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# The Effect of the Movement Education on the Dynamic Balance Skills of Preschool Children

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**Abstract:** This study aimed at evaluating the effect of the sample movement education program on dynamic balance skills of preschool children( 5-7 years). 80 preschool children in total – 40 in experimental (20 girls and 20 boys) and 40 (20 girls and 20 boys) in control group – were included in this project. While children in the experimental group were applied movement education program for one hour and three days in a week during 3 months, control group received the regular curriculum. The movement education program was composed of fundamental motor skills, posture exercises and games. Stabilometry Lafayette 16020 model stability platform was used to assess the dynamic balance. SPSS package program was utilized for the statistical analyses. Independent T Test was conducted to compare the results of experimental and control groups. Paired Samples T Test was used for differences between pre- and post-tests in both groups. Significance level was taken as ($p<0.05$). According to the results of the statistical analysis; the dynamic balance values of the experiment group in the pre- and post-tests were found significant ($p<0.001$), while the dynamic balance values of the control group in the pre- and post-tests were found negatively significant ($p<0.05$). On the other hand, the first dynamic balance values of control group were found significant ($p<0.01$) whereas the last dynamic balance test values were found significant for the experiment group ($p<0.001$). The results tell us that movement education program which was implemented positively affected dynamic balance of preschool children.

**Key words:** Preschool Children · Movement Education Program · Dynamic Balance

## INTRODUCTION

Balance as a component of motor function is ensured through the connections among sight, deep sensory organs and motor system. Balance can change according to the musculiskeletal system, age, visual and vestibular stimulations and the unity of these components.

Balance and other physical features play an important role in displaying sport skills successfully. Balance is defined as a sensomotoric ability which tries to protect it while standing and in motion. As for the sense of balance, it is the ability to balance the body and to maintain the balance [1].

Balance is neccessary for many motor skills to occur. Balance increases with the age and girls have a better balance during their childhood [2]. Balance begins to improve at very early ages. As the age rises, the skill of balance increases.

Balance is the base for all the movements and effected by various factors. This ability is useful for solving motor problems emerging in such conditions in which there are tight side fields and balance can easily be lost due to the change in gravity center of the body [3]. The delay, seen in the activities that require the ability of balance like standing on one foot, is considered to arise from the late occurance of the reactions of head coordination and body position (e.g. Landau and parachute reflection) and the reactions of balance against leaning back. Vestibular, throat deep senses and asymmetric touching stimulation are deemed to have a role in the reactions peculiar to posture [4].

Perceiving the visual stimulations and any disorder in the mechanism involving the supply of balance lead in the incoordination in the movements. Vestibular system is a special system which ensures

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balance with the help of visual stimulations depending upon the position of the head.

Balancing occurs by means of muscular tonus and neuromuscular reflections under the control of this system [5-7].

## MATERIALS AND METHODS

Instruments and the methods of the research carried out in order to search for the effect of the movement education program on dynamic balance skills of the preschool children have been presented below.

**Subjects:** At the beginning of the research, 60 girls and 59 boys (n= 119), whose ages are between 5 and 7 attending the same kindergarten, compose experiment and control groups. During the working time (3 months), those who have 2 successive lessons' absence or who haven't participated into totally 3 working sessions during the research have been removed from research group and 80 students, 40 of whom have composed experiment group (20 girls-20 boys) and 40 of whom have composed control group (20 girls-20 boys) have been taken into consideration in total. For the children included in the working group, a condition, which is the fact that the children do not regularly go on any sportive activity and this should not pose any medical risk in their participation into movement education, has been sought. So as to enable this condition, as experiment and control group, the whole group has undergone a check-up with the help of their parents, the children who have especially asthma, bronchitis and blood and heart problems haven't been included in the research by informing their parents through seminars and meetings of the fact that these children would not be included in the study.

Parents have been briefed about the program by meeting them twice before the studies. Approvals of parents have been taken by having them sign the letter of permission prepared before the study. Attention has been paid to the selection of the students who have attended the school and whose parents have given permission while composing study and control groups.

Legal permissions necessary for the research have been taken. All the measurements have been carried out during the school time. Before starting the study, the approval of the Ethic Board has been taken. Measurements related to the subjects have been carried out by the experts of each field.

