



## THE RESEARCH OF THE EFFECT OF THE PILATES SPECIAL MOVEMENT TRAINING PROGRAM WHICH IS APPLIED TO AUTISM SPECTRUM STUDENTS ON STUDENT'S BALANCE AND FLEXIBILITY PROPERTIES

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### Abstract:

The aim of this research is to investigate the effects of pilates movement training program which is applied to autism spectrum children on student's flexibility and balance development. 26 students (12 male+6 female) participated to this research. The age of the students were formed as group of 6-12 aged, two groups have been created for research. 18 students were determined as experimental (12 male+6 female), 18 students were determined as a second control group (12 male+6 female), while creating group, it is paid attention to not to be similar in student's age, gender, physical appearance. The research data's were analysed by SPSS v16 program, the pre-test & post-test comparisons and minimum, maximum, values were tabulated. Even though according to research results there is not seen any development in control group, the significant development is seen in experimental group ( $p<0,05$ ) and in balance development ( $p<0,001$ ). As a result, it is observed that the pilates special movement training program which is applied to autism spectrum children's provides a positive contribution to children's physical properties, ability of flexibility and balance.

**Keywords:** autism spectrum, pilates, flexibility, balance

### Introduction

Autism can be defined as a defect which is defined with behavioural symptoms in connection with interest which affect the higher cortical functions and the lifelong socialization, language, communication and many other events.

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Autism occurs as estimated in one in 150 children. It occurs 4 times more than boys in girls. The symptoms in autism children have been listed in three big subjects which are communication, behaviour and social interaction.

Autism children's other characteristics are repetitive activities, stereotypical uniform movements, showing reactions to environmental changes and daily routine and showing unusual reactions to sensory experiences.

The physical education and sport programs for individuals with pervasive developmental disorder include the exercises which increase the strength of the development at all levels of cardiorespiratory. During the infancy and toddler, the planned wide variety activities are needed for improving the balance, simulating sensory motor system, improving and advancing the skills of basic locomotor and non-locomotor which will prepare an active lifestyle.

The most important characteristics of autism children are the lack of ability to speak, inability to use language and communication. These symptoms cause to children's poor relations with environmental, individuals, peers and undevelopment in communication. Undevelopment speaking and language skills in childhood emerge slightly in adolescence. In this process, they can say one word (take, give, handle etc.) or short sentences (goodbye, welcome, throw the ball, etc.)

Not being able to talk and communicate affect to children negatively in their social and emotional development. Their social communications improve slightly slower than peers. This obstructs to develop their social skills. In their skills negativity occurs because they cannot use their imagination when they play games and with toys. They cannot behave properly for the purposes of game and toys. Their peer's emotions don't make sense to them. Their own feelings can reflect meaninglessly to their behaviour.

The motor development which is very important for normal children is also very important for autistic children and develops in normal course. This situation which shows normal development and appearance as a physical development can create difficulties in implementation phase. They can live difficulties and delay in making a suitable behaviour according to technical guidelines. Or insufficiency can take the attention. Accordingly, in the psychomotor skills program which is going to planned for children more emphasis should be given to basic motor skills (walk, run, jump, hold, throw, hit etc.), after that passed to motor skills (dribbling, skiing, playing tennis etc.) and sport skills (activities for port) training.

## **Movement Training and Sport in Autistic People**

Evaluation of children's strengths and weaknesses in a comprehensive manner in movement training and sport activities which is applied to autistic children and preparation of individual physical education and sport program according to evaluation provide a major contribution to health, wellbeing, lifelong quality sports experience, recreation participation and development of individual talent.

In any case of autistic child's stage, the participation to daily aerobic exercises is very important. Because, aerobic exercise decreases to provide a self-excitation and aimless behaviour, increases the time for academic and professional works and develop the hard motor performance.

In physical education and sport program for children it is known that the pilates movement training programs have positive contribution. For special movement training programs related to pilates exercises which are prepared for his aim:

1. To find the every gym, field, equipment and materials for the implementation of the program.
2. To provide an alternative for the selection of material for study and to consider requests.
3. To make activities easier if having stress in activities.
4. To regard student's interests.
5. To use the different colour, weight and size materials examples.
6. To do group activities besides individual activities.
7. To create special individual programs.
8. To give feedback frequently.
9. To provide canalizing negative behaviour to different directions.
10. To allow doing some activities individual.
11. To provide doing the behaviours with same exercises and regularly in warm-up.
12. To use visual material.
13. To do reminders about pre-workouts during the workouts.
14. Trying to communicate verbally with children.
15. To give attention to eye contact in activities.

