The compensatory impact of mini-basketball skills on the progress of fundamental movements in children

Farnoosh Fotrousi, Jaleh Bagherly, Abdollah Ghasemi

Abstract

The aim of this study is to investigate the compensatory impact of mini–basketball skills on the progress of fundamental movement in children, and hence to evaluate the degree of training impact in such skills in the desired performance of sports movements. Girls of 7 to 10 years old participated in Test of Gross Motor Development (TGMD-2). The sample group of this research was girls with fewer scores as an experimental group that was trained mini-basketball exercises for 12 weeks in 36 sessions. After the practice, all girls were re-evaluated under TGMD-2. The data obtained by this test was analyzed using dependent and independent t-test. The results show improvements from pre-test to post-test scores in both experimental and control groups, while the experimental group significantly performed better than the control group in the post-test. The research indicates that the basic mini-basketball exercises had a considerable impact on the progress of the basic movements in children, who had previously experienced delays in those movements.

1. Introduction

A considerable numbers of children have not reached to the advanced levels of fundamental movements due to the lack of ample opportunities for exercise and physical activities, which causes to be weak in the specialized movements. Since this weakness has negative impacts on daily life activities, rectifying this weakness seems crucial (Gallahue, Ozmun, & Goodway, 1998). Fundamental movements are the basis and stage of specialized movements and skills (Payne & Isaacs, 2011). The necessity of concerns about fundamental movements, and the compensation for the consequences of this issue have made the researcher eager to involve in the assessment of the involved fundamental movements growth. By the help of these tools, we are going to understand the influence of training degree of such skills on the desired performance of the sports movements by using the current methods for the assessment of the growth movement, and to understand whether the adaptive sport programs such as mini-basketball exercises are appropriate for the progress of the fundamental movements.
Environment has been recognized as a very effective factor on physical growth and cognitive performance (Krombholz, 1997), and the extra physical activities have proven to be effective to increase children movement performance (Krombholz, 2006; Booth et al., 1999; Ozmun & Gallahue, 2005).

Several studies found a significant relation between the percent of spent times in moderate and vigorous physical activity and total fundamental movement skills (Haywood & Getchell, 2009; Fisher et al., 2005).

Fundamental movement should be considered in the pre-school ages, because the lack of access to advanced level of movement hinders some childhood activities and prevents specific movement achievements. This implies that school-age children are capable to improve fundamental movement skills. Gender differences also depend on the opportunities created by the changes in physical education programs as well as social and physical environments (Van Beurden, Zask, Barnett, & Dietrich, 2002). Frustration is experienced by the children who do not have suitable movement skills (Sanders & Kidman, 1998).

Goodway and Branta (2003), who used the TGMD-2, in their research, found out that rectifying the motor skills would result in better manipulating and locomotion scores.

The Studies demonstrate the existence of a relation between physical activities and the sample of basic movement (Okely, Booth, & Patterson, 2001) For example McKenzie, Alcaraz, Sallis, & Faucette, (1998) concluded that executing compiled training program has caused an increase of the manipulative skills.

Another has investigated the effects of a creative movement program on gross motor skills of pre-school children (Wang, 2004), using TGMD-2. The work showed a positive and significant impact of the creative movement on manipulating and Locomotor skills growth.

Different researches have shown the significant effect of motor program activities on the improvement of motor skills (Sheikh, Safania, & Afshari, 2011; Akbari et al., 2009). The similar studies have been conducted to find the effect of skill-specific on objective control skills and fundamental movement skills (Hurmeric, 2010; Raudsepp & Päll, 2006). A growth in physical activity levels for children of New Zealand with a low socio-economic background was achieved by implementing an after-school soccer intervention. This program may suggest the effectiveness of other forms of physical activity accumulation such as physical education (Tegg, 2008).

