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The investigation of the effects of the sport goalball on level of some physical propriety of visually handicapped individuals

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Abstract

This study was carried out with the aim of stating whether or not playing goalball is effective on the duration of audial reaction, the power of hand and grasping, flexibility and balance of the individuals those visually disabled in different degrees. For this purpose, in the province Van, 30 experimental subjects were included in the study, 15 subjects of the study were of an advancing group whose visual degrees were varied between B1 and B3 and other 15 subjects were of not doing sports. The average age of those subjects was 31.53 ± 9.19. The average age of those doing sport was 2. 93± .88 years. The test of the right and left audial reaction of the subjects was defined with the device New Test 1000. Also, their grasping power was measured with Grip Strength Dynamometer. In addition, the test of flexibility of subjects was applied twice and the highest grade was recorded. In the hopping test, those completed the test were evaluated with (+), and those not completed the test were evaluated with (-). Then, the digital data was transferred to electronic environment. One way variance analysis (ANOVA), Mann –Whitney (One Way) and T Tests were used for statistical analyses of the data. There was no significant difference on account of height, weight, flexibility and hopping test ($p < 0.05$). It was assigned that there is a difference ($p < 0.01$) between the groups in duration of right hand audial reaction and left hand grasping power; there are significant differences between the groups in age, duration of left hand reaction and right hand grasping power.

Key Words: Audial reaction time, flexibility, grasping power, visually handicapped.

INTRODUCTION

Visual disability was defined differently in varied sources. Ministry of Education has defined visual disability as those, who are not possible to benefit from the education exercises with the ability to see and despite all the correction those, whose seeing with two eyes is below 1/10 and view angle below 20 degrees, in other words, those who can see something, which can be seen in 6.1 meters by someone with normal visual ability, in nearly 60 cm or at closer range is as big as and or not able to see anything in any distance (25).

Loss of sight does not lead to loss of motor and physical feature directly. But developmental losses may occur because of not being able to find enough opportunity to move. The reasons for this are limitation of movement, manipulating the environment and connections with the environment. Delay of motor is not seen in those people who have lost sense of seeing afterwards. But delay of motor is seen in those who have lost their sense of seeing previously (20).

One of the most important problems that visual deficiency leads is limiting the freedom of movement. It depends mostly on freedom to move; for someone to stand on his/her own or to be in the situation of an independent person. There are two dimension of freedom to move. First of these is tendency (Orientation), the second one is wandering (Independent movement) (14). For someone with visual disability tendency is to identify its position and the relations among the other objects by using its senses of hearing, kinesthetic and smelling (13). Independent movement is basic right which is given to him/her according to many people. It is stated that where, how and how he/she can go depend on independent movement and using tendency skills for those who have been affected with visual deficiency. It is extremely important in terms of independency in social life for those with visual

deficiency to have good tendency and independent movement skills (33).

It is estimated that % 85 of the information which human beings take from the outer world is via seeing. But this does not mean that children with visual deficiency take information % 85 less than those seeing. It means that children with visual deficiency can use also their other senses to get information (26). The superiority, that those not see show to get the meaning of the stimuli via hearing and touching, comes primarily from their deprivation from opportunity to benefit from the help and power of seeing. So, they may become more experienced in diagnosing or meaning their impressions that they get via their other senses (9).

The positive effects of the regular exercises on man's health are not unquestionable. These positive effects provide not only good commotions but also physical development of the disabled people in society (10). It is known that sports are a mean which supports the development of humans' muscle and neural system, mental and physical reactions and the development of physiological and metabolic development of the body. It is emphasized that physical activities have a kind of specialty of rehabilitation (5). Taking part in sportive activities provides great benefits in a wide range such as development of muscles, coordination, balance, control of standing, flexibility and respiratory-circulatory system (8). In this situation, the branch of the sport also affects the time of reaction. However, someone has chosen the branch according to the structure and feature; it is accepted as normal for him to shows decrease in the time of reaction if he/she works in an environment that there is no reaction time. It can be whether not by he/she completes it successfully or looking the severity of the response given to stimulus in the sports branches that the reaction time is important (1).