## **Methodology**

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The permissions from education institutions, medical reports and parent's permit have been taken for students exercising who participated to the research. Students participated to the research program twice a week with 50-75 minutes workouts. The balance and flexibility values have been taken with doing pre-tests from the students in control and experimental group before participating to the study.

In research process, the sport science faculty students and the recreation department research assistants participated to the workouts as volunteer instructors. The pre-test and post-test measurements were taken in exercises laboratory of gym of sport science faculty. After the research, the comparison of groups have been analysed with program SSPS v16 and valued with doing the post-tests again to control and experimental group.

The special movement training program which comprise with pilates materials was prepared for research. The materials which are used in research have been created with the kind of:

1. Pilates mats
2. Foam roll
3. Peanut shape ball (90 cmx145 cm)
4. Pilates ball (40cm, 50 cm, 60 cm)
5. Balance ball (8 cmx16 cm)
6. Weight ball (250 gr., 500 gr., 750 gr., 1000 gr.)
7. Circle (40cm, 50 cm, 60 cm)
8. Dumbbells (250 gr., 500 gr., 750 gr., 1000 gr.)
9. Resistanca bands
10. Pilates rollers
11. Pilates ball with resistance
12. Pilates mini balls
13. Pilates soft balls

While preparing the special movement training program, the study program was created with taking views of the special education department lecturers and the lecturer of coaching education department of sport science faculty.

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**Table 2:** The Pilates special movement training program for students who participated to the training

Weeks	Basic movements	Special movements	Gains	Used materials
<b>Week 1.</b> (2 exercises)	General warming, opening and stretching	Educational games	Muscles and joints of the body to be ready to exercise	Pilates mats, Foam roll, Resistanca bands, Pilates rollers
<b>Week 2.</b> (2 exercises)	General warming, opening and stretching	Educational games with ball	Muscles and joints of the body to be ready to use materials	Peanut shape ball (90 cmx145 cm), Pilates ball (40cm, 50 cm, 60 cm), Pilates mini balls, Pilates soft balls
<b>Week 3.</b> (2exercises)	General warming, opening and stretching	Educational games with ball and weights	Muscles and joints of the body to be ready to use materials	Balance ball (8 cmx16 cm), Weight ball (250 gr., 500 gr., 750 gr., 1000 gr.)
<b>Week 4.</b> (2exercises)	General warming, opening and stretching	Educational games with different sport materials	Muscles and joints of the body to be ready to use different materials	Circle (40cm, 50 cm, 60 cm), Dumbbells (250 gr., 500 gr., 750 gr., 1000 gr.), Circle (40cm, 50 cm, 60 cm), Dumbbells (250 gr., 500 gr., 750 gr., 1000 gr.)
<b>Week 5.</b> (2 exercises)	General warming, opening and stretching	Educational games made on gym mat	Ability to do ground exercises individual and pairs	Pilates mats, Foam roll, Resistanca bands, Pilates rollers, Resistanca bands, Pilates rollers
<b>Week 6.</b> (2 exercises)	General warming, opening and stretching	Educational games made with weight balls on the gym mat	Ability to do ground exercises with weight balls individual and pairs	Pilates ball with resistance, Pilates mini balls, Pilates soft balls
<b>Week 7.</b> (2 exercises)	General warming, opening and	Educational games related to sport branches	Ability to do flexibility and balance	Pilates mats, Foam roll, Resistanca bands, Pilates rollers and various sport

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	stretching		exercises individual and pairs	balls
<b>Week 8.</b> (2 exercises)	General warming, opening and stretching	Competition with educational games made on gym mat	Ability to do ground exercises with racing individual and pairs	Penanut shape ball (90 cmx145 cm), Pilates ball (40cm, 50 cm, 60 cm), Pilates mini balls, Pilates soft balls and various sport balls
<b>Week 9.</b> (2 exercises)	General warming, opening and stretching	Educational games related to sport branches	Ability to do flexibility and balance exercises individual and pairs	Balance ball (8 cmx16 cm), Weight ball (250 gr., 500 gr., 750 gr., 1000 gr.) and various sport balls
<b>Week 10.</b> (2 exercises)	General warming, opening and stretching	Educational games related to sport branches	Ability to do flexibility and balance exercises individual and pairs	Circle (40cm, 50 cm, 60 cm), Dambıl (250 gr., 500 gr., 750 gr., 1000 gr.), Circle (40cm, 50 cm, 60 cm), Dumbbells (250 gr., 500 gr., 750 gr., 1000 gr.) and various sport balls
<b>Week 11.</b> (2 exercises)	General warming, opening and stretching	Competition with educational games made on gym mat	Ability to do ground exercises with racing individual and pairs	Pilates mats, Foam roll, Resistanca bands, Pilates rollers, Resistanca bands, Pilates rollers and various sport balls
<b>Week 12.</b> (2 exercises)	General warming, opening and stretching	Shows with educational games made on gym mat	Ability to do shows with ground exercises individual and pairs	Pilates ball with resistance, Pilates mini balls, Pilates soft balls and various sport balls

