspects of autistic children. Deng et al. will conduct a control experiment on 45 autistic children who are set as the experimental group and the control group, with a period of 6 months. The experimental group received sensory integration training, while the control group did not receive any training. Six months later, through the analysis of the results obtained in the experimental group, the experimental group was able to achieve effective improvement compared with the control group after receiving sensory integration treatment [6]. Pan and Li (3) pointed out that various body movements can improve the physical quality of autistic children and promote their health. Sports games can be used as the content of communication among autistic children and promote their social communication ability. Special physical exercise has a positive effect on improving their tactile sensitivity, balance ability, proprioception, coordination ability and attention [7].

To sum up, some experts at home and abroad use sports games or emotional training to intervene in autistic children. The research shows that it can improve the autistic children's interest in sports, enhance their participation in sports, improve their balance ability, strengthen their muscle strength, limb coordination, improve their strength, and reduce their stereotyped behaviors, It can make autistic children feel relaxed and comfortable in the process of playing, express their subconsciousness, and establish trust relationship to achieve the ideal therapeutic effect [8]. However, there is little research on the impact of a specific sports on autistic children's sports ability. In addition, the research methods and means for autistic children at home and abroad are relatively simple. Most of the research methods or means are conducted from a certain angle or an intervention method alone, which is not conducive to the comprehensive development of autistic children. Therefore, effective intervention for autistic children must be conducted from the intersection of multiple disciplines, including medicine, psychology Behaviors and other aspects of children with autism to carry out all-round intervention.

3. Methods

In this paper, 68 children with mild autism were randomly selected to swim for 38 weeks, Test the sports ability indicators before and after participating in the experiment to analyze and study the influence of autistic children on their sports ability after participating in swimming exercises at a certain stage (because of the particularity of autistic children, each child is an independent individual, and has not much in common with other children, so this paper only compares autistic children themselves),as is show in Figure 1.

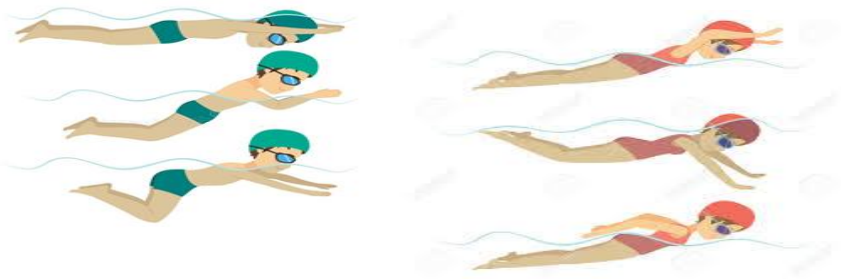

Figure 1 : Effect of swimming teaching experiment

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4. Analysis of research results

4.1 Research on changes of BMI index of autistic children before and after the experiment

BMI is an important standard commonly used in the world to measure the degree of body obesity, which can reflect a person's degree of obesity and body shape to a certain extent. In this test, the BMI index of the subjects before the experiment is tested for the first time. According to this experimental scheme, let several swimming teachers participating in the public welfare course of autism test the BMI index of the experimental subjects of 68 children with mild autism again after 38 weeks of swimming practice. By analyzing and comparing the results of the two tests, we can reflect the changes in the body shape and obesity of the autistic children, as is show in Table 1.

Table 1: Changes of BMI index

	BMI change	
	Before experiment	After experiment
Male (38)	21.38	18.88
Female (30)	22.66	19.29

4.2 Study on the changes of coordination ability of autistic children before and after the experiment

According to the communication with swimming teachers and teachers engaged in children's physical training and in combination with their own information, the coordination ability of autistic children can be reflected by walking with both feet on the line or walking with both feet on the rope. Therefore, the coordination ability of this test is reflected by walking with both feet on the line (3m). The test is to let several swimming teachers participate in the public welfare course of autism under the guidance of this experimental scheme, 68 children with mild autism were tested by treading on the line, and the passing time was recorded. After 38 weeks of swimming practice, the autistic children were tested twice, and the changes in coordination ability of the autistic children were reflected by analyzing and comparing the time changes of the results of the two tests, as is show in Table 2.