Disabled people have the possibility to do sports in different branches according to the situation of their disability and severity. Goalball, Torball, bowling, football, chess and athletics are the most common sport branches among visually disabled people that we see. These sports branches help the visually disabled people to pass time and gain confidence, balance, muscle control, freedom in movement and coordination. Sport helps removing the fear of being damaged by the inevitable environment because of loss of seeing and helps to continue a more independent life (21). Goalball is among the most common sport branches which are done among the visually disabled people. It is a game which was developed as rehabilitation for German soldiers those who lost their ability to see after the World War 2. They use eye band as they have different degree of seeing. Though the level of physical suitability of the visual disabled student is lower, there are many students whose level of physical suitability is much more than their peers (22).

In this study, it is aimed to determine whether or not it has effects an audial reaction time, hand-grasping power, flexibility and feature of balance of those playing Goalball with different degrees of visual disability.

MATERIAL & METHOD

This study was applied to those, whose age average is 31.13 ± 8.53 years and in total 30 visually disabled people. 15 of these are Goalball players having exercises two days in a week and 15 not doing sports. The level of visual disability of these changes is among B1, B2, B3. The height of the subjects was measured with (Nan-IB 150) sliding caliper and their weight with sensitive scales (Angel).

Application of the Tests

Times of the Audial Reaction

It was applied with Newtest 1000 device and with their left and right hands which are used dominantly (defined by asking). After trials every measurement was repeated 3 times and the best degree was taken to calculation. Measurements adjusted according to 0.01 msec and they were calculated.

Measurements of Grasping Power

Measurements were done with Grip Strength Dynamometer (Hand Grip) Takkei branded. After a five- minute-warm up, the measurements were taken while they are standing up right and not twisting their arms and their arms not touching their bodies and their aims making an angel of 45º. This was repeated twice or three times for left and right hands and the best result was registered for every volunteer.

Tests Flexibility Standard Sit and Lay Down

The subject was made to sit down on the smooth around and wanted him/her to support sole of his/her feet to the test stool straightly. Then, while extending his/her body forward he/she was wanted to for a few seconds to stand with his/her hands

fingers stretched and straightly to the last point. After this application was done twice the best degree was registered.

The Hopping Test

Aim: Measuring the Dynamic Balance

Material: Smooth Ground

Application: Contains one step hopping, one step walking act one after the other

Evaluation: It will be registered as (+) if the subject does this 4 times or more (12)

In the analysis of the data, in SPSS 16.00 program, Mann- Whitney and One Way Variance Analysis (One-way Anova) and T Test were used. Kevels of meaningfulness was evaluated on level of $p<0.05$. Mann- Whitney Test was used for their analysis as the age and hopping test results, which are of the changings taken to evaluation, did not show a normal dispersion.

RESULTS

In table 1, when it is looked it will be seen that the difference among groups in terms of dispersion of those doing sports and sedentary in the test of age and hopping is meaningful ($p<0.05$) and in hopping test results, it will be seen that there is not meaningful difference ($p<0.05$) among groups.

When it is examined in table 2 separately, it is stated that there is not a significant difference ($p<0.05$) among the average results of height, weight and sit- access according to variables playing Goalball and Sedentary. It was determined that the averages of results for left hand reaction time and right hand grasping power have shown a difference on level of $p<0.01$ according to the groups. Besides, right hand audial reaction time and left hand grasping power have a significant difference among groups ($p<0.01$).

When it is looked at the dispersion of the results of right and left hand audial reaction time of the hand used dominantly and not used hand, it is was seen that average of the right hand reaction time results of those using right hands dominantly is lower than the average result of left hand reaction time. When these results compared statistically, the difference is on the level of $p<0.01$. Besides, it was determined that the average result for left hand audial reaction time of those who use their left hands dominantly is lower than the average of right hand audial reaction time. It appeared that it shows a significant difference ($p<0.01$) statistically (Table 3).

Table 1. The dispersion of the mean according to age and hopping results.

Variables	Groups	Mean	SD	Mean Rank	p
Age (Year)	Playing Goalball	30.00	11.65	11.87	.023*
	Sedentary	31.86	6.45	19.13	
Hopping	Playing Goalball	1.27	.46	13.00	.070
	Sedentary	1.47	.52	18.00	

* P<0.05

Table 2. The dispersion of some variables on those doing and not doing sports.