**Research Design:** In this part, design of the experiment, data collection tools, methods and techniques used in the analysis of procedure and data have been explained.

In the research, design of the pre-test and post-test has been used with the control group. Research has been carried out through 2 groups as an experiment group and a control group. One of the groups, appointed with equal chance, has been defined as control group. While a program including basic movements, different children games and posture studies has been applied to the experiment group, control group has continued their daily lives.

**Methods:** Movement education program used in the research has been handled as an independent variable while the dynamic balance of students has been dealt with as a dependent variable. Dynamic balance tests have been applied to all the groups as pre- and post-measurements [8, 9].

**Data Collection Instrument:** By using Lafayette 16020 model stability platform, 10 degrees deviance from the horizontal plane on the apparatus has been defined as a loss of balance. After getting on the platform, students have been asked to stand on the platform by keeping her/his balanced position and the time has started as s/he has the balance. Students have been given a right for a trial through information given about the apparatus. Balancing duration of the subject during a 30-second period of time has been measured, the results have been recorded in seconds [10, 11].

**Movement Education Program:** Movement education lasted for 12 weeks. It is composed of basic motor movements, posture exercises and the games suitable for the age group. According to daily class plan, first 5 minutes of the class were spent with a game for warming-up, 25 minutes of the class were composed of posture exercises and the following 25 minutes were allocated to basic movements and the exercises about these basic movements; and in the last 5 minutes, games related to the learned skills or circuit trainings related to the skills studied before have been applied. Resources that were used while comprising the program have been presented in bracket with their sequence numbers in the list [1,10,12-27].

**Statistical Analysis:** In this study, in order to see the difference between the values of the pre- and post-tests of the experiment and control groups, dependent t test has been used. So as to look at the difference between the groups, independent t test has been applied. At the beginning of the experiment procedure, ANCOVA (covariance) analysis has been applied in the last

measurements as a result of the difference in the values of the dynamic balance between the groups at a significant level. If it is $p < 0.05$, it is supposed as sigficant.

## RESULTS

According to the results, while a significant difference has statistically been found among the dynamic balance pre- and post-test values of control group (pre-test =14,986, post-test =19,668), a significant difference has statistically been found among the dynamic balance pre- and post-test test values of experiment group as well; however, this difference is in the direction of recession in the skills of dynamic balance.

In the beginning of the experiment procedure, ANCOVA (Covariance) has been applied in the last measurements as a result of the fact that there is a significant difference in the intergroup's dynamic balance values [8].

In Table 2, corrected stabilometre mean values of the experiment group seem to be higher than those of control group.

In Table 3, a significant difference has statistically been found between the dynamic pre- and post-test values of experiment group ($p<0,05$); a significant difference has been statistically found between the dynamic pre- and post-test values of control group ($p<0,05$), too. Nevertheless, this difference has occured in the direction of recession rather than dynamic balance values.

Table 1: The Results of Experiment- Control Groups' Dynamic Balance Values of Pre-Test

| Measurement | N | x̄ | S | SD | T | P |
|---|---|---|---|---|---|---|
| E.D.B. | 40 | 14,986 | 2,848 | 78 | -2,805 | ,006 |
| C.D.B. | 40 | 16,581 | 2,195 | | | |

E.D.B.: Experiment Dynamic Balance
C.D.B.:Control Dynamic Balance

Table 2: The Results of Experiment- Control Groups' Dynamic Balance Values of Post- Test

| Group | N | x̄ | Corrected x̄ |
|---|---|---|---|
| E.D.B. | 40 | 19,668 | 20,342 |
| C.D.B. | 40 | 13,839 | 13,316 |

Table 3: T test results of Pre-Post Test Dynamic Balance Mean Points according to the groups

| Measurement | N | x̄ | S | SD | T | P |
|---|---|---|---|---|---|---|
| E.D.B. Pre | 40 | 14,986 | 2,848 | 39 | -9,235 | ,000 |
| E.D.B. Post | 40 | 19,668 | 3,983 | 39 | | |
| C.D.B. Pre | 40 | 16,581 | 2,195 | 39 | 3,665 | ,001 |
| C.D.B. Post | 40 | 13,839 | 4,887 | 39 | | |

## DISCUSSION

According to the findings obtained through the study aiming at evaluating the effect of movement education program applied on the dynamic balance values of the preschool children; a significant difference has been found between pre- and post-test values (pre test $\overline{X}$ =14,986, post- test $\overline{X}$ =19,668) of the dynamic balance of the experiment group ($p<0.01$). A significant difference between pre- and post-test values (pre test $\overline{X}$ =16,581, post-test $\overline{X}$ =13,839) of the dynamic balance of experiment group has been found ($p<0.05$); however, this difference is towards recession instead of improvement.