All these studies mentioned above suggested the importance of the fundamental movement period indicating that fundamental movement progress is dependent on exercise opportunity, eulogy and education in a learning environment as the experimental factors. In this work we have tried to investigate the impact of one experimental factor (i.e. exercise opportunity) on the progress of fundamental movement. This report presents a study to investigate the compensatory impact of mini–basketball training program for 12 weeks on the progress of fundamental movement in children of 7 to 10 ages.

2. RESEARCH METHOD

The experimental method of this research is stated in details as follows:

Participant: 120 girls (7 to 10 years old) were examined under Ulrich Gross Motor Development test and then 40 of them who had fewer score in test, were organized into two experimental and control groups randomly.

Variables: Both independent and dependent variables are considered. Independent variables include the basic skills of basketball such as ball handling, footwork drills, bounce pass, chest pass, speed dribble, low dribble, the crossover, the in and out, pivot, layup shot, set shot and dunk, and three point shot. Also dependent variables include run, gallop, hop, leap, horizontal jump, slide, striking a stationary ball, stationary dribble, catch, kick, overhand throw and underhand roll. These skills are Ulrich Gross Motor Development test subscales.

Instruments and materials: The instrument of this study was Test of Ulrich Gross Motor Development—second edition (TGMD-2) that was included in two subtests as Locomotor and Object Control motor skills. This test measures twelve categories of gross motor skills, which is designed for children aged 3 to 10 years.(Ulrich, 2000).
Procedure: This is a semi-empirical type of research and the data is collected from elementary school girls of seven to ten years old. At the beginning of the training period, a pre-test of fundamental movement was held among 120 girls using TGMD-2. After the primary screening test on 40 students, 5 groups of 8 students with the lowest grades in basic movements from each age group were chosen randomly to form two groups each with 20 members. The first group was considered as the experiment group while the second one as the control group. The experiment group was trained during the semester by mini-basketball exercises while the control group did not receive any training and they just practiced common activities. After 12 weeks of practice in 36 sessions, all samples of experimental and control groups were tested by Ulrich gross motor development test again. The data was reviewed and analyzed using descriptive and inferential statistics such as Kolmogrov-Smirnov test and particularly dependent and independent “t-test” distribution.

Examination scores of Ulrich gross motor development was obtained based on the available items in the test. The zero or one was assigned to the each skill if its criteria have been demonstrated or not. The final score of each skill was calculated by adding the score of all performance criteria.

3. RESULTS AND DISCUSSION

In order to compare the pre-test and post-test of movement quotient mean in control and experimental groups, the dependent t-test (parametric test) was used in accordance to the test results of Kolmogrov-Smirnov based on normal distribution. The correlation coefficients for control and experimental groups were equal to 0.913 and 0.780 respectively.

Table 1. Comparison pre-test and post-test of movement quotient mean in experimental and control groups

<table>
<thead>
<tr>
<th>Groups</th>
<th>Mean Difference</th>
<th>t</th>
<th>df</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>pre-test and post-test of movement</td>
<td>-2.526</td>
<td>-4.800</td>
<td>18</td>
<td>P&lt; 0.001</td>
</tr>
<tr>
<td>quotient in control group</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>pre-test and post-test of movement</td>
<td>-18.750</td>
<td>-14.187</td>
<td>19</td>
<td>P&lt; 0.001</td>
</tr>
<tr>
<td>quotient in experimental group</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The findings of this research, which is shown in table 1, indicate that the post-test scores of the movement interest for the control group (t=-4.80, P=0.001) and the experimental group (t=-14.18, P=0.001) had progressed over the pre-test.

Table 2. Comparison pre-test and post-test of movement quotient mean in control and experimental groups

<table>
<thead>
<tr>
<th>Levene's Test for Equality of Variances</th>
<th>t</th>
<th>df</th>
<th>p</th>
<th>Mean Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>pre-test of movement quotient mean in control and experimental groups</td>
<td>0.868</td>
<td>0.358</td>
<td>-0.801</td>
<td>38</td>
</tr>
<tr>
<td>post-test of movement quotient mean in control and experimental groups</td>
<td>6.380</td>
<td>0.016</td>
<td>6.643</td>
<td>32.823</td>
</tr>
</tbody>
</table>

In order to compare the post-test of movement quotient mean in control and experimental groups, the independent t-test was used by considering the assumptions for parametric pre-test and by having no significant difference in the pre-test of those two groups.

