

Effect of the Development of Explosive Power, Shooting Accuracy and Flexible Thighs Joint, Spine on Penalty Kick Accuracy for the Students Majoring in Soccer in Faculty of Physical Education

I.F. Abdul Hadi and H.A.A. Ali

Department of Sport Training and Movement Science,
Faculty of Physical Education for Boys and Girls, Port Said University, Egypt

Abstract: This study aimed to 1) develop standardized exercises to enhance explosive power, shooting accuracy and flexible thighs joint, spine for the soccer students in Faculty of Physical Education for boys and girls, University of Port Said and 2) to identify the effect of explosive power, shooting accuracy and flexible thighs joint, spine development on accuracy penalty kick for the soccer students in the Faculty of Physical Education for boys and girls in Port Said, Egypt. Research sample included 24 students selected from the 3rd year students majoring in soccer, Faculty of Physical Education for boys and girls, Port Said, in 2011. Twenty two students from outside the basic sample and from the same community to conduct the survey and also both of tests and measurements to collect basic data required were used for this study. The study findings resulted in the positive impact of the proposed training program on improving the penalty kick accuracy.

Key words: Soccer training % Special physical preparation % Improving the penalty kicks accuracy

INTRODUCTION

The physical condition of the soccer players is one of the crucial foundations, which determine the efficiency of the skill and tactical performance, as any plan, whatever its selection accuracy, can fail if physical abilities are not taken into consideration. Performing skill automatically cannot also be carried out without player having physical attributes and characteristics that serve the kinetic performance of basic skills. There is hardly an agreement between the workers in the field of education and training soccer such as Barke [1], Maghrabi [2], Abdul Baser [3], Reilly [4], Michael and Davis [5], Keswick [6], National Soccer Coaches Association of America [7] and Mielke [8] that the skill of penalty kick is one of the most important basic skills, which each soccer player must generally mastery and under severe stress, in particular, because of its importance in determining the match score, especially in the penalty kicks cases. Given the importance of the penalty kick, the authors of soccer programs in primary, secondary and university education (Faculties of Physical Education) are concerned with such programs to include a skill of penalty kick. Although both researchers noted through their participation in teaching

and soccer coaching to the students of Faculty of Physical Education a lack of penalty kick accuracy, raising the curiosity of the researchers to address how to resolve this problem. The present study was conducted for exploratory experience to identify the physical preparation and penalty kick accuracy by applying the physical and skill tests, which indicate their lack of muscle strength of lower limb and accuracy, flexibility of thighs joints and spine. This is likely to be due to the lack of effectively positive programs for developing muscle strength of the lower limb and flexible thighs joints, spine, prompting, which motivated the researchers to conduct this study.

Objectives:

- C Developing standardized exercises to enhance explosive power, shooting accuracy and flexible thighs joint, spine under study for the students majoring in soccer.
- C Identifying the effect of developing explosive power, shooting accuracy and flexible thighs joint, spine on the penalty kick accuracy under study for the students majoring in soccer.

Corresponding Authors: Ibrahim Fawzy Abdul Hadi, Department of Sport Training and Movement Science,
Faculty of Physical Education for Boys and Girls, Port Said University, Egypt.

Hypotheses:

- C There would be statistically significant differences in the amount of explosive power of lower limb muscles between Pre-Post Tests for favor of Post-test.
- C There would be statistically significant differences in the amount of penalty kick accuracy between Pre-Post Tests for favor of Post-test.
- C There would be statistically significant differences in the amount of flexible thighs joint, spine between Pre-Post Tests for favor of Post-test.

MATERIALS AND METHODS

Research Methodology: Both researchers used the experimental method, utilizing the Pre-Post experimental design for one experimental group due to its relevance to the nature of this study.

Sample: The sample was selected according to intentional method and included 24 students selected among those in the 3rd year majoring in soccer, Faculty of Physical Education for Boys and Girls in Port Said in 2011. Twenty two students out of the basic sample and from the same community to conduct the survey were used.

Data Collection:

Test: Penalty kicks accuracy with sole in soccer [2].

Test: Measure the flexibility of the spine and muscles elastic behind the thighs (trunk flexion test from high-stand posture) [3, 9, 10].

- C Pre-tests were conducted as shown in Table 1.

Proposed Training Program Objectives:

- C To develop explosive power of the muscles working on neck, spine, joints of both the wrists of hands, elbows, shoulders, thighs, knees and feet wrists during penalty kick under study.
- C To develop explosive power of the muscles working on neck, spine, joints of both the wrists of hands, elbows, shoulders, thighs and knees and feet wrists conformity with the requirements of penalty kick under study.
- C To develop shooting accuracy and flexible thighs joint, spine conformity with the requirements of penalty kick under study.