In his research which he carried out in order to examine the effect of perceptual motor improvement programs on the balance and agility skills of 4-6-year-old children, Tüfekçioğlu stated that he did not find any significant difference; even though there was a rise in the values of dynamic balance values and that it would be possible if studies started to be applied beginning from the age of 4 by spreading them on a plan [28].

In his study, Altınkök (2007) examined the effect of 4-week physical education program design on the children's improvement of the static and dynamic balance skills by applying it to the 5-6 years-old children in preschool term and statistically found a significant difference at the level of $p<0.001$. Control group's pre-test and post test values of dynamic balance were stated as 18.71sec. and 18.01sec. whereas dynamic balance pre-test and post-test values of experiment group were recorded as 18.53 sec. and 25,00 sec. The values obtained in the study are quite close to those available in the literature, the difference sometimes seen in the post-test values is considered to result from the content of the program [29].

Kiomourtzouglou *et. al.* (1997) stated that dynamic balance of the sportive group that did rhythmic gymnastics was better than the balance of the control group when they compared the static and dinamic balance values of the 9-15 year-old children doing rhythmic gymnastics in a model with experiment and control groups. They confirmed that, as the age rises, dynamic balance values get better [30].

In his study, Yildirim (2007) searched for the dynamic balance improvement of the children between the ages of 5-10 who took 2-hour gymnastic education in a week during 8 weeks. Dynamic balance values of the experiment group were found to rise significantly at the level of $p<0.001$ among the values of pre- and post-test. The dynamic balance duration of the control group was claimed to be 21.48 sec. at the pre-test and to be 25.08 sec. at the post-test [31].

Singer (1980) did not define a crucial relation between the static and dynamic balance degrees of the preschool children. He stated that the children with higher body weight had lower balance degrees, whereas they were better than those who were tall [32].

The balance values collected are normal values considering the age group and seem to be parallel to those with the same age group in the literature.

Considering the control group, experiment group's balancing duration ($p<0.05$) seems in statistical terms to increase significantly while the values of control group seem to decrease. These findings show that movement education program applied has a positive effect on improved balance, but resulted in recession in the values of control group who did not attend the study of the same age group and display that similiar studies are necessary to be carried out in this age group. In this case, we can suggest that improvement of these study programs and making them available for children will effect their dynamic balance improvement positively.

