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Original Article (Pages: 16309-16318)

Comparing the effectiveness of Braitonic and Yoga exercises in perceptual and motor skills of Multiple sclerosis children

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Abstract

Background: Today, due to the increase in the number of children with Multiple sclerosis (MS) compared to previous years and the difference in severity of the disease in each child, new methods and appropriate exercises are required to help them have a better life. Therefore, the main purpose of this study was to compare the effectiveness of braitonic and Yoga exercises and rhythmic movements on the perceptual and motor skills of children with MS.

Methods: The present study was a pretest-posttest quasi-experimental applied research. The study sample included 45 MS children referring to Qazvin Pishgaman Rehabilitation Center, who were selected voluntarily. To evaluate the conditions of the participants before and after the intervention, a short form of the Bruininks-Oseretsky motor proficiency test (BOMP), consisting of eight components of sprinting and agility, balance, two-way coordination, strength, response speed, visual-motor control, upper limb speed and agility, and upper limb coordination tests was used.

Results: Braitonic and Yoga exercises had a positive and significant effect on increasing the level of perceptual and motor skills (static balance, dynamic balance, strength, speed, accuracy and coordination) of children with MS ($p>0.05$). The effect of braitonic exercises on increasing the perceptual motor skills of children with MS was greater than that of the Yoga exercises ($p>0.05$).

Conclusion: According to the findings of this study, it is possible to increase the perceptual-motor skills among MS children with very simple, low-cost and joyful methods.

Key Words: Braitonic, Children, Cognitive and Motor Skills, MS, Yoga.

* Please cite this article as: Abdollahi Tazkereh S, Salehian MH. Comparing the effectiveness of Braitonic and Yoga exercises in perceptual and motor skills of Multiple sclerosis children. Int J Pediatr 2022; 10 (7):16309-16318. DOI: **10.22038/ijp. 2022.61436.4727**

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Received date: Nov.03,2021; Accepted date:Feb.26,2022

1- INTRODUCTION

Multiple sclerosis (MS) is an inflammatory disease in which the myelin sheaths of nerve cells are damaged in the brain and spinal cord. This impairment can disturb the ability of the parts of the nervous system that are responsible for communication to cause many physical signs and symptoms (1). MS appears in several forms and its new symptoms occur either as a recurrent phase (reversibly) or over time (intermittently). Between relapses, the symptoms of the disease may disappear completely; however, persistent neurological problems occur continuously, especially as the disease progresses to later stages. Although the cause of the disease is unknown, its mechanism is mainly related to the damage by the immune system or disruption of myelin sheath-producing cells. The reasons given for these mechanisms include genetic and environmental factors such as infection. A person with inflammation has all the neurological signs or symptoms; the most common of these symptoms are autonomic, visual, motor, and sensory nervous system problems (2).

Meanwhile, children with MS develop physical disabilities in the early years of life, the severity of which varies from child to child. Symptoms of MS in children are similar to those of adults in the disease and include problems with urination and abdominal function, weakness, difficulty walking, eye number changes, muscle spasms, sensory changes such as murmurs or numbness, tremors. Unfortunately, there is no universal cure for MSin children and adults, but strategies and methods such as physical therapy, occupational therapy, counseling, and medications can make life easier and better for these children (3).

Today, due to the increase in the number of children with MS compared to the previous years and the difference in the severity of the disease in each child, it is possible to create a better life for them by inventing and using new methods and appropriate sports. Due to the two-way relationship between perception and movement, the acquisition of motor skills requires the acquisition of perceptual skills and vice versa. Children with perceptual disabilities have difficulty interpreting environmental meaning. The more movement and experiences a child has in perceptual learning, the greater the chance of perceptual and motor integration and the development of a flexible response to different motor situations. Thus, choosing and providing appropriate exercises for children with MS is an important issue that must be carefully planned (4). Considering the perceptual and motor skills of MS children, we selected the following components in this study: static balance, dynamic balance, power, speed, accuracy and coordination. Nowadays due to the development of machine lifestyle, inactivity and disturbed perceptual and motor skills in children with disabilities and children with MS are among the worrying problems in society. With proper planning, sports such as Yoga and britonic, which are more focused on the development of motor skills, along with some creative games can stimulate the motor development of children with MS and increase their motivation and life expectancy (5).