Variables	Groups	Mean	SD	t	p
Height (cm)	Playing Goalball	174.53	4.44	.143	.887
	Sedentary	174.27	5.69		
Weight (kg)	Playing Goalball	70.00	5.57	.805	.427
	Sedentary	68.33	5.76		
Right Hand Audial Reaction	Playing Goalball	168.13	53.22	-2.575	.016*
(millisecond)	Sedentary	216.20	48.94		
Left Hand Audial Reaction	Goalball	157.07	43.76	-3.283	.003**
(millisecond)	Sedentary	231.67	76.35		
Right Hand Grasping Power	Playing Goalball	23.33	1.91	9.613	.000**
(kg)	Sedentary	17.93	1.03		
Left Hand Grasping Power	Playing Goalball	21.13	1.92	4.816	.000**
(kg)	Sedentary	17.73	1.94		
Sit - Access (cm)	Playing Goalball	29.07	4.64	.515	.611
	Sedentary	28.20	4.58		

** P<0.01; * p<0.05

Table 3. The dispersion of the right and left hands audial reaction results according to the dominant hand.

Dominant Hand	Audial Reaction Test	Mean	SD	t	p
Right Hand	Right	190.36	57.76	16.48	.000*
	Left	202.08	75.85	13.32	
Left Hand	Right	201.20	49.90	9.016	.001*
	Left	155.80	28.09	12.40	

* P<0.01

Table 4. The dispersion of hand grasping power according to dominant hand.

Dominant Hand	Hand Grasping Power	Mean	SD	t	p
Right Hand	Right	21.20	3.09	34.241	
	Left	19.64	2.67	36.708	.000*
Left Hand	Right	17.80	1.30	30.527	
	Left	18.40	1.82	22.649	.000*

* P<0.01

When the dispersions of the hand grasping power of the dominant hand according to the hand which is not dominant were examined, it will be seen that both, in those who use right hand or left hands dominantly, the power of hand grasping power of dominantly used hands has shown a significant difference on a level of ($p<0.01$, Table 4).

DISCUSSION

With this study it is aimed to determine whether or not playing Goalball has effects on audial reaction time, hand grasping power, flexibility and balance of those who are visually disabled in different degrees.

When the average age of the subjects that included to the study were examined according to the groups, it was seen the average of those who are playing Goalball is 30.00 ± 11.65 years and of those who do not play Goalball is 33.06 ± 5.83 years. When these average results of age are compared statistically, it will be seen a significant difference ($p<0.05$) between two groups.

When the average result of the hopping test are examined according to group dispersion, it will be seen that there is not a meaningful difference ($p<0.05$) between those doing sports and sedentary. In their study Kaya & Pulur (17) found great differences in favor of those doing sports in the test that they applied to the kids between 13-15 years.

When we look at results of the average height between two groups, it is seen that the average of those not playing is 174.93 ± 4.44 cm and the average of those playing is 174.27 ± 5.69. In the result of comparison of these results statistically, it was seen that there is not a meaningful difference ($p<0.05$). Hekim and et al (12) have found no difference between groups in terms of height average in their study applied to 44 school girls at the age of 12.

While we compare the weight averages between two groups, it is established that the average weight of those doing sports is 70.00 ± 5.57kg and of those not doing is 68.33 ± 5.76kg. When the averages of two groups examined statistically, it is seen that there is not a great difference ($p<0.05$). Sahin and et al (31) exhibited in their study that there is no difference in term of weight variable between the groups. In addition, there are studies (18, 28) that have shown doing sports creates difference in term of weight. It is thought that these can be affected because these studies have been applied to different age groups and may lead in different results.

When it is looked at the right hand audial reaction time for those playing and not playing Goalball, It will be seen that for those who are playing Goalball, the average of the result of right hand audial reaction is 168, 13 ± 53.22 msec and the average of not playing is 216.20 ± 48.94 msec. It appeared that this results are meaningful on the level of $p<0.01$ statistically. Also, when the time of left hand audial reaction was examined in term of those playing and not playing, the average result of left hand audial reaction is seen as 157.07 ± 43.76 msec. This results appeared to be meaningful on the level of $p<0.01$ statistically. Karamursel (16) has stated that in their study in which Spirduse and Ciliford compared sedentary and the groups playing racket for three years, they stated that they found the time of simple and optional reaction is shorter