## REFERENCES


1. Akgün, N., Ç. İşleğen, A. Ertat, *et. al.* 1990. Eurofit Test Results Of Children in The Western Part Of Turkey, *VI.th European Research Seminar* (The Eurofit Tests Of Physical Fitness), İzmir.
2. Makris V., R.D. Yee, C.D. Langefeld, A.S. Chappel, C.W. Slemenda, Visual Loss and Performance in Blind Athletes, Medicine and Science in Sports and Exercise, 1993(1): 265-269.
3. Muratlı, S., 1997. Child and Sport Under the Light of Science Training, 8-15, 185 Culture Printing, Bagırgan Publications, Ankara.
4. Lepore, M., G.W. Gayle and S. Stevens, 1998. *Adapted Aquatics Programming.* Champaign, II, Human Kinetics.
5. Kalyoncu, T.A. 1997. *Sport in Disabled Person*, Bağırgan Publication, Ankara.
6. Kayıhan, H., A. Sade, U. Cavlak, H. Uysal, 1989. The Comparison of Balace and Touch Perception of Healthy and Visually Impaired Young, Physiotherapy- Rehabilitation, 6(1): 63-75.
7. Nielsen, L., 1991. Spatial Relationship in Congenitally Blind Infant: A Study J. Vis. Imp. Blind., pp: 11-13, January.
8. Büyüköztürk, Ş., 2007. Handbook of The Analyzes of Data for Social Sciences, Research Pattern of Statistic, Interpretation of SPSS and Comments, Pegem Publication.
9. Karasar, N., 1995. Scientific Research Method, Concepts, Principles, Techniques, 7. Press, Ankara.
10. Bacanlı, H., 2001. Development and Learning, 4. Press, Nobel Press Distribution, Ankara. pp: 47-48.
11. Chansinirukor, W., D. Wilson, K. Grimmer and B. Dansie, 2001. Effects Of Backpacks on Students: Measurement of Cervical and Shoulder Posture. Aust. J. Physiother. 47(02): 110-16.
12. Açıkada, C. and E. Ergen, (1990) Science and Sport. Büro-Tek Offset, Ankara. pp: 110-115, 211-216.
13. Afyon, Y.A. and H. Özkan, 2006. The Comparison of Handball and Basketball Athlet's Postural Features in Puberty Term, 9. International Sport Science Congress, Proceedings, 3-5 November.
14. Akman, M.N., Y. Ersoy, M. Arı, Z. Sarı, A. Sarı and S. Tanaçan, 1995. Incidence of Spine And Lower Limb Postural Disorders in School Aged Children, J. Inönü Univ. Medical Faculty, 2(1): 49-53.
15. Alpkaya, U., 2003. () Analysis of Reaction Time Changes Related to Age and Gender, J. Sport Res., 7(2): 49-65
16. Altay, F., 2000. Biomechanical Analysis of Side Balance Movement Post of Two Different Speed Sone Rotation in Rhytmic Gymnastics, H.U. Institude of Health Sciences Doctoral Thesis, (Asist. Supervisor Assoc. Dr. Ziya Koruç), Ankara.
17. Alter, M.J., 1996. *Science Of Flexibility.* Second Edition. Human Kinetics. pp: 39-50, 139-146.
18. Anson, J.G., 1989. Effect of Moment of Inertia on Simple Reaction Time. J. of Motor Behaviour, 21: 60-71.
19. Ascani, E., V. Salsano and G. Giglio, 1997. The Incidence and Early Detection of Spinal Deformities. A Study Based on the Screening of 16104 School Children. Ital. J. Traumatol., 3(1): 111-7.
20. Aslan, N., 1990. Education with Game II, Yargıçoğlu Press, Ankara.
21. Balcı, A., 2001. Researh Methods and Principles in Social Science, Pegem Press, pp: 36.
22. Bilir, Ş., 1978. Child and Development, Handbook of Child Development and Education, Hacettepe Univ.
23. Bruel, C., 1988. 150 New Games for Children and Yuong People, Translated; Mehmet Dündar, Teacher Anaş Publication, 2. Press, Ankara.
24. Chatterjee, S., A. Mandal and N. Das, 1993. Physical and Motor Fitness Level of Indian School-Going Boys. The J. Sports Medicine and Physical Fitness, 33: 268-277.

25. Cömert, S., 1979. Games and Dramas in Class, Garden and Family Gatherings, Remzi Bookstore, 4. Press, Istanbul.,
26. Çamlıyer, H. and H. Çamlıyer, 1997. Children Movement Education in Educational Integrity, 1. Press.
27. Sel, R., 1993. Physical Education and Teaching, M. E. B. Publications, Istanbul., pp: 219-222.
28. Tüfekçioğlu, E., 2002. The Effect of Perceptual Motor Development Programs on 4-6 Ages Preschool Children's Balance and Agilities, M. U. Institude of Health Sciences. Master's Thesis, Istanbul.,
29. Altınkök, M., 2007. The Researches of the Effect of Draft Physical Education Program on Static and Dynamic Balance of 5-6 Ages Children, I. Symposium on Exercise Physiology, Konya.
30. Kiomourtzouglou, E., V. Deri, O. Mertzanidou and G. Tzetzis, 1997. Experience with perceptual and Motor Skills in Rhytmic Gymnastics, Percept Motor Skills, 84: 1363-72.
31. Yıldırım, Ö., 2007. The observation of the development of static balance, dynamic balance and flexibility of Children between the ages of 5-10 who are doing gymnastics, University of Marmara, Coaching Department, Practice in Sport Science Thesis. (Consultant: Oya Erkut Atılgan) Istanbul.
32. Singer, R.N., 1980. Motor Learning and Human Performance. Third Edition, Florida State Univ., pp: 199-207.