

“The Effect of Plyometric Training in Developing Speed Strength and Accuracy of Performing Pressed Serving Skill by Volleyball Players of Al Mustanseriya University”

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ABSTRACT

This study aimed to prepare plyometric physical training in order to develop speed strength of arms, legs and accuracy of pressed serve by volleyball players. The researcher proposed that there are significant differences among arithmetic means between pre- and post- test results for the controlling and empirical group in favor of empirical one. Sample of the study consists of (16) students of Al Mustanseriya University's volleyball team divided into two empirical and control groups each of which consists of (8) players. The researcher concluded efficiency of physical training using plyometric method to develop speed strength and accuracy of pressed serving performance by players.

Keywords: Plyometric training, speed strength, accuracy, serving skill, volleyball

INTRODUCTION

The development witnessed by the world contributes greatly to develop levels of sport teams in individual and team games through using the latest training means and methods that had a great effect on developing the level of players in various physical, skill and planning aspects. This training process is based on using modern training methods based on scientific principles according to opinions of specialists in the field of sport training that constitutes a turning point in the level for players' performance.

A lot of sport training experts asserted that it is important to use plyometric training to develop the strength of legs and feet. The plyometric method is considered one of the best modern training methods to develop speed strength through using a set of special exercises that aim to raise the level of players' performance.

Since volleyball needs speed strength because the nature of the game is by using the pressed serve, spikes and block, it requires a muscular strength repeated in a limited period of time, making the game depends on the strands of muscle strength and speed basically where both characteristics work in the motor performance service for players and that these qualities are the final outcome of the performance. This confirms the significance of speed strength as a physical basis underlying skill performance of the game. The main purpose of developing speed strength by volleyball players at the stage of (special setting) is for work on major muscle groups responsible for performance

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with the purpose of overcoming rapid development of muscle contractions. On this basis, the researcher noted that there is weakness in the level of players in the strands of power, speed and should develop of the speed strength as this strength is consisted of strength and speed and this is done using plyometric exercises.

Hence, significance of the study came in importance of using physical exercises through plyometric method in developing speed strength of arms and legs that contributes to raising the level of players in physical, skill and technical capabilities in the game of volleyball.

Research Problem

The game volleyball is one of the team sports that their players have special potential and specifications, in order to achieve advanced levels in the game. Since the researcher is a volleyball player, coach and teacher, he noted that there is a clear decline in level of performance of players in the skills that require strength of arms or legs, indicating weakness in the level of speed strength of the player. Thus, the researcher decided to prepare training using plyometric technique to develop the distinctive speed strength of arms and legs and its impact accurately on pressed serve by university volleyball team players.

OBJECTIVE OF THE STUDY

- 1- To prepare exercises using plyometric method to develop speed strength for arms and legs and accuracy of performing pressed serve by university volleyball team players for both empirical and control groups.
- 2- To define the effect of exercises using plyometric method to develop speed strength for arms and legs and accuracy of performing pressed serve by university volleyball team players for both empirical and control groups.

METHODOLOGY OF THE STUDY

The researcher used the empirical method using equal groups with pre and post tests to achieve the objectives of the study.

SAMPLE OF THE STUDY

The sample of the study was selected purposively from Al Mustanseriyah University's volleyball team players by selecting (16) of (18) students as (2) did not want to perform the tests. The sample was divided into two groups, each of which consists of (8) players using dual division method. Using the poll, players were divided into two groups. The first group holds even numbers (empirical group) and the other group holds odd numbers (control group).

Homogeneity of Samples

To ensure homogeneity and non-prejudice between the empirical and control groups, the researcher decided to perform homogeneity test between both groups. All values of skewness coefficient were within normal curve (less than ± 3), which refers to homogeneity in the study sample in variables of (length, mass and age) as shown in Table 1.

