THE EFFECT OF SPORT ON BALANCE AND WALKİNG DİSTANCE WİTH VİSUALLY IMPAİRED PEOPLE [2]

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ABSTRACT

The aim of this study was to investigate the effect of sports on balance and walking distance in visual impairment peoples. The average age of the study was 14,31 ± 4,12 with the participation of 58 individuls, 35 men and 23 women and assigned to two groups. Group 1, included 31 subjects who have visual impairments and become to graded the B1, B2 and B3 in national goalball and swimming team,experienced 5 years,, and group 2, included 27 sedantary subjects who have visually impairments and become to graded the B1(total blind), B2 (they may perceive the shape of the hand, but the visual acuity is not better than 20/600) and B3 (20 / 600-60 / 600 have sight).

The subject's balance and walking distance were assessed with Berg balance scale and 6 minute walking test. The data were evaluated using Mann Whitney U test for paired comparisons, Kruskal Wallis H test for multiple comparisons and Mann Whitney U as post hoc test were used in the analyzes of the data. The level of significance was taken as $p<0.05$. Balance score and walking distance were higher in group 1 than group 2. Groups were divided subgroups according to sight degree (B1, B2, B3). Compared subgroups in group 1, walking distance is better in B2, B3 than B1. There is no difference on balance score in three groups. Compared subgroups in group 2, there is no difference walking distance and balance score. The idea was developed that sport have possitive effects on balance and walking distance. Because of possitive effects of sport, visually impaired people can be directed to sport so they can be more independent on daily life activity.

Key Words: Visually impairment people, Balance, Walking distance, Sport.

GÖRME ENGELLİ BİREYLERDE SPORUN DENGE VE YÜRÜME MESAFESİ ÜZERİNE ETKİSİ

ÖZ

Çalışmanın amacı; görme engelli bireylerde sporun denge ve yürüme mesafesi üzerine etkisini incelemektir. Çalışmaya yaş ortalaması 14,31 ± 4,12 olan, 35 erkek, 23 kadın olmak üzere toplam 58 deneğin katılımı ile gerçekleşmiş olup iki gruba ayrılmıştır. 1. Grup; 5 yıl deneyimli n=31 görme engelli milli goalboll ve yüzme sporcularından, 2. Grup kontrol grubu olarak n=27 görme engelli sedanter deneklerden oluşmaktadır. Her iki grup arasında görme engel derecelerine göre B1 (hiç görmeyen), B2 (el şeklini algılayabilirler ancak görme keskinliği 20/600'den daha iyi değildir) ve B3 (20/600-60/600 görme gücüne sahiplerdir) şeklinde sınıflandırma yapılmıştır.

Katılımcıların denge ve yürüme mesafeleri Berg denge skalası ve 6 dakika yürüme testi ile değerlendirilmiştir. Verilerin analizlerinde ikili karşılaştırmalar için Mann Whitney U testi, çoklu karşılaştırmalar için Kruskal Wallis H testi ve post hoc testi olarak Mann Whitney U kullanılmıştır. Anlamlılık düzeyi $p<0.05$ olarak alınmıştır. Milli sporcuların yürüme mesafesi ve denge durumları sedanter görme engellilere göre daha iyi bulunmuştur. Görme engelli sporcu grubunda alt gruplar incelendiğinde B2 ve B3 grubunun yürüme mesafesinin B1 grubuna göre daha iyi olduğu gözlenmiştir. Her üç grupta da denge bakımından fark gözlenmemiştir. Kontrol grubunun her üç alt grup arasında yürüme mesafesi ve denge bakımından fark olmadığı gözlenmiştir. Sporun denge ve yürüme mesafesi üzerine olumlu etkileri görülmüştür. Görme engelli bireylerin spora yönlendirilerek günlük yaşam aktivitelerinde daha bağımsız olabilmelerinin sağlanabileceği kanaatindeyiz

Anahtar kelimeler: Görme engelli bireyler, Denge, Yürüme mesafesi, Spor

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INTRODUCTION

Today, both in the world and in our country, the number of disabled people is quite high. Sports due to rehabilitation and therapeutic effect; It is used both as physical, mental, emotional and social development tools for disabled people and it also gives opportunity for disabled athletes to develop and gain great success due to importance given to disabled sports today.[13]

Sports also offers a chance for social integration to the disabled people. It also contributes to the self-esteem, self-confidence, level of biological and psychological well-being. These gains are even greater when supported by sporty competitions. The competitiveness of the disabled people will develop by living the sense of winning and losing. They will be stronger in dealing with obstacles in their lives[1].