Yoga is one of the best options for a more comfortable life for children with MS whose disease is not at a severe stage. Yoga is a combination of breathing and gentle stretching movements that can relax the body. Then, those who suffer from muscle stiffness or reduced range of motion may experience a good recovery by doing Yoga. Reed et al. (6) measured the effect of seven weeks of Yoga practice on the mood, stress, quality of life, and physical activity of people with cancer and found that those who practiced Yoga had a longer distance in the six-minute test, though there was no significant difference in other factors. Singh et al. (7) measured

the effects of selected Yoga exercises on the physical and psychological variables of dumb children and concluded that physical fitness factors improved in the experimental group. Mostert et al. (8) measured the effects of short-term exercises on aerobic fitness, fatigue, health, and activity levels of people with MS and it was found that in the experimental group, aerobic threshold, feeling of health, and level of physical activity increased.

Braitonic includes the components of aerobics, strength, flexibility and martial arts, so it can be effective in improving the motor skills and life quality of the MS children. Tavanapour (9), examining the effect of a byronic training course on the perceptual abilities of female elementary school students showed that the experimental group performed significantly better than the control group in all subscales. Motamedi (10), examining the effect of Braitonic cognitive-motor exercises on quality of life, body mass index, and cognitive functions of middle-aged women with type 2 diabetes, showed that Braitonic exercises have a significant positive effect on their physical and social functions, as well as their general health.

The present study attempts to compare the effects of britonic and Yoga exercises on the perceptual and motor skills of the MS children in the welfare of Qazvin, Iran.

2- MATERIALS AND METHODS

This research enjoys a quasi-experimental design and is an applied one in terms of purpose.

2-1. Participants

The statistical population included 68 MS children referring to Pishgaman Rehabilitation Center of Qazvin Welfare. Forty five children aged 6-8 years old were selected, voluntarily. They were, randomly, divided into three groups: two experimental groups in Braitonic and Yoga exercises and one control group. The training programs were performed in 24 sessions 45 minutes each (8 weeks, 3 sessions per week), under the supervision of an experienced instructor.

2-2. Procedure

After selecting the sample, informed consent was obtained from their parents. The participating children were randomly divided into two experimental groups and a control group. Prior to the experiment, the perceptual-motor abilities of the subjects in all groups were evaluated by the short form of the Bruininks-Oseretsky test (11). Moreover, the experimental group underwent approximately three sessions of 30 to 25 minutes for each subject on three consecutive days. In each session, first the general warm-up movements, including stretching, kinetic and jumping movements appropriate to the age and special conditions of each participant, and then the designed bratonic exercises were performed. At this stage, the subjects in the control group were engaged in their normal daily activities and did not perform any designed exercises. Finally, in the post-test stage, all participants were re-evaluated using the Bruininks-Oseretsky test. It should be noted that taking care of the children and direct monitoring of the training process were among the most important principles that were considered in all stages so as not to endanger the health of children during work.

2-3. Data collection tool

In order to assess the status of subjects before and after the test, a short form of the Bruininks-Oseretsky motor proficiency test (BOMP), consisting of eight components of sprinting and agility, balance, two-way coordination, strength, response speed, visual-motor control, upper limb speed and agility, and upper limb coordination tests was used. Wuang et al. (12) had evaluated the validity of the

scale and its internal consistency among children with mental retardation, to be at excellent degrees (0.95 and 0.98, respectively).

In this study, based on the evaluative suggestions of experts, some questions were removed and questions with sufficient validity remained; and the reliability of the final scale was obtained through Cronbach's alpha coefficient to be 0.85.

2-4. Exercise protocol

2-4.1. Braitonic exercises (13, 14)

Exercise 1: Braitonic sheet was installed on the wall. A basket with 6 balls in different colors was placed in front of the person. The participant, accidentally, picked up a ball and threw it into a house whose color matched the ball.

Exercise 2: A Braitonic sheet was installed on the wall and the participant was asked to stand next to the wall, jump up, and touch the color that the instructor announced, with one hand.

Exercise 3: Braitonic sheet was put on the floor and the balance board was placed in the middle of it. The instructor asked the subject to stand on the balance board and place one of her legs on the announced color by the constructor order.

Exercise 4: Braitonic sheet was put on the floor. The participants stood with their hands on their backs and jumped on the announced color in pairs.