among active people. In their study that they applied to visually disabled people who are playing and not playing Goalball, Bakir & Aydogan (4) found that there are meaningful differences in favor of those doing sports in terms of audial reaction time. In some studies (7,34) no matter at which age they are, it is emphasized that the reaction time of the group of doing sport is shorter than time of the group not doing sport. The results that provided in this study has shown that exercise can lead to positive effects on the performance of brain and especially in speed of sensorial processing and via exercises brain functions can be affected. Therefore, as a result of physical activity cardiovascular system provides blood support better to Central Nervous System and this helps to shorten the reaction time (24) or for some with visual disability defining his/her position and relation with other objects around themselves depends on their using senses like hearing, kinesthetic and smelling intensely or with their senses becoming sharp; in another word, it may be explained by having more experiences about this issue.

Right hand grasping power of those doing sports is 23.33±1.91 kg and those of not doing are 17.93±1.03kg. When the results of the groups are compared statistically, it was found out that these results have shown a meaningful difference on the level of $p<0.01$. Also, the power of left hand grasping of those doing sports is 21.13±1.92kg, and of those who are doing is 17.73±1.94kg. It was also found out that the average of left hand grasping power has shown a significant difference on the level of $p<0.01$ between the groups. In their study Caliskan et al. have established that there has been a significant difference among the hand grasping power measurements which were taken before and after a training of Goalball for twelve weeks. In another study, Ozmerdivenli et al. (24) put forward that there is an important difference between the grasping power of those doing sports and sedentary. Besides, in their study they applied to 25 mentally disabled children, Bicer et al. (6) found that doing sports have effects on grasping power.

When the results of sit and lay down test were examined, it was seen that the average result of those doing sport is 29.07±4.64 cm, and of those not doing sport is 28.20 ± 4.58 cm. When it is compared statistically, it is seen that there is not an important difference ($p<0.05$) between groups. In their study that they applied to those doing and not doing sport and aged between 12-24, Kurkcu et al. (19) put forward that there is not meaningful difference among the groups in term of flexibility. Saygin et al. (29) found that the results of flexibility have shown difference, among the subjects aged 10-12 year those they trained for movement. It is known that flexibility is a physical feature that decreases by aging (35). It is thought that the difference of the flexibility results in this study from the other studies are because of the older age average of the subjects and because of not giving sufficient place to exercises for flexibility during the trainings of Goalball.

When we have a glance to dispersion of the right and left hand reaction time result of the subjects according to hand that is used and not used dominantly, it is seen that there is difference on level of $p<0.01$ in favor of right hand statistically between the averages of those who use their right hands dominantly (190.36 ± 57.76) and the average of left hand reaction time (202.08 ± 75.85). It has also appeared that there is a difference on level of $p<0.01$ in favor of left hand statistically between the average of the result of hand reaction time of those using their left hands dominantly (201.20 ± 49.90) and the average of left hand reaction time (155.80±28.09). With their study, Karadag & Kutlu (15) stated that there is an important difference in terms of audial reaction time between the feet which is dominant and not dominant. The audial reaction time of the dominant hand is higher than the reaction time of the hand which is not dominant. This may be explained by Yakovlew's (35) thesis in which it says, with neurophysiological development, the number of motor bundles is more in a certain rate and it is different in the development of dominant hand. It is also stated that there may be a recede in the time of reaction because of the weakness of nerve-muscle coordination of those who do not exercise enough regularly (2).

When it is looked at the averages of the power of grasping of dominantly used hand and the hand of the subjects which is not used dominantly, while the average of the right hand grasping power of those who use than dominantly is 21.20 ± 3.09 kg, the average of the power of left hand is 19.64 ± 2.67 kg. A significant difference ($p<0.01$) was established among the results statistically. The average of right hand grasping power of those using left hand grasping power is 18.40 ± 1.82 kg. It was found that a difference on level of $p<0.01$ was seen in the average results. In various studies (3, 27), it was stated that the dominant hand has power of grasping more than the hand which is not dominant. This may be explained with Akgun's (2) idea of "in a

muscle which is weak because of being used less, as a result of insufficient exercise, the increase of power with exercises takes it higher over %50 in the initial two weeks.

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