Disable individuals are often more successful than the other areas. It is seen that the disabled people generally have loose muscle structure, and the loss of motor development due to aging is increasingly. With sports support this loss can be reduced to a minimum level.[22]

Participation in sportive activities is very beneficial for person in the areas where strengthening muscles, coordination development, balance development, posture control development, flexibility development, respiratory and circulatory system development, and spasticity prevention.[14]

Vision is an important motivational tool for all areas of development. The fact that visualization is never present or limited can cause significant delays in areas of development such as crawling, walking, language and concept development starting from head and neck control. Effective practices in early childhood are quite important for children with visual impairment to be able to complete their development close to their normal developing peers [2, 20]. Many studies show that visually disabled children are delayed in acquiring the ability to move, such as rolling, walking, which allows displacement. [14].

Posture in humans is under intense regulation by the complex neuromuscular system. Thanks to this regulation, a rapid postural adaptation occurs against to changes in the center of gravity during rest and activity. This harmony is called balance, and the postural responses that provides the harmony, occurs with integration in central nervour system of vestibular, proprioceptive, and visual data[17].

Balance is a complex system related with maintaining the relative position of body parts. The optimal use of multiple muscles and the integration of different sensory perceptions (visual, auditory, sensory) are complex structures of this system[4].

Despite the importance of visual stimuli for balance, the balance levels of people visual disabled or the levels of success in sporting activities is a matter of debate. However, the investigations are not sufficient but there are various findings. Murphy (1989), for example, has observed that visually impaired children are prone against to static and slow motion[12]. Nobles and Bink state that a weak balance in people with visual disabled is seen as an important problem. Because any disturbance in the mechanics, including the perception of the visual stimuli and stabilization, causes the coordination to deteriorate in the movements[7]. In addition, Murphy noted that video-recording studies on 6 childreen with visually impaired between

the ages of 5-6 showed insufficient in motor skills such as running, jumping, climbing, throwing, jumping, balance in addition to low exercise tolerance. Appropriate activities to be selected for people with visual impairments will improve developing of the motor skills and improve the balance to better level[12].

According to the studies performed, it is seen in result of a number of motoric traits that develops in poeple with visual disabled doing sports that balance also is higher level compered to people with visual disabled who don't do sports[9].

It seems that balance ability plays a very important role in the performance of the athletes and in the prevention of injuries. Hrysomallis, It has been indicated that it is not clear whether regular training without special balance training and participating in sportive activities changes the balance ability[7], and it has been pointed out in many studies that doing sports affects posture control positively[15]. It has also been showed that learning of sporting skills and doing regular exercise during a long period improves the effectiveness of dynamic and static postural control in daily living activities[4].

Some studies have shown that gymnasts are affected less from sense of vision in evaluation of walking on a straight line, standing and walking on balance beam compered to untrained people. In balance tests, gymnasts are less affected than non-trained people because the field of view is closed or open. This is related to the difficult-complex nature of gymnastic movements. While complex acrobatic movements are being learned, in result of inadequate visual sensory information and repeating movements many times can be considered to have improved this property in the gymnasts[4].

In the development of the senses of a visually impaired person and in relation to balance, sportive activities are effective, as well as practices such as walking, sitting, circling, smelling, feeling etc. and it develops one's sense of trust. The visually impaired person can be assisted by the use of sounds in daily activities in sporting activities and activities[11].

In the researches postural disorders, muscle development, body balance insufficient and walking disorders are the beginning of the problems that the children affected by visual impairment who frequently encountered compared to the viewers[9].

The aim of this research is to examine the effect of sports, balance and walking distance on visually impaired individuals.