2-4.2. Yoga exercises

The group performed 8 sessions of Hatha Yoga (Physical Yoga) for 8 weeks, 3 sessions per week. The exercises included breathing techniques, postures (asanas) and relaxation techniques; and lasted between 60 and 70 minutes per session. In each Yoga session, various techniques were taught and the patients were advised not to eat heavy food for at least three hours before starting the exercises. The program usually begins with words to calm the body and mind, and with the help of these methods, the patients were taught how to keep anxiety and worry away during the exercises. Due to the group Yoga training program and the difference between the patients in terms of physical condition, some asanas were avoided for patients with more mobility problems. The patients were first assessed for balance (leaf balance test, Wales flexibility), functional endurance (six minutes of walking), and hand strength (hand dynamometer), and then under the supervision of a Yoga instructor in each session they performed 35 to 40 minutes of asana (movement) exercises ,) 10 to 15 minutes of Pranayama (breathing), and 15 to 20 minutes of meditation (release). Asana exercises included stretching and flexibility exercises performed on almost every muscle in the body. Pranayama exercises were done in a sitting position so that the spine is straight and elongated and there should be no specific and controlled inhalation and exhalation at the beginning. Afterwards, the inhaling and exhaling were performed with a specific and different rhythm, to the trainers' order. Meditation exercises included sitting and focusing on a specific topic (15).

2-5. Data analysis

Descriptive and inferential statistics were used to analyze the obtained raw data. To test the hypothesis, multivariate analysis of covariance (MANCOVA) was performed using SPSS 21 software.

3- RESULTS

The age distribution of the participants in the control group is presented in **Table 1**.

Table-1: Frequency distribution of the participants' age

Age (year)	Braitonic		Yoga		Control	
	N	Percent	N	Percent	N	Percent
6	4	26.7%	5	33.3%	4	26.7%
7	4	26.7%	7	46.7%	6	40%
8	7	46.7%	3	20%	5	33.3%
Total	15	100	15	100	15	100

According to **Table 1**, in the braitonic group, 26.7% are 6 years old, 26.7% are 7 years old and 0.40% are 7 years old. In the yoga group, 33.3% are 6 years old, 46.7% are 7 years old and 20.2% are 8 years old. In the control group, 26.7% are 6 years old, 0.40% are 7 years old and 33.3% are 8 years old.

Table-2: Results of the analysis of covariance to evaluate the difference between perceptual and motor skills in the post-test between the Braitonic and Yoga groups

Source of change	Sum of Squares	df	Mean Squares	F	Sig.	Eta squares
The effect of pre-test	432.63	1	432.63	2375.1	0.001	0.989
Group effect	80.257	1	80.257	440.61	0.001	0.642
Error	4.918	27	0.182	-	-	-
Total	61570	30	-	-	-	-

It can be observed in **Table 2**, that the effect of the group is significant at the level of 99% probability (p = 0.001, Eta squared = 64, F = 440.61). That is, after adjusting for the pre-test scores, the level of perceptual and motor skills in the post-test is significantly different between the Braitonic group and Yoga groups.

Table-3: Homogeneity of regression slope for the components (static balance, dynamic balance, power, speed, accuracy and coordination) in the experimental groups

Source of change	Variable	Sum of Squares	df	Mean Squares	F	Sig.
The effect of pre-test	Post-test static equilibrium	1.457	1	1.457	3.306	0.088
	Dynamic balance post-test	0.817	1	0.817	0.602	0.449
	Post-test power	17.226	1	17.226	3.519	0.079
	Post-test speed	0.251	1	0.251	0.185	0.673
	Post-test accuracy	0.079	1	0.538	0.765	0.395
	Post-test coordination	0.538	1	0.538	0.765	0.395
Error	Post-test static equilibrium	7.137	16	0.446	-	-
	Dynamic balance post-test	6.379	16	0.399	-	-
	Post-test power	78.325	16	4.895	-	-
	Post-test speed	21.726	16	1.358	-	-
	Post-test accuracy	8.939	16	0.559	-	-
	Post-test coordination	11.251	16	0.703	-	-

According to the **Table 3,** the adjusted means indicate that the level of perceptual and motor skills in the Braitonic group (m = 46.76) is significantly higher than that in the Yoga group (m = 43.48).The effect of Braitonic exercises on increasing the perceptual and motor skills of children with MS is significantly greater than the effect of Yoga exercises.

