Variance as a Base for Training Coordinative Abilities and its Effect on Developing Some Defensive Moves for Handball Beginners

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Abstract: The current research aims at designing a varied training program for coordinative abilities and identifying its effect on some defensive moves of handball beginners. The researcher used the quasi-experimental approach with one group design (pre-/post-tests). Sample was purposefully chosen of 16 handball beginners (10-12 years) - Tanta Sports Club - season 2009-2010. Results indicated a positive effect for varied training on developing the defensive moves of handball beginners under investigation. Improvement percentage between pre- and post-tests ranged from 6.34% to 86.40% and improvement percentage for defensive moves was 35.75%. The researcher concluded that using training aids and equipments in the recommended training program helped achieving the desired coordinative and technical levels needed for the practiced activity.

Key words: Varied training • Coordinative abilities • Handball beginners • Defensive moves

INTRODUCTION

The training process, with all its components, is so important that it affects the player's responses and his/her whole training status. So, different training aids should be used inside and outside the court as total adaptation of physical abilities does not depend only on training with the ball, but also depends on specific exercises with or without equipments [1].

Handball performance level is affected by a set of biological factors, including physiological and morphological factors. But physiological factors come first in its effect on physical, technical and tactical levels as physiological response is linked with training loads and body systems adaptations, besides the player's ability to send neurological signals suitable for the type of muscle contraction needed for performance. This clearly shows the importance of the neuro-muscular system as a prime mover of the musculoskeletal system. Sports training has an effect on neurological system as it improves the motor connectivity and shortens reaction time besides increasing stimulus speed, leading to improving motor coordination of each muscle [2, 3].

Directing motor response depends on the information received from the neurological system, from internal or external environment or both. Although there are no special receptors for time and duration, the brain can conclude performance durations through other information received from other senses, through which performance speed can be increased. This is done through increasing the neurological system's ability to quickly move from stimulus to cessation, increasing the inter-muscle and intra-muscles neuro-muscular coordination and increasing the efficiency of receptor senses. He also indicated that training coordinative abilities depends on feeling the contraction intensity, contraction duration and contraction motor tempo. Intervals between stimuli are very important factors affecting muscle contraction, besides stimulus intensity and frequency [3-5].

Varied training is a type of training where the player can perform movements consecutively although they are contradicted in difficulty, training medium, movement direction and movement timing, aiming at improving the neuro-muscular responses and movement flow during consecutive muscle contraction. This clearly shows the scientific base of the recommended program that uses variance of information received by the neurological system from the internal or external environment. This information includes type, color, vertical distance and horizontal distance of the training medium besides the coach's directions, directing pro-preceptors of muscle...
spindles in skeletal muscles, Golgi tendon organs and Pacinian corpuscles. This motivates a great number of motor units during muscle contraction and improves electric flow to motor units connected with muscle fibers.

As a coach, the researcher noted that beginner handball players lack defensive moves. Analysis of used training program revealed that this lack is due to weakness of coordinative abilities and its ways of training. This was in agreement with several previous studies. This led the researcher to do the current research [6-9].

The current research aims at designing a varied training program for coordinative abilities and identifying its effect on defensive moves for handball beginners.

The Researcher Hypothesized That:

- There are statistical significant differences between the pre- and post- tests on the levels of some coordinative abilities of handball beginners in favor of post-test.
- There are statistical significant differences between the pre- and post- tests on the levels of some defensive moves of handball beginners in favor of post-test.

**MATERIALS AND METHODS**

**Approach:** The researcher used the quasi-experimental approach with one group design (pre/post-test).

**Sample:** Sample was purposefully chosen of 16 handball beginners (10-12 years) - Tanta Sports Club - season 2009-2010.

Table 1 describes the sample according to all research variables. It indicates that Squewness value was between 3±. This means that sample was free of radical distributions.


**Coordinative Abilities and Defensive Moves Tests:**

To identify the coordinative abilities related to handball and its tests, the researcher reviewed the related literature and identified 12 coordinative abilities according to experts opinions. These coordinative abilities are as follows: total coordinative ability of the body (measured by jumping inside numbered circles) and it is measured by second [10] - agility (measured by shuttle run test) and it is measured by second [11] - transfer speed (measured by 30m run from a moving beginning) and it is measured by second [10] - dynamic balance (measured by octagonal shape jump) and it is measured by second [10] - leg muscles ability (measured by wide jump from stance) and it is measured by cm [12] - directions cognition ability (measured by walking over a path) and it is measured by point [13] - muscle kinesthetic ability (measured by kinesthetic perception of leg and body movements through distance) and it is measured by point [13] - place identification and changing directions abilities and it is measured by point [13] - coordination (measured by coordinative ability tests under time pressure) and it is measured by second [13] - reaction time (measured by the ruler test) and it is measured by cm [10] - various defensive moves test and it is measured by point [12].