Equaling Sample of the Study

The researcher performed this equaling to detect their applicability in pre-tests prior to implement the exercises and Table 2 shows results of pre-tests for empirical and control groups:

Tests used in the Study

The researcher used some tests in the study including:

1. The speed strength test for arm muscles (by: Qais Naji Abduljabbar & Bastawisi Ahmed, 1987, 347).
2. The speed strength test for leg muscles (by: Marwan Abdelmajid: 2001, 203 – 204).
3. Test of spike serve accuracy in volleyball (by: Mohamed Sobhy Hassanin & Hamdy Abdelmonem: 1997, 240)

Pre-tests

Pre-tests were performed in the outdoors playgrounds in Al Mustanseriyah University at nine o'clock a.m on Sunday, 03/28/2016, with implementation of all the tests for both empirical and control groups on the same day, and the researcher deliberately to fix the variables that

Table 1: Homogeneity in the study sample in variables of (length, mass and age)

| S | Variables | Measure unit | Arithmetic mean | Standard deviation | Median | Skewness coefficient values |
|---|-----------|--------------|-----------------|--------------------|--------|-----------------------------|
| 1 | Length | Cm | 169.56 | 40.690 | 169 | 0.04128 |
| 2 | Mass | Kg | 69.562 | 4.732 | 70.11 | -0.3474 |
| 3 | Age | Month | 20.500 | 0.730 | 20.32 | 0.7397 |

can affect results in terms of space, time, devices, tools and method of implementation and setting in post-tests.

The Main Trial

The researcher prepared a set of physical exercises own according to plyometric method based on references and scientific sources, taking some views of experts and specialists in the field of sports training, since the researcher benefited from his field experience as a player, a coach and instructor of the subject of volleyball at Mustansiriyah University. For the purpose of detecting some negatives that may impede the progress of volleyball players in general and the university team in particular, a lot of expert of sports training referred that the use of independent variable k (physical exercise) in a scientific manner leads to development of physical and skill capabilities of players through programming training, organization and implementation processes and then evaluation using training sizes, intensities and repetitions appropriate to the abilities of athletes. This was confirmed by (Moatasem Gutuq: 1995.8) as “the increased training load is consistent with the age of the athlete and technical level gradually and graded”. The researcher used jumps from stationary and backlash exercises.

All physical exercises were applied from 04/01/2016 until 05/22/2016 within a period of (6) weeks (3) training

units per week as the duration of physical exercise in the main section ranged between (13-15) minutes, with a total (30) exercise used by the researcher divided by the number of training units, as shown in Appendix 1.

Post-tests

After the implementation of all units and application of all exercises directly by the team coach and under the supervision of the researcher for the purpose of knowing the level of the two groups (empirical and control groups), the researcher deliberately conducted post-tests on Sunday, 22.05.2016 and confirmed consideration of controlling the same variables as in the pre-tests for the purpose of reducing the impact and get accurate results.

DISCUSSING RESULTS OF THE STUDY

Results of Pre- and Post-tests for the Control Group

Table 3 shows significant differences in results of the control group in post-test. The researcher attributes this improvement in test results to the use of a set of repetitions by trainers including the program prepared by the trainer that included a set of exercises that clearly helped in giving the player a slight enhancement compared with results of the empirical group.

Table 2: Equaling sample of the study in results of pre-tests for empirical and control groups for physical and skill test

| Statistical treatments | Measure unit | Mean±SD | | | | Calculated T value | Significance |
|--------------------------------|---------------------|-----------------|-------|---------------|--------|--------------------|--------------|
| | | Empirical group | | Control group | | | |
| Tests | | | | | | | |
| Speed strength for arm muscles | No. of times×10 sec | 7.625 | 1.187 | 6.625 | 0.517 | 2.183 | Significant |
| Speed strength for leg muscles | Cm | 159.625 | 5.527 | 149.250 | 12.418 | 2.159 | Significant |
| Accuracy of pressed serve | Degree | 13.750 | 1.581 | 12.125 | 1.246 | 2.283 | Significant |