Table-4: MANCOVA results comparing the components between the experimental groups

Source of change	Wilks lambda value	F	df Assumption	df error	Sig.	Eta squares
Group	0.021	132.59	6	17	0.001	0.779

According to **Table 4** after adjusting the pre-test scores, the average weight composition of the components (static balance, dynamic balance, strength, speed, accuracy and coordination) in the post-test is significantly different between the Braitonic and Yoga groups (P≥0.05).

Table-5: ANCOVA results comparing the components between the experimental groups

Source of change	Variable	SS	df	A S	F	Sig.	Eta squares
The effect of pre-test	Post-test static equilibrium	90.947	1	90.947	210.78	0.001	0.705
	Dynamic balance post-test	71.78	1	71.78	144.17	0.001	0.668
	Post-test power	50.642	1	50.642	10.634	0.004	0.226
	Post-test speed	106.82	1	106.82	80.808	0.001	0.586
	Post-test accuracy	40.262	1	40.262	82.71	0.001	0.59
	Post-test coordination	84.365	1	84.365	140.057	0.001	0.665
Error	Post-test static equilibrium	9.493	22	0.431	-	-	-
	Dynamic balance post-test	10.954	22	0.498	-	-	-
	Post-test power	104.77	22	4.762	-	-	-
	Post-test speed	29.083	22	1.322	-	-	-
	Post-test accuracy	10.709	22	0.487	-	-	-
	Post-test coordination	13.204	22	0.6	-	-	-

In all components (static balance, dynamic balance, power, speed, accuracy and coordination) the group effect is significant at the level of 99% probability (p<0.01; **Table 5**). That is, after adjusting for the pre-test scores, the posttest values of different components (static balance, dynamic balance, power, speed, accuracy and coordination) are significantly different between the Braitonic and Yoga groups.

According to **Table 6** the adjusted means indicate that the values of the components (static balance, dynamic balance, power, speed, accuracy and coordination) in the Braitonic group is significantly higher than the Yoga group (p>0.05). Therefore, the effect of Braitonic exercises on increasing the skills (static balance, dynamic balance, strength, speed, accuracy and coordination) of children with MS is significantly greater than the effect of Yoga exercises.

Table-6: The adjusted means of the components in the experimental groups

Item	Group	N	Adjusted mean	Standard errors
Post-test static equilibrium	Braitonic	15	45.966	0.174
	Yoga	15	42.3	0.174
Dynamic balance post-test	Braitonic	15	42.995	0.187
	Yoga	15	39.738	0.187
Post-test power	Braitonic	15	40.468	0.579
	Yoga	15	37.732	0.579
Post-test speed	Braitonic	15	50.853	0.305
	Yoga	15	46.88	0.305
Post-test accuracy	Braitonic	15	47.22	0.185
	Yoga	15	44.78.	0.185
Post-test coordination	Braitonic	15	53.032	0.205
	Yoga	15	49.501	0.205

4- DISCUSSION

The results showed that Braitonic exercises affect perceptual and motor skills (static balance, dynamic balance, strength, speed, accuracy and coordination) of children with MS. Braitonic exercises are combined exercises that due to the involvement of both object manipulation and movement skills affect different motor and perceptual skills during the training period. This can also affect children with the disease, especially children with MS. Children, especially those with MS, also need the opportunity to practice and experience a rich and stimulating environment, along with the encouragement and imagination to develop and strengthen their perceptual and motor abilities.

In line with the results of this study Dehghanizadeh et al. (16), investigating the effect of Braitonic exercises on the development of motor skills of trainable handicapped children, concluded that Braitonic exercises are helpful on motor development of the participants. Our results are also consistent with those of Karimi and Aytizadeh (17) with the difference that they have studied the effect of Braitonic exercise on stable attention and static balance in hyperactive children and believe that Braitonic exercises can increase sustained attention, impulse control and static balance in hyperactive children. Likewise, the study by Tavanapour et al. (9) showed the positive effect of Braitonic training on the perceptual-motor abilities of elementary school female students and defined it as a good program for the comprehensive development of perceptual-motor abilities of elementary school students. In another study, Bagheri et al. (18) found positive and significant effects of Braitonic exercises on the concentration and academic achievement of Iranian and Afghan students living in Iran. Despite all the mentioned studies confirming the positive and significant effect of Braitonic exercises on the development of perceptual and motor skills, its effects on MS children is still ambiguous. According to Piaget, children learn best through active experiences; so game and activity should be taught for a child to provide him/her with opportunities to interact with others and gain experience through it (19). In this way, exercise and motor training can be considered as an effective factor in the development of children's perceptual and motor skills. Braitonic exercises due to their diversity, use of different stations, group activities, cognitive involvement, the opportunity to lose the idea, even in