Since the Levene test shows the inequality of variances, independent t-test results were reported for comparing the post-test of movement quotient for the control and experimental groups with the assumption of non-homogeneity of variances. Independent t-test results in Table 2 shows no significant difference between pre-test scores of the movement quotient mean for different studied groups (P>0.05). Also, independent t-test results indicated that
significant differences existed between post-test scores of the movement quotient mean of the studied groups 
(P<0.001). Due to the inequality of variance and the presence of significance Levene tests in post-test for two 
groups, the results of non-parametric Mann-Whitney U test for further assurance is also given in the Table 3.

<table>
<thead>
<tr>
<th>Mann-Whitney U</th>
<th>Wilcoxon W</th>
<th>z</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>movement quotient</td>
<td>Experimental and Control Groups</td>
<td>28.00</td>
<td>218.00</td>
</tr>
</tbody>
</table>

Mann-Whitney U test results presented in the above table shows a significant difference between scores of the 
movement quotient mean for the studied groups (Z = -4.574, P< 0.001). The results of this test confirmed Parametric 
of t-test results.

The result of t-test shows that there is a considerable difference between two experimental and control groups. 
The scores of post-test movement interest in the experimental group, when compared with the control group, 
showed a progress in movement quotient (t=6.64, p=0.001).

The results of current study are summarized, as follow:
1-The post-test scores of movement quotient interest for control group progressed when compared with pre-test 
scores which can be reasonable due to repetitiveness of the test, out of control activities and age.
2-The experimental group progressed over the pre-test due to the effect of exercise and physical activity on 
improving the fundamental movement, which was the objective of this project.
3-The scores of post-test movement quotient interest in the experimental group when compared with the control 
group, were improved. This progress was the objective of this project that showing the compensatory impact of 
mini-basketball skills on the progress of fundamental movements.

The findings of this research correlate well with the researches of Sanders and Kidman (1998), Krombholz 

These findings highlight previous studies such as the work by Mackenzie et al. (1998) that shows the 
performance of compiled training program is lead progress of manipulative motor skill. Goodway and Banta (2003) 
studied the basis of the positive effects of pre-elementary trainings on the growth of movement skills and found out 
that the rectifying the movement skills would result in better scores in objects manipulating and locomotion. This 
research, which conducted on 12 weeks, had results similar to current research.

A result of current research has the same direction with Päll (2006) and Irmak (2010) that found the effect of 
skill-specific on objective control skills and fundamental movements.
Also this finding is likely to confirm the results with OKELY et al. (2001), which studied the relation between 
physical activities and the patterns of basic movements. Results of the current research also confirm the research of 
Tegg (2008), Wang (2004), Sheik (2011) and Akbari (2009), which showed the impact of selected motor program 
on the progress of fundamental movements. Also in our study the effect of one candidate program (mini-basketball) 
on the progress of fundamental movements has been proven which can be the confirmation of the above research.

In overall, the results of current research, which are in the same direction with other studies mentioned above, 
confirm that the basic mini-basketball exercises can have a considerable impact on the progress of the basic 
movements in children who have delays in their movements.

4. CONCLUSION

The results of this research show that the basic mini-basketball exercises have a considerable influence on the 
progress of the basic movements in children who are weak in their basic movements. It also strengthens the findings 
of other researchers emphasizing the importance of pre-school and elementary school in training on basic movement
and confirming the compensatory impact of exercise programs on the progress of fundamental movement. As a suggestion an elaborated training program can be devised for schools in order to compensate for delays of basic movements in children. Also based on this paper's findings, an extended study would be able to suggest a new evaluation method for student's fundamental movement growth when they enter school.

References