Tabular T value under significance level (0.05) and freedom degree 14 = 2.14

Table 3: Results of pre- and post- physical and skill tests for the control group

| Treatments | N | Measure Unit | Mean±SD | | | | Diff in means | SD | Calculated T value | Significance |
|--------------------------------|---|---------------------|-----------|--------|-------------|-------|---------------|-------|--------------------|--------------|
| | | | Variables | | Post--tests | | | | | |
| Variables | | | | | | | | | | |
| Speed strength for arm muscles | | No. of times×10 sec | 6.625 | 0.517 | 9.000 | 1.069 | 2.375 | 0.323 | 7.333 | Significant |
| Speed strength for leg muscles | 8 | Cm | 149.25 | 12.418 | 172.75 | 8.827 | 23.500 | 4.484 | 5.241 | Significant |
| Accuracy of pressed serve | | Degree | 12.125 | 1.246 | 14.750 | 0.707 | 2.625 | 0.419 | 6.251 | Significant |

Tabular T value under significance level (0.05) and freedom degree 7=2.36

Table 4 shows statistically significant differences among arithmetic means in results of the empirical group between pre- and post-tests in favor of post-test. The researcher attributes this improvement in test results to the use physical exercises by Plyometric method as they were prepared in a scientific manner and within views of experts and specialists in the field of sports training that led to develop the level of strength and speed levels of body muscles in general and muscles of arms and legs are in particular. As confirmed by (Abu Ela Ahmed, Ahmed Nasreddin: 2002.85), “The distinctive speed strength is the integration of strength and speed in a single component” and adding the element of grading in loads, difficulty level of exercises during implementation, division of educational units and proper rest periods that had a positive impact on the development of distinctive speed strength. This was confirmed by (Hussein Ali Hussein: 2000.15) as “the use of appropriate load capacities for the sport and the division of rest periods in units are important and necessary and the only important thing in training process”.

Table 4 shows the development of the empirical group in the test of pressed serve skill in post-test because results showed no significant difference between the arithmetic means in pre and post tests in favor of the post-test. The researcher attributes the cause of development in the test results due to the use of physical plyometric exercises prepared by the researcher in a manner consistent with the level and abilities of

players because all exercises were designed scientifically and were studied. Scientific sources indicate that the development of physical abilities leads to development and growth of the technically gifted side and this was confirmed by (Ibrahim Magdi Saleh: 1998.3), saying that “physical abilities are one of the most crucial factors on which the success of performance is based to reach the athletic levels and the development and promotion of these special abilities are closely linked to the process of developing motor skills”. Moreover, (Issam Abdul Khaliq: 1994.189) refers that “The motor performance of the skill depends on special physical abilities”.

Results of Table 5 showed significant differences in the distinctive speed strength tests and test of pressed serve between the control and empirical groups in favor of the empirical group. The researcher attributed this development to the importance of using physical exercise in plyometric method prepared by the researcher, which was set according to scientific steps using appropriate intensity gradually, optimal frequencies and rest periods, resulting in a clear development in the empirical group on the account of the control group.

The exercises were applied in the second part of the main section in the unit which develops a set of major muscles in the body which included exercises on the elements of strength and speed, that helped greatly in developing the viability of strength and speed and this

Table 4: Results of pre- and post- physical and skill tests for the empirical group

| Treatments | N | Measure unit | Mean±SD | | | | Diff in means | SD | Calculated T value | Significance |
|--------------------------------|---|---------------------|------------|-------|-------------|-------|---------------|-------|--------------------|--------------|
| | | | Pre--tests | | Post--tests | | | | | |
| Variables | | | | | | | | | | |
| Speed strength for arm muscles | | No. of times×10 sec | 7.625 | 1.187 | 12.375 | 0.916 | 4.750 | 0.647 | 7.333 | Significant |
| Speed strength for leg muscles | 8 | Cm | 159.62 | 5.527 | 193.250 | 8.795 | 33.625 | 2.896 | 11.608 | Significant |
| Accuracy of pressed serve | | Degree | 13.75 | 1.581 | 19.500 | 1.309 | 5.750 | 0.839 | 6.846 | Significant |