children with MS, are interesting, and effective on their perceptual and motor skills.

In addition, the results of the current study showed that Yoga exercises have a positive and significant effect on different components of the perceptual and motor skills of children with MS. Yoga provides a state of calmness, tranquility and satisfaction, which is less common in children with movement disorders; and these children can improve their perceptual and motor skills by performing Yoga protocols and exercises.

The results of this study are consistent with the research of Saadat (20), in which Yoga exercises were found to reduce inappropriate behaviors and increase the amount of nodules in hyperactive children. The findings are also in congruence with those of Parshad (21) reporting that movement exercises increase flexibility, concentration and alertness in children. Similarly, Okan et al. (22) stated that Yoga exercises result in better sleep and less anxiety in children. In general, research evidence has highlighted that Yoga has a positive and considerable effect on the perceptual and motor skills of children with disorders, though very few studies have been conducted in the field of children with MS.

Implementing exercise and physical activity is an important non-pharmacological treatment method to help improve motor skills of MS children. In the past, physicians advised their MS patients to refrain from exercising. They believed that fatigue and fever were complications of these exercises that would lead to worsening of the patients' disease (23). Recently, many studies have shown that proper exercise along with the rehabilitation techniques can be effective in improving this disease (9, 23, 24) The benefits of exercise therapy for patients with inflammatory bowel disease include improving the physical condition of patients, better daily activities and mental health (5). According to the results of the present research, it can be concluded that Yoga exercises can also have a positive effect on the perceptual and motor skills of these children.

Moreover, the results showed that there is a difference between Braitonic and Yoga exercises in the improvement of perceptual and motor skills (static balance, dynamic balance, strength, speed, accuracy and coordination) of children with MS. According to the results, the effects of Braitonic exercises are more effective than Yoga exercises in increasing the perceptual and motor skills of MS children. In line with the results of the present study, Dehghanizadeh et al. (14), Karimi and Aytizadeh (17), Tavanapour and Rahbanfard (9), and Bagheri et al. (16) have concluded that Braitonic exercises have a positive and significant effect on perceptual skills and motor movement of children with disorders. Dana et al. (24), Salehian and Ghadiri (5), have shown that Yoga exercises have positive and significant effects on perceptual and motor skills of hyperactive children.

Yoga exercises make people feel relaxed and create less excitement in children than Braitonic exercises, and the variety of items in them is less than that in Braitonic exercises. Therefore, due to the fact that children generally like excitement and variety in doing sports, they are more inclined to do Braitonic exercises.

Braitonic is a unique sport that is different from other sports due to its special features. Braitonic performance with rhythmic movements combines the components of art, beauty and movement, and brings pleasure and relaxation, suitable for the child's motor development. The movements can be performed without any equipment and in a small space. Creativity and innovation in this sport has made its movements infinitely diverse and fun for all age groups. Some of the components of

this sport that might have been influential in making it more effective than Yoga, in our study, include sequence of motion, balance, observational learning and pattern imitation, teaching different languages, participating in group and social activities, using the process observation, conflict in problem solving while performing a new movement, strengthening motor intelligence, strengthening memory and synchronization for all. Braitonic increases concentration and creativity, improves physical fitness, speed and agility, nerve and muscle coordination, and facilitates growth and motor development in children with MS (25).

One of the limitations of the present study was its being performed only on 6-8 year old MS girls, though exercise and test conditions were the same for all members of the study sample. One of the strengths of this research was its implementation for the first time in the study context.

5- CONCLUSION

It can be concluded, according to the findings of this study, that it is possible to increase the perceptual-motor skills of children with MS with very simple, low-cost and joyful methods.

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