<table>
<thead>
<tr>
<th>Variables</th>
<th>Measurement</th>
<th>Means</th>
<th>SD</th>
<th>Median</th>
<th>Squewness</th>
</tr>
</thead>
<tbody>
<tr>
<td>1- Height</td>
<td>Cm</td>
<td>145.75</td>
<td>4.76</td>
<td>145.50</td>
<td>0.39</td>
</tr>
<tr>
<td>2- Weight</td>
<td>Kg</td>
<td>36.58</td>
<td>4.88</td>
<td>37.00</td>
<td>-1.41</td>
</tr>
<tr>
<td>3- Age</td>
<td>Year</td>
<td>11.14</td>
<td>0.23</td>
<td>11.05</td>
<td>2.39</td>
</tr>
<tr>
<td>4- Training period</td>
<td>Month</td>
<td>12.02</td>
<td>0.54</td>
<td>12.00</td>
<td>0.45</td>
</tr>
<tr>
<td>5- Total body coordination</td>
<td>second</td>
<td>14.32</td>
<td>2.38</td>
<td>13.55</td>
<td>0.60</td>
</tr>
<tr>
<td>6- Agility</td>
<td>Second</td>
<td>15.84</td>
<td>1.39</td>
<td>15.74</td>
<td>0.15</td>
</tr>
<tr>
<td>7- Transitive speed</td>
<td>Second</td>
<td>6.37</td>
<td>0.34</td>
<td>6.21</td>
<td>1.17</td>
</tr>
<tr>
<td>8- Dynamic balance</td>
<td>Second</td>
<td>10.00</td>
<td>1.47</td>
<td>10.00</td>
<td>0.20</td>
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<tr>
<td>9- Leg muscles ability</td>
<td>Cm</td>
<td>174.37</td>
<td>14.22</td>
<td>172.50</td>
<td>0.12</td>
</tr>
<tr>
<td>10- Direction cognition ability</td>
<td>Point</td>
<td>4.41</td>
<td>1.37</td>
<td>4.50</td>
<td>-0.83</td>
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<tr>
<td>11- Muscle kinesthetic</td>
<td>Point</td>
<td>8.50</td>
<td>2.21</td>
<td>7.75</td>
<td>-0.12</td>
</tr>
<tr>
<td>12- Place direction and direction change</td>
<td>Point</td>
<td>1.25</td>
<td>1.13</td>
<td>2.00</td>
<td>-0.13</td>
</tr>
<tr>
<td>13- Coordination</td>
<td>Second</td>
<td>10.20</td>
<td>0.56</td>
<td>10.28</td>
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<td>14- Reaction time</td>
<td>Cm</td>
<td>2.15</td>
<td>0.38</td>
<td>2.00</td>
<td>0.86</td>
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<td>15- Defensive moves</td>
<td>number</td>
<td>8.56</td>
<td>1.965</td>
<td>8.50</td>
<td>0.22</td>
</tr>
</tbody>
</table>
The Recommended Training Program: It aims at developing muscle coordination and improving defensive moves. The program followed interval training method. The program was applied from 18/7/2009 to 5/8/2009 for 8 weeks. Training loads were calibrated so that training intensity was more than 80% for 5 units per week. Total unit duration was from 75 to 100 minutes (total program duration = 3600 minutes). 40% of total training volume was dedicated for physical training (40 minutes X 5 units X 8 Weeks = 1600 minutes). 40% of total training volume was dedicated for co-ordinative training (40 minutes X 5 units X 8 Weeks = 1600 minutes). Rest period was calculated to be five times the work time. Warm-up and cool down was isolated from total unit duration 20 minutes. The program aims at developing muscle coordination which, in turn, enhances defensive moves through training on various moves (forward - backward - sideward - diagonal). Exercises are performed with elastic cords fixed on various heights (5cm - 10cm - 15cm - 20cm). Various mediums can be used like wooden floors, grass floors, hard (asphalt) floors and soft (matrixes - mates) floors.

Measurements: The researcher applied pre and post-tests according to the chosen tests protocols.

Statistical Treatment: The researcher used the following statistical treatments: means - median - SD - Squewness - correlation coefficient - (t) test - improvement percentage.

RESULTS AND DISCUSSION

Tables 2, 3 indicate the pre- and post- tests for co-ordinative abilities variables and the technical variable.

DISCUSSION AND CONCLUSION

Table 2 showed that means of pre-test were between 1.25 for place direction and direction change and 174.37 for leg muscles ability. Post-tests ranged between 1.4 for reaction time and 185.43 for leg muscles ability. Means between pre- and post- tests ranged from 1.25 for place direction and direction change and 185.43 for leg muscles ability. (t) Table value (1.79) was less than its paired value (3.22-14.19). This indicates that means differences between pre- and post-tests were in favor of post-tests. Improvement percentages ranged from 6.34% for leg muscles ability and 86.4% for place direction and direction change.

These results indicate that the recommended training program had positive effects on post-tests results. This is in agreement with various previous studies. As they indicated that developing co-ordinative abilities demand other components like coordination, agility, kinesthetic perception, speed and accuracy of motor performance. Handball performance nature needs a great deal of coordination [14, 15].

Table 3 shows that pre-test means value (8.56) while post-test value was (11.62) for defensive moves. (t)
Table value (1.79) was less than its paired value (6.64). This indicates that means differences between pre- and post-tests were in favor of post-tests. Improvement percentage was 35.75%. This is in agreement with several previous studies in that the development of the technical variable is due to the effects of the recommended training program as it reflects the enhancements in coordinative abilities [5-7, 9].

**Recommendations**

The Researcher Recommends the Following:

- Using the recommended varied training program for developing coordinative abilities for handball beginners.
- Specific training for coordinative abilities is characterized by: variation of execution method - variation in stimuli - variation in execution circumstances - performing moves quickly and accurately.

**REFERENCES**