MATERIAL AND METHOD

The study was conducted with the participation of volunteers with a total of 58 trials, with a mean age of 14.31 ± 4.12 and 35 men and 23 women with visual impairments and they divided to two groups. Group 1 (n=31) consisted of national goalboll and swimming athletes with visually imparied who have at least 5 years experience and Group 2 (n = 27) control group consisted of sedantary people wyih visually impaired. Classification was made in both groups as B1, B2 and B3 according to the blindness grades.

B1: They will not see completely. They may have light perception, but they can not recognize hand form at any distance. B2: They may perceive the shape of the hand, but the visual acuity is not better than 20/600. Vision angles are less than 5 degrees in the visual field. B3: Viewing angles are between 5-20 degrees. They

have power of sight 20/600-60/600. It includes both visually impaired and partially sighted individuals. Everyone with visual loss does not need special education. Special training is needed when visual loss prevents learning[10].

Before the tests, the subjects were found to have no health condition to work and ıt has been tried to increase the motivation levels and wants of the subjects. Before the measurements and tests are carried out, the necessary warm-up work has been carried out. Berg balance scale was used for balance evaluation of subjects, and 6 minutes walking test was used for evaluation of walking distances. The Berg balance scale is a scale used to evaluate postural control. The scale consists of 14 items. Each item is scored between 0 and 4 points. 4; good, 0;bad it is scored according to its ability to act. Maximum score is 56 points[15]. The 6-min walk test is a submaximal, indirect, cardiovascular physical fitness test. During the 6-min walk test, participants were walked for 6 minutes on a 30-m-long corridor. During the walk the observer walked with the participants. Thus, the risk of falling is eliminated. The distance the participants took in total was recorded in meters (m)[8].

Statistical analysis

Statistical package program was used to analyze the data obtained in the research. The raw data obtained are presented together with statistical procedures in cross tabulation with arithmetic mean and standard deviations. The Kolmogov-Smirnov Z test was used for the normality test of the independent variables and it was seen that the balance and walking distance scores of the subjects were not distributed normally. For this reason, Mann Whitney U test was used for binary comparisons in normal non-dispersive data analysis, Kruskal Wallis H test for multiple comparisons, and Mann Whitney U as a post hoc test.

RESULTS

Table 1: Height and weight distributions of subjects

Subjects		N	Mean ± SD
National athletes	Height	31	162.52±12.82
	Weight	31	54.03±13.20
Sedentary	Height	27	149.11±17.84
	Weight	27	42.67±12.89
Total	Height	58	156.28±16.65
	Weight	58	48.74±14.15

Table 2. Comparison of groups' balance and walking distances

	Nationalathletes(n=31) Mean ± SD	Sedantary Group(n=27) Mean ± SD	Mann Whitney U test	p
Balance	48.06 ± 1.56	39.40 ± 2.93	2.000	0.001*
Walking distance (m)	673.54 ± 153.59	481.85 ± 88.14	119.500	0.001*

*p<0.05

A statistically significant difference was found when the balance and walking distance of both groups were compared (p=0.001).

Table 3: Balance and walking distance distributions of national athletes group

	B1 (n=6) Mean ± SD	B2 (n=13) Mean ± SD	B3 (n=12) Mean ± SD	Kruskal Wallis	p
Balance	48.16 ± 0.40	48.53 ±1.66	47.50 ±1.73	2.814	.245
Walking distance (m)	500.00 ±109.54	683.07±137.13	750.00±124.31	10.529	.005*

*p<0.05

According to the spectators' views, the players are divided into 3 groups. When comparing the walking distance and the balance score of these 3 groups, it was seen that there was no difference between the groups (Kruskal Wallis, p= 0.245), and there was a difference in walking distance between the 3 groups (Kruskal Wallis, p=0.005).

Table 4: Binary comparison of walking distances of subgroups in national sports

Groups	Walking distance p value
B1-B2	0.014*
B1-B3	0.003*
B2-B3	0.162

*p<0.05

B1 group constitutes difference in the national athletes' walking distance. As the visual acuity increases, the increase in walking distance appears to be statistically significant.

