

“The Effect of Plyometric Training in Developing Explosive Strength on Performing Long Pass Over Shoulder to Goalkeeper during Fast Breaks in Handball”

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ABSTRACT

This study aimed to use plyometric training with training means consistent with the sample in order to develop explosive strength of upper extremities on performing long pass over shoulder to goalkeepers during fast breaks in handball. The researcher used the empirical method for the single group to solve the group. The sample was represented in handball players of Middle Euphrates in Al Sania Club (3 goalkeepers). Next, the researcher selected accuracy of performing long pass over shoulder for goalkeepers to achieve objectives of the study. An exploratory trial was made and post-tests were applied in the study, then the researcher applied plyometric training for a period of 6 weeks and by (3) training units per week. After obtaining results, the researcher processed through the use of non-parametric statistics. After analyzing results, the researcher reached findings the most important of which is that plyometric training has a positive influence on the development of explosive strength of upper extrimities and thus the development of long pass performance over the shoulder by handball goalkeepers.

Keywords: Plyometric training, explosive strength, long pass, handball goalkeepers

INTRODUCTION

Physical Education entered in most aspects of life as it proved its active role and outstanding performance in all areas, including educational, training and psychological, therapeutic and social fields. Handball game requires high physical abilities, especially goalkeepers, such as explosive strength, which is one of these physical abilities that combine strands of power and speed, which is performed only once, and that many of basic handball

skills require the use of explosive strength as a physical adjective in their performance, including long pass skill over shoulder, especially for goalkeepers. It is one of the basic skills for them and enables the team to apply fast breaks quickly and easily, so we find that the proficiency of goalkeepers for this skill depends on what is owned by the player in terms of a special physical capabilities as well as proper techniques.

Goalkeeper training is one of the important things that need to be addressed by trainers. Through the above, and through continuous training of goalkeepers in the club of Middle Euphrates including clubs of Qadisiyah governorate, and following up their training, it was shown that there was a low use of plyometric training that contributes to development of explosive strength of the upper extremities parties, which is the basis for performing of their kinetic duties and different skills.

Access this article online



Website:
<http://sjsr.se/>

ISSN:
2001-9211

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This is why the researcher was motivated to prepare plyometric training using the explosive strength upper extremities which contribute to raising the level of long pass over shoulder by handball goalkeepers.

Research Problem

The explosive strength of upper extremities is one of effective physical characteristics affecting preparation of handball players in general and goalkeepers in particular, because of its large and influential role in winning for the team if associated with other physical characteristics and motor performance art. Through teaching and working in sport training, the researcher noted that there is weakness and a decline in explosive strength of muscles working for goalkeepers as training of goalkeepers and developing their performance did not have a great deal of research and attention by researchers despite the importance posed by explosive strength of limbs as reflected on the level of the team and its attempts to win over opponents. Hence, the research problem is summarized as a scientific attempt to study the use of plyometric training with explosive strength of upper extremities on performing long pass over shoulder to goalkeepers during fast breaks in handball.

Purpose of the Study

1. To identify the explosive strength and performing long pass over shoulder by goalkeepers in handball.
2. To identify the effect of plyometric training with explosive strength in developing of explosive strength of upper extremities and performance of long pass over shoulder by goalkeepers in handball.

Research Methodology

The researcher used the experimental method with pre-test on one empirical group design with post-test as proper for the nature and problem of the study. The essence of experimental style is “an attempt to control all fundamental factors, except one variable that is manipulated in a certain way where it is possible to install and measure this manipulation”. (10-237).

Sample of the Study

The sample was represented in handball players of Al Sania Club in Qadesiyah governorate (3 goalkeepers).

Tests used in the Study

The researcher used a legalized test to measure explosive strength of upper extremities and test of measuring long pass over shoulder in handball.

First test

Explosive strength of upper extremities (3, 227).

Second test

Performing long pass over shoulder in handball (measuring muscular capacity directing arms from stationary with shooting) (3, 227).

Exploratory Trial

The exploratory trial is one of the most necessary procedures that the researcher carries out prior to the main trial, in order to know the initial image of experience and to identify the validity of devices and instruments used and pointing to requirements of accurate and correct work free of difficulties and to ensure availability of safety conditions when performing tests in addition to identification of scientific parameters (validity, reliability and objectivity) to test the long pass over shoulder in handball. On that basis, the exploratory trial was made on the sample of the study totaling (3) players on Thursday 25/02/2016 at three o'clock in the evening in the closed hall of Al Sania Sporting Club sports in Qadisiyah governorate.

Scientific Parameters of the Test

The researcher extracted scientific parameters (validity, reliability and objectivity) for test results to members of the exploratory trial under study.

First: Test Validity

Test validity is “measuring test for what was measured accurately and not measuring other thing” (273, 2000, 6).

If the researcher selected content validity through presenting tests to a group of specialists in the field of (tests, training and handball) and there was a consensus that this test was valid measuring the characteristic that needs to be measured.

Second: Test Reliability

The researcher selected reliability coefficient for the test through testing and retesting using Spearman correlation coefficient as shown in Table 1.

Third: Objectivity

The researcher selected test subjectivity through collecting data for two arbitrators working on evaluating test performance results at the same time during

performance of exploratory sample of the test. After collecting results, Spearman correlation coefficient was calculated with values of subjectivity coefficient showed in Table 1 for both reliability and subjectivity of long pass performance test over shoulder for handball players:

Pre-tests

The researcher performed pre-tests prior to performing plyometric training on Tuesday 01/03/2016 by applying explosive strength test for upper extremities and long pass overhead in handball on the study sample in Martyr Abbas Al Janabi Court in Qadesiyah governorate.

