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The effects of harmonic training on developing balance ability in handball female students of the second stage

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Abstract

This paper includes the introduction and research problem, which is the weakness in the ability to balance for most female students of the second stage in handball, which is a basic psychological and functional condition through which the player can control her motor performance when performing some basic skills in handball game through kinetic linkage ability, routing, rhythmicity, react, and re-adapt to motor skills. Therefore, the researchers considered the study of the effect of harmonic training on the development of the ability to balance in handball for the second stage female students in the Faculty of Physical Education and Sport Sciences. The objectives included: identifying the effects of harmonic Training to developing the ability to balance in handball among female students of the second stage. As well as research hypotheses: there are statistically significant differences in the ability of balance between the pre- and post-tests of the experimental group. The research sample comprised of 20 female students from The Faculty of Physical Education and Sport Sciences, Al-Mustansiriyah University, where the two researchers concluded: There is convergence in the balance between the control and experimental groups during the conduct of pre-tests. The researchers recommended: Emphasizing on the use of various exercises to develop the ability of balance due to its effect on performance in handball.

Keywords: Harmonic training, developing balance ability, handball

Introduction

Harmonic capabilities, which constitute the sum of the desired motor compatibility in addition to sports technique, are a prerequisite for ensuring excellence and achievement in the sports field. Motor compatibility and sport technique relate to the processes of receiving and processing information, self-control of behavior and kinetic behavior associated with performance. And for the athlete to be able to perform certain movements, necessary psychological and kinetic processes must be conducted with cognition and kinetic sense.

Balance or the ability to balance among the most important harmonic capabilities that handball female player must have, due to its role in learning and acquiring basic skills in handball and in other sports. Balance is an essential and important element in the performance of motor skills in handball, so, she should always be in balance to be able to perform well. This quality is always present and essential for the female players.

Therefore, the importance of research lies in the preparation of harmonic training to see the extent of its reflection on the development of the ability to balance in handball for the second stage female students.

Research problem

Due to the obvious weakness in the ability of balance for most of the handball second stage female students, which is a prerequisite psychological and functional condition through which the female player can control her motor performance when performing some basic skills in handball game through kinetic linkage ability, routing, rhythmicity, react, and re-adapt to motor skills. Therefore, the researchers considered to study the influence of harmonic training on the development of the ability to balance in handball for the second stage female students in the Faculty of Physical Education and Sport Sciences.

Research objectives

1. Developing special training for harmonic abilities (balance ability) among the handball second stage female students.
2. Identifying the influence of harmonic abilities training to develop the ability to balance among the handball second stage female students.

Research hypotheses

1. There are no statistically significant differences in the ability of balance between the pre- and post-tests of the control group.
2. There are statistically significant differences in the ability of balance between the pre- and post-tests of the experimental group.
3. There are no statistically significant differences in the ability of the balance in the pre-test between the experimental and control groups.
4. There are statistically significant differences in the ability of balance in the post-test between the experimental and control groups.

Research scopes

1. **Human scope:** A sample of the second stage female students in the Faculty of Physical Education and Sport Sciences.
2. **Spatial scope:** Indoor hall in the Faculty of Physical Education and Sport Sciences, Al-Mustansiriyah University.
3. **Temporal scope:** From 1 November 2018 until 1 January 2019

Terms definition

Balance, defined by Ruth as the ability to maintain a certain body position during stability or movement ^[1].

Research methodology and field procedure**Research methodology**

Researchers used the empirical method as being the most appropriate method to solve the problem of the research, and it is one of the most accurate and sufficient types of methods to achieving accurate and reliable results ^[2].

Community and sample of research

Research community consisted of 36 female students of the Faculty of Physical Education and Sport Sciences in Al-Mustansiriyah University. As for the sample of the research they were 20 female students divided into two groups: experimental group of 10 students and control group of 10 students. The sample was homogenized with the variables of age, weight, height and Joule, table 1 illustrate this.

Information collection means

- Arab and foreign references
- Balance test
- Balance test instrument (plate with dimensions of 3 cm width and 15 cm length).
- Timer.
- Data registration form
- Scale
- Length measurement unit.

Flamingo balance test ^[3].

Test purpose: To assess the athlete's ability to maintain balance on a single leg.