Table 2: Changes in experimental results

	Changes in experimental results	
	Before experiment	After experiment
Male (38)	16.18	15.02
Female (30)	13.89	12.66

4.3 Research on the changes of balance ability of autistic children before and after the experiment

Balance ability is one of the most important sports abilities of children, and it is also an important physical quality of the human body. As for the test method of balance ability, relevant experts at home and abroad believe that one foot closed eye test is one of the methods to measure balance ability. I also learned about the relevant personnel of the Autistic Children's Rehabilitation School. They believed that most mild autistic children could also complete the one foot closed eye test with the help or independence, so the balance ability of autistic children in this experiment was also reflected by standing with one foot closed eyes [7]. Under the guidance of the experimental program, I and my colleagues who participated in the swimming public welfare class for autistic children, Test the standing time of autistic children with one foot closed on the left and one foot closed on the right, and record the time that each autistic child insisted on. A test was conducted before the experiment, and the autistic children were tested again after 38 weeks of swimming practice. The changes in balance ability of autistic children were reflected by analyzing and comparing the time changes of the results of the two tests, as is show in Table 3.

Table 3: Changes in experimental results

	Changes in experimental results	
	Before experiment	Before experiment
Male (38)	3.3	3.8
Female (30)	6.5	6.9

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4.4 Research on changes of core strength of autistic children before and after the experiment

Core strength refers to the comprehensive reflection of various forces in the middle part of the human body, including those below the shoulder and those above the hip joint, including the pelvis. It is an important connection point to drive the movement of the upper and lower limbs of the body, and is of great significance to maintain the balance and coordination of the body. Experts and scholars at home and abroad agree that the way of flat support can reflect a person's core strength [9]. This study combines their views and believes that flat support can also reflect the core strength of autistic children or that the core strength of autistic children can also be reflected by flat support. Therefore, this experimental test also uses the time change of plate support to reflect the changes in the core strength of autistic children, as is show in Table 4.

Table 4: Changes in experimental results

	Changes in experimental results	
	Before experiment	Before experiment
Male (38)	8.8	6.6
Female (30)	7.9	5.8

4.5 Research on the changes of physical flexibility of autistic children before and after the experiment

Flexibility refers to the range of motion of human joints, as well as the elasticity and stretching ability of joint ligaments, muscles, skin, tendons and other body tissues, that is, the range of motion of joints and joint systems. With regard to the method of flexibility testing, relevant experts at home and abroad believe that the simple test method for the evaluation of body flexibility includes forward bending. The National Physical Health Standards for Students (revised in 2014) also uses forward bending to test children's flexibility. For the flexibility test of children with mild autism, combined with the specific conditions of children with autism and the opinions of some teachers, the sitting forward bending method is also used to express the physical flexibility of children with autism, as is show in Table 5.

Table 5: Changes in experimental results

	Changes in experimental results	
	Before experiment	Before experiment
Male (38)	16	20
Female (30)	17	19

5. Conclusions

Research shows that 38 weeks of swimming exercise under the guidance of the experimental program can improve the body shape or obesity of autistic children, and can make the body BMI index show a downward trend, which is a very good performance for autistic children. It also shows that swimming exercise can improve the body shape, body fat composition and obesity of autistic children to a certain extent, and can also play a role in reducing weight for autistic children. At the same time, in terms of coordination, to some extent, the research shows that after 38 weeks of swimming practice, autistic children's coordination ability between their upper and lower limbs, the alternating ability between left and right feet, and the coordination of the whole body have been improved. It also shows that swimming practice can be an effective way to develop the coordination ability of autistic children, which can be used for reference by other teachers, rehabilitation institutions for autistic children and parents of children. In terms of balance, through the balance ability reflected by standing with one foot closed, most autistic children's standing time with one foot closed can be improved to a certain extent after 38 weeks of swimming practice. From the range of changes in the left and right foot values, it can be seen that the effect of lifting the right foot is better than that of the left foot, reflecting to a certain extent, The continuous swimming exercise carried out according to the experimental scheme can improve the balance ability of most children with mild autism to a certain extent, which can improve the balance ability of their whole body. In terms of core strength, research shows that swimming training can increase the duration of plate support for most children with mild autism, and the growth rate varies from person to person, providing support for the method of developing the core strength of children with mild autism with plate support in the future. In terms of flexibility, by comparing the

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changes in the number of sit forward bends before and after the experiment, the number of sit forward bends of 68 autistic children has increased to a certain extent after 38 weeks of swimming exercise. Swimming exercise can play a certain role in both autistic children whose body BMI index falls within the average range and autistic children whose body BMI index falls within the overweight or obesity range, the influence on obesity or overweight is greater and more obvious.

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