Tabular T value under significance level (0.05) and freedom degree 7=2.36

Table 5: Comparing results of post-tests for empirical and control groups

| Statistical treatments tests | Measure unit | Mean±SD | | | | Calculated T value | Significance |
|--------------------------------|---------------------|-----------------|-------|---------------|-------|--------------------|--------------|
| | | Empirical group | | Control group | | | |
| Speed strength for arm muscles | No. of times×10 sec | 9.000 | 1.069 | 12.375 | 0.916 | 6.780 | Significant |
| Speed strength for leg muscles | Cm | 172.750 | 8.827 | 193.250 | 8.795 | 4.653 | Significant |
| Accuracy of pressed serve | Degree | 14.750 | 0.707 | 19.500 | 1.309 | 9.029 | Significant |

T value under significance level (0.05) = 2.14

is was confirmed by (Mohamed Osman: 1990.120) as “there is a significant correlation between elements of strength and speed where a muscle or muscle group cannot perform contraction quickly unless you enjoy enough strength in performance”. In addition, (Qassim Hassan Hussein and Bastawisi Ahmed: 1995.223) refer that “training with weights and different tools such as medical ball, steps and hurdles leads to develop the distinctive speed strength as these exercises depend on increasing the speed of muscle contraction because the goal of creating muscle strength is to get a quick strength”. As for the skill side (pressed serve), results of test of pressed serve skill indicate that players of the empirical group advanced over players of the control group and the researcher attributes this development to the nature of the exercise and its impact on the skill side because he cannot develop any motor skill only through development of the physical side because all of skills depend completely during application and implementation on the physical side. Further, the researcher depended on variability in body postures during the implementation of exercises, resulting in a clear development of the empirical group and increased its skill potential in volleyball as confirmed by (Uday Abdul Hussein Karim al-Rubaie: 2005.67) as “the level of skill abilities develops by the development of their physical abilities”.

CONCLUSIONS

1. The researcher concluded that plyometric method is effective in developing speed strength of arms and legs.
2. Physical exercises using plyometric method led to develop the skill side (pressed serve).

RECOMMENDATIONS

1. The researcher recommends the use of plyometric training and development of fitness elements as the physical side is linked to skill side.
2. To conduct similar studies on different games to show the effect of training on other physical and skill elements.

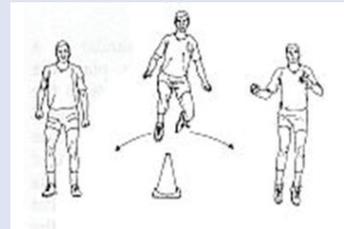
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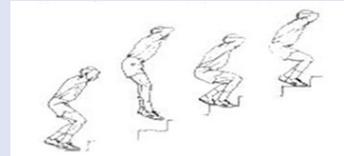
APPENDIX

Appendix 1: Some physical exercises using plyometric method

Side jumping: From the beginning position to jump upwards from over the cone to the other side and then jumping to the other side with pulling the knees upwards



Steps training (jumping with both feet from a step to another till 10 degrees and confirming the pull of knees towards chest and opening legs with shoulder width)



Jumping in front of cones (30 – 40 cm) continuously with feet and asserting the jump upwards, number of cones is 10



Jumping in front of hurdles (50 cm) with both feet and body still straight with swinging arms to get height



Lifting a weight before the body upwards, jumps on the spot and confirming correct performance of training in high strength and speed



Raising a weight upwards, performing jumps on the spot and confirming correct performance of training in high strength and speed



From the starting position, jumping upwards in front with lifting weights over shoulders and confirming correct performance of training in high strength and speed



Jumping over a Swedi steps 40 – 50 cm and falling to the ground with both feet in a continuous manner