Tools used in the test: plate with dimensions of 3cm width and 1cm length, timer and cones.

Test description

The test depends on placing the athlete's on a single leg on a plate with dimensions of 3 cm width and 15 cm length; his free leg should be pulled with his stretched out hand on the side. We count the number of falls per minute, the timer stops at each fall. The athlete is not allowed to hold his free leg with his other hand, because balance position becomes easy. It is also advised to slightly bend single leg to increase the ability to balance.

Table 1: Recording: The number of falls per minute is calculated.

Value	level
0-1 falls	Excellent
1-2 falls	Very good
2-3 falls	Good
3-4 falls	Medium
4-5 falls	Below medium
6 falls or more	Weak

Pilot test

The researchers conducted a pilot test, a miniature of the basic test, which must meet the same conditions as those found in the main trial as possible so that the results can be counted. The objective of the trial was to:

1. Ensure the validity of the test.
2. Identify the errors and constraints expected during the implementation of the trial.
3. Ensure the workability of devices and tools used in the research.
4. Identify the time it takes to run the test.

Test Psychometric characteristics**Test validity**

The researchers relied on presenting the test to a group of experts in the field of testing and measurement to determine the validity of this test and they approved the validity of the test for the research sample and the agreement percentage was 100%.

Test stability

The researchers found the stability coefficient of the balance test using the method of test application and then the re-application as applied to 6 female students from research community and from outside basic research sample (trial sample), the test application was repeated 7 days later under the same conditions of the first test, and the result was 88% which is a high stability rate.

Test objectivity

The test of the ability to balance is objective because it relied on evidence and proofs to be based on in the process of evaluation, i.e., objectivity "is a criterion of knowledge, which is characterized by certainty and is based on evidence that can be proved by others ^[4].

Harmonic training program

The researchers developed a training program in accordance with the characteristics and capabilities of the handball second stage female students, after reviewing the scientific references related to the subject of the study and previous studies. The program is formulated as described in appendix 1, where the program includes exercises of several aspects (physical, skill,

technical and tactical) with the intention to developing and improving the ability to balance.

Trial implementation steps

Pre-test

The researchers conducted the pre-test of the experimental and control groups, on 28 October 2018, and tested the two groups with the ability to balance test, all the variables that may affect the test results were adjusted.

Main trial

The main trial was conducted on the experimental group sample, as the program contained 12 instruction units and the time of each instruction unit was 90 minutes. Consequently, instruction units took six weeks to be implemented, two units per week. The control group did not apply any new program.

Table 2: Shows the difference in the pre- and post-measurements of balance ability test of the control group

Ability to balance test	Sample size	Arithmetic mean	Standard deviation	Freedom degree	T Value	Significance level	Decision
The ability to balance	Pre	6.20	1.686	9	-0.514	.6190	Insignificant
	Post	6.40	1.577				

Data in table 2 refer to the arithmetic means and standard deviations of the control group members in the pre- and post-measurements in the ability to balance test, as we see that they are convergent. In the pre-measurement it was 6.20 with a standard deviation estimated 1.686, and in the post-measurement it was 6.40 with standard deviation of 1.577.

From these slight differences, we can say that there are no differences in the mean of the pre- and post-test measurements for the control group in the ability to balance test. This is confirmed by T-value that reached 0.514, where it was insignificant at the alpha level 0.05, which leads us to say

Post-test

The researchers conducted the post-test of the research sample of the experimental and control groups after the completion of the main trial and with the same conditions of the pre-test.

Statistical means

The researchers used the Statistical Package (SPSS) software, to process and analyze the research results obtained.

Presentation and discussion of research results

The first hypothesis

There were no differences between the pre- and post-measurements for the control group in the test of the ability to balance.

that the null hypothesis, which denies the existence of differences, was accepted. Hence, the first hypothesis which states that "there are no differences between the pre- and post-measurements for the control group in the test of the ability to balance" was accepted. The confirmation rate of this result is 95% with a 5% probability of error.

The second hypothesis

There are differences between the pre- and post-measurements for the experimental group in the balance ability test.