Table 5: Control group balance and walking distance distributions

	B1 (n=6) X ± SS	B2 (n=8) X ± SS	B3 (n=13) X ± SS	Kruskal Wallis	p
Balance	39.33±2.65	40.25±3.65	38.92±2.69	1.306	0.520
Walking distance (m)	526.66±75.54	465.00±102.95	471.53±83.45	2.243	0.326

p>0.05

The control group is divided into 3 groups according to their visual acuity. When the walking distance and the balance score of these 3 groups were compared, it was seen that there was no difference (Kruskal Wallis, p= 0.520, Kruskal Wallis, p=0.326) between the groups in terms of balance scores and walking distance.

DISCUSSION AND CONCLUSION

The national athletes' balance and walking distance were found better than sedanters in our work on visually impaired national athletes and sedentary visually impaired individuals (National athletes balance 48.06 ± 1.56, sedanters balance 39.40 ± 2.93, National athletes walking distance 673.54 ± 153.59, sedanters walking distance 481.85 ± 88.14). Moreover, according to the measurements made by separating 3

groups among the athletes according to their visual grades; it was seen that there was no difference between the groups in terms of balance scores when these 3 groups were compared with walking distance and equilibrium score and there was a difference between the 3 groups in terms of in walking distance. The group who have better vision grade has revealed the difference in walking distance. The group with better visual acuity was found to have more distance than the other groups. The difference in the distance of the national athletes on walking distance forms the group B2-B3 which has better visual acuity. Görme derecesi arttıkça yürüme mesafesindeki artış istatistiksel olarak anlam kazandığı görülmüştür. (Walking distance of B1 group: 500.00±109.54, Walking distance of B2 group: 683.07±137.13, Walking distance of B3 group: 750.00±124.31)

In the literature; Sportive activities have considerable in balance developmentBecause balance is the ability to provide the desired position of the body during movement. This is a situation that can be realized more easily by increasing the sport activities. It is the basis for the body to be in an upright position in order to make the necessary movements in well-developed motorcycle activities. It is stated that elite athletes have demonstrated balance control developed in connection with the requirements of each discipline. [18].

In a research conducted, the balance performances of judo athletes with visually impaired were examined and the DHPS test was used to determine the balance performance of the subjects. The test is based on the determination of balance scores on closed eyes conditions. According to the test results, it was determined that judo athletes with visually impaired, non-visually impaired sedanters and non-sports sedanter individuals had similar flat floor balance scores. A similar result is also obtained in the foam floor balance score and the total balance score. These results were suggested that individuals who play sports as visually impaired or not visually impaired may be using vestibular and somatosensory system more effectively because they can not use visual information in balance[19].

Again, in a study, the balance, respiratory capacity and reaction times of athletes in different disability groups were compared. According to the results of this research; it has been reported that the horizontal and vertical balance scores of visually impaired athletes are not significantly different from non-visually impaired sedentaries and non-visually impaired athletes[6].

In the study performed by Carmeli and his colleagues, functional balance test was evaluated to the participants between the ages of 54 and 66 . A positive correlation was found between physical activity and balance when the functional balance test was evaluate after participant's physical activity training. This has shown that locomotor performance can be improved by physical activity[5].

In another study, congenital and later individuals with deaf were taken, examined their balance capabilities and when the results of the continuous balance tests of all the cases included in the study were compared, meaningful results were obtained in favor of congenital and later children with deaf playing sports. According to this result; it is clearly shown that sports habits are important in terms of physical activity and balance ability in people with deaf.[21]

In our study, it was observed that the balance of the national athlete group was better than the sedanter group and it was observed that the sports balance development was similar to the studies in the literature.

Sporting habits contribute to the development of balance, coordination, mobility and motor functions by increasing the ability of proprioceptive and vestibular sense systems to work. In the literature, it is possible to see many studies involving disabled and non-disabled participants. In this context the result of our work has been consistent with the literature [3, ,21].

As a result, it is a fact that sports irritation, regardless of the type of disability, provides positive improvements to individuals with disabled. According to these research findings that shows the positive effects of the sport on balance and walking distance, it can be said that visually handicapped individuals can contribute to providing independence in daily life activities by directing them to the sport.

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