**Note:** The special prepared pilates movement training program have been applied with taking from the research of Şirinkan, Ahmet. *Investigation Of The Effect Of The Pilates Movement Education Program On Development Of Flexibility And Balance Of The Children At Special Education And Rehabilitation Center*. European Journal of Physical Education and

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<http://oapub.org/edu/index.php/ejep/article/view/225>

## Findings

**Table 1:** The age, gender, height, weight status of children who participated to the training program

Groups	Status	M	%
Age deney grubu	6-8 aged	4	22,2
Age kontrol grubu	6-8 aged	6	33,3
Age deney grubu	9-12 aged	14	77,8
Age kontrol grubu	9-12 aged	12	66,7
Gender deney grubu	Male	12	66,7
Gender kontrol grubu	Male	12	66,7
Gender deney grubu	Female	6	33,3
Gender kontrol grubu	Female	6	33,3
Height deney grubu	100-110 cm	4	22,2
Height kontrol grubu	100-110 cm	3	10,6
Height deney grubu	111-120cm	8	44,5
Height kontrol grubu	111-120cm	9	50
Height deney grubu	121-140cm	6	33,3
Height kontrol grubu	121-140cm	6	33,3
Height deney grubu	141cm and above	2	10,1
Height kontrol grubu	141cm and above	2	10,1
Weight deney grubu	35-45 kg	4	22,2
Weight kontrol grubu	35-45 kg	4	22,2
Weight deney grubu	46-55 kg	8	44,5
Weight kontrol grubu	46-55 kg	8	44,5
Weight deney grubu	56 kg and above	6	33,3
Weight kontrol grubu	56 kg and above	6	33,3

## Analysis

The research data has been analysed by SPSS v16.0 software. Pre-test, post-test comparisons, minimum, maximum and z values were tabulated.

**Table 3:** The results of pre-tests and post-tests of control and experimental group who participated to the research

Tester	Pre-post tests	n	Min.	Max.	z
Flexibility test in experimental group	Pre-test	18	4,05	9,12	,000
	Post-test	18	7,45	18,05	
Flexibility test in control group	Pre-test	18	3,25	7,60	,543
	Post-test	18	4,00	,45	
Flamingo balance test in experimental group	Pre-test	18	12	25	,000
	Post-test	18	18	52	
Flamingo balance test in control group	Pre-test	18	10	22	,279
	Post-test	18	11	24	

### Conclusion and Evaluation

According to research results, it is achieved that even though any kind of development have been seen in control group, a significant development have been seen in flexibility development of experimental group ( $p < 0,001$ ) and also in balance development ( $p < 0,001$ ).

Nowadays individuals with the autism spectrum are being left behind about motor function is noticed by researchers and educators (Todd and Reid, 2006). Although every individual show differences, generally the strain in requiring balance and coordination movements and the weakness in overall muscle strength are seen (Kurtz, 2008)

It is expressed that there is widespread lack of motivation in participation physical activities. Students who have this situation participation to exercise about school, opportunities to benefit from physical activity in free time and their level are less than peers who have typical development (Pan et al, 2011).

In research of Atalay and Karadağ (2011), it is stated that the sport activities contribute to the strengthening of the autistic children's muscles and development of balance and hand-eye coordination.

In the studies of Bruininks and Chvat (1990), they have expressed that the sport activities are both implement and purpose. Autistic people have honour, confidence and live the emotion of success with integrating into society with sport activities.

The basic motor skills usually develop with applying regular and continuous program (Fernhall, 1993). In two or three months programs which are applied for



autistic people the development of autistic people's physical properties are observed but also this development in the long-term program will be more permanent.

One of the most important ways of canalizing positively their energy is sport events for autistic people. The routing of individual's energy with sport activities to positive group activities means sport therapy. It is known that sport is a implement to support human muscle and nervous system, mental and physical reactions and body's physiological and metabolic development. It is clear that in this direction, the sport and physical activities have kind of rehabilitation property (Beasley, 1982).

As a result, in general all of the research's it is achieved that the sport activities which have been applied to autism spectrum children about movement training, exercise programs and free-time activities contribute positively to their motoric features and skills. Also in our research, it is observed that the pilates special movement training program which is applied to autism spectrum children contribute positively to children's flexibility and balance skills in their physical features.

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