Main Trial

The researcher prepared plyometric training (Annex 1) with explosive strength for upper extremities through depending on a group of references and sources in training and the internet. In addition, the researcher added a set of exercises that he found necessary for the subject and sample of the study. These exercises were given (10 – 15) minutes of the main part time in training units within the prepared training course prepared by trainers for members of the sample for 6 weeks (3 units per week) from 14/03/2016 to 30/04/2016.

Post-tests

The researcher performed post-tests on Sunday 01/05/2016 at Martyr Abbas Al Janabi Court in Qadesiyah governorate with consideration of conditions of implementing such tests and their instructions under the same conditions and abilities used in pre-tests.

Table 1: Showed test over shoulder for handball players

Test	Reliability coefficient	Subjectivity coefficient
Long pass over shoulder performance in handball	0.91	0.98

Table 2: Values of median, deviation and wilcox for concerned tests of empirical group of the study

Statistical parameters	Measure unit	Pre-test		Post-test		Wilcox value	Significance
		Median	Deviation	Median	Deviation		
Explosive strength for upper extremities	M	98.2	0.39	3.5	0.42	0	Significant
Long pass over shoulder in handball	Degree	9.16	1.20	7.20	1.29	0	Significant

Tabular wilcox value was (0) at sample size of (6) under significance level (0.05)

DISCUSSION AND ANALYSIS RESULTS

This is a presentation of results of explosive strength tests for upper extremities and accuracy of performing long pass over shoulder by handball goalkeepers in pre and post tests for the empirical sample of the study with analysis and discussion.

Table 2 above shows the following:

Through presentation of search results of pre and post tests of explosive strength in upper extremities and test of accurate long pass over shoulder in handball goalkeepers and their analysis, it was found that there were significant differences between the two pre and post measurements for the empirical group in favor of post measurement.

The researcher attributes this development of the sample members to results of the explosive strength of upper extremities to exercise the used plyometric training, as it included a variety of exercises for explosive muscular strength for upper limbs and most muscles in the upper part of the body in general, as well as giving these exercises in a timely manner with the use of appropriate means to develop strength in the main section of the training unit resulting in a positive impact on developing explosive strength.

Donald (1998) explains that the plyometric training style prompts the aim of developing explosive strength of arms with the primary purpose to increase muscle's ability to stretch as during stretching a large amount of flexible energy rubber is stored in the muscle and this energy is reused during next contraction and makes it stronger from 3-2, 4.

Exercises which rely on the work of reflected sensory receptors achieved the greatest benefit for them by reducing the period of time between stretching and shortening where this period was calculated to reach approximately 0.85 ml of a second and the energy stored in muscles as a result of stretching out at rapid

rates during the shortening contraction phase and participates in the first ten moments of the second. (5-42.43).

Proper rational training plyometric training works to increase the explosive strength required by the performance skill, especially if the exercise is representative of nature of performing the skill in its route and the nature of performance, which require integration of speed with power to achieve high performance capability, such as what is happening in the stages of performing long pass overhead. (3-312).

CONCLUSIONS

In the light of objectives of the study, based on results of the research reaching the following conclusions:

1. Members of the study sample have a poor level of explosive capacity of upper extremities and accuracy of long pass over shoulder in handball.
2. Special exercises have a positive effect on developing explosive capacity of upper extremities for members of the study sample.
3. Developing explosive strength of upper extremities as a result of plyometric training has a positive effect on developing performance of long pass over shoulder in handball.

RECOMMENDATIONS

Through conclusions reached by researchers, they recommend the following:

1. The need to use plyometric training to develop explosive strength of upper extremities has a

positive effect on developing performance of long pass over shoulder by handball goalkeepers.

2. Applying the proposed exercises of explosive strength of upper extremities on lower age categories, the youth, has a positive effect on developing some basic handball skills.
3. The need to conduct researches and studies on other physical abilities due to their great significance in developing skill performance of handball goalkeepers in particular and for other players in general.

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ANNEX 1

Annex 1: Models of plyometric exercises used in the main part of the training course between (10) and (15) minutes of the time of main part (60 min)

S	Exercises	Period of performance	Reps	Breaks
1	Throwing medicine ball (2 kg) with one hand over shoulder on a circle drawn on ground with diameter of 2 m and a distance of 6 m	5 sec	6 reps	5 sec
2	Throwing medicine ball (2 kg) to the highest possible point and receiving it	5 sec	10 reps	5 sec
3	Tying a wheelchair with a rubber strap and trying to advance forward from stationary	6 sec	5 reps	5 sec
4	Pulling the tied strap by goalkeeper at a fixed point through chair movement towards fixation point of the strap	5 sec	6 reps	5 sec
5	Throwing weighed handball tied by a rubber strap from forward and receiving it	5 sec	10 reps	5 sec
6	Pulling a weight tied by a strap from (10) m distance	6 sec	6 reps	5 sec
7	Performing pull exercises on the ring from supine position on a step	5 sec	5 reps	5 sec
8	Performing forward leaning exercise with clapping	8 sec	10 reps	5 sec
9	Pushing weighed handballs over shoulder to the longest possible distance	8 sec	10 reps	5 sec
10	Using various dumbbell exercises for upper extremities	5 sec	10 reps	5 sec