Table 3: Shows the difference in the pre- and post-measurements of balance ability test of the experimental group

Ability to balance test	Sample size	Arithmetic mean	Standard deviation	Freedom degree	T Value	Significance level	Decision
The ability to balance	Pre	6.20	1.475	9	3.250	0.010	Significant
	Post	4.40	.5160				

Data in table 3 refer to the arithmetic means and standard deviations of the experimental group members in the pre- and post-measurements in the ability to balance test, as we see that they are convergent. In the pre-measurement it was 6.20 with a standard deviation estimated 1.475, and in the post-measurement it was 4.40 with standard deviation of .5160.

From these slight differences, we can say that there are no differences in the mean of the pre- and post-test measurements for the experimental group in the ability to balance test. This is confirmed by T-value that reached 3.250, where it was insignificant at the alpha level 0.010, which leads us to say that the null hypothesis, which denies the existence of differences, was denied. Hence, the second

hypothesis which states that "there are differences between the pre- and post-measurements for the experimental group in the test of the ability to balance" was accepted. And these differences were in favor of the pre-test. The confirmation rate of this result is 95% with a 5% probability of error.

This is consistent with what Sharma mentioned "that the exercise on harmonic practices leads to the improvement of harmonic abilities of different age stages, especially beginners" (1992) [5].

The third hypothesis

There are no differences between the experimental and control groups in the balance ability test as for the pre-test.

Table 4: shows the difference between the experimental and control groups in the pre-measurement of balance ability

Ability to balance test	Homogeneity (Levine's f)	Significance level	Sample size	Arithmetic mean	Standard deviation	Freedom degree	T Value	Significance level	Decision
The ability to balance	Experimental	.0090	10	6.20	1.475	18	0.011	9890	Significant
	Control		10	6.20	1.686				

Data of table 4 show that homogeneity test value (Levine's f) was 009.0 which is statistically insignificant at alpha significance level 0.05, and this requires the use of statistical

significance test (T) for two homogeneous independent samples.

By reviewing the arithmetic means of study sample members

in balance ability test, we see that they were 6.20 in the experimental group at 1.475 standard deviation, and for the control group 6.20 at 1.686 standard deviation. Hence we can say that there are slight differences between them. But the difference test of T value was 0.011 as it came statistically insignificant at alpha significance level 0.05. Hence, the null hypothesis that denies the differences was accepted. The third research hypothesis, that states no differences between the

experimental and control groups in the ability to balance test for the pre-test, was accepted. The confirmation rate of this result is 95% with a 5% probability of error.

The third hypothesis

There are differences between the experimental and control groups in the balance ability test as for the post-measurement.

Table 5: Shows the difference between the experimental and control groups in the post-measurement of balance ability

Ability to balance test		Homogeneity (Levene's f)	Significance level	Sample size	Arithmetic mean	Standard deviation	Freedom degree	T Value	Significance level	Decision
The ability to balance	Experimental	9.24	.0070	10	4.40	.51600	10.90	-3.81	0.003	Significant
	Control			10	6.40	1.577				

Data of table 5 show that homogeneity test value (Levene's f) was 24.9 which is statistically significant at alpha significance level 0.01, and this requires the use of statistical significance test (T) for two inhomogeneous independent samples.

By reviewing the arithmetic means of study sample members in balance ability test, we see that they were 4.40 in the experimental group at 510. Standard deviation, and for the control group 6.40 at 1.577 standard deviation. Hence we can say that there are obvious differences between them. This was confirmed in the difference test of T value which was 3.81- as it came statistically significant at alpha significance level 0.01. Hence, the null hypothesis that denies the differences was denied. The fourth research hypothesis, that states the differences between the experimental and control groups in the ability to balance test for the post-measurement, was accepted. These differences were in favor of the control group. The confirmation rate of this result is 99% with a 1% probability of error.

Conclusions and recommendations

Conclusions

The most important conclusions reached by the two researchers are:

1. Harmonic trainings have a positive effect on the ability to balance.
2. There is an evolution in the level of balance of basic skills in handball.
3. There is convergence in the ability to balance between the control and experimental groups during the conduct of pre-tests.
4. There is an evolution in the ability to balance for the experimental group.

Recommendations

1. The need for attention to be given to the development of harmony components for female players in general.
2. Emphasizing the use of various trainings to develop the ability of balance for its effect on performance in handball.
3. Conducting a similar study, aiming at developing all harmonic capabilities.

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