Proposed Training Program Content:

- C Exercises to develop explosive power of the muscles working on neck, spine, joints of both the wrists of hands, elbows, shoulders, thighs and knees and feet wrists conformity with the requirements of penalty kick under study.
- C Exercises to develop the shooting accuracy conformity with the requirements of penalty kick under study.
- C Exercises to develop the flexibility of neck, spine joints and the wrists of hands, elbows, shoulders, thighs and knees and feet wrists conformity with the requirements of penalty kicks under study.

Implementation Plan of Proposed Training Program: Tables from 2-4 illustrated that the plan of implementation program to develop explosive power, shooting accuracy and flexible thighs joint, spine on the penalty kick accuracy under study.

Research Experimental Design

Pre-Test: Pre-test was conducted for both explosive power and shooting accuracy tests on 21/02/2011. Pre-test was also conducted on students in flexible thighs joints, spine test on 22/02/2011. Data was scheduled in Table 4.

Program Application: Proposed program under study was applied during a lesson majoring in soccer from 24/02/2001 to 24/05/2011.

Special Physical Preparation: Forms (1-12) displays circular training units (Gr₁, Gr₂, Gr₃, Gr₄) during each month of the three ones. Tables 5-16 also displayed the dose of each exercise at each phase during each month of the three ones under study.

Post-Test: After completing the program under study, the same tests were conducted in Pre-test and at the same conditions were reapplied; data was scheduled in Table 17.

Statistical Analysis: Statistical Package for the Social Sciences (SPSS) was used for statistical analysis as the following:

- C Arithmetic Mean
- C Standard Deviation

Table 1: Schedule for Pre-testing

Tests	Date of testing
Explosive power and accuracy	21/02/2011
Flexible thighs joints and spine	22/02/2011

Table 2: Time distribution of modules for a specialization lesson, soccer and the third grade during three months

Month	Number of weeks	Number of modules	Unit time (in minutes)	Units' time (minutes)
First	4	8	90	720
Second	4	8	90	720
Third	4	8	90	720
Total	12	24	270	2160

Table 3: Distribution of training load intensity during circular training modules under study

S	Month	Week	Lesson No.	Intensity of training load			Training circle	Notes
				Max.	Less than max.	Medium		
1	First	1	2.1	+			4.1	Developing Gr ₃ ,Gr ₁
2		4.3	+			4.1	Developing Gr ₃ ,Gr ₁	
3		6.5		+		3.2	DevelopingGr ₃ ,Gr ₂	
4		8.7		+		3.2	DevelopingGr ₃ ,Gr ₂	
5	Second	5	10.9	+			4.1	Developing Gr ₄ ,Gr ₁
6		12.11	+			4.1	Developing Gr ₄ ,Gr ₁	
7		14.13			+	3.2	DevelopingGr ₃ ,Gr ₂	
8		16.15			+	3.2	DevelopingGr ₃ ,Gr ₂	
9	Third	9	18.17	+			4.1	Developing Gr ₄ ,Gr ₁
10		20.19	+			4.1	Developing Gr ₄ ,Gr ₁	
11		23.22			+	3.2	DevelopingGr ₃ ,Gr ₂	
12		24.23			+	3.2	DevelopingGr ₃ ,Gr ₂	

Table 4: The arithmetic mean, standard deviation and upper and lower limits and the range for each variable under study in Pre-test (n = 24 students).

Particulars	Measure unit	M	SD	Maximum	Minimum	Range
Explosive power	m	1.730	0.1178	1.50	1.95	0.45
Flexible thighs joint and spine	cm	5.340	1.2714	4.00	8.00	4.00
Penalty kick accuracy	Point	5.210	1.4191	3.00	8.00	5.00

Table 5: Identify dose each exercise at each station

Station	Exercises	Performance Time (Min)	Rest Time (min)	Sets Number
1	1	4	1	3
2	2	4	1	3
3	3	4	1	3

Table 6: Identify dose each exercise at each station

Station	Exercises	Performance Time (Min)	Rest Time (min)	Sets Number
1	1	3	1	44.3
2	2	3	1	44.3
3	3	3	1	44.3
4	4	5.1	1	44.3

Table 7: Identify dose each exercise at each station

Station	Exercises	Performance Time (Min)	Rest Time (min)	Sets Number
1	1	3	1	3
2	2	3	1	3
3	3	3	1	3
4	4	5.1	1	3

Table 8: Identify dose each exercise at each station

Station	Exercises	Performance Time (Min)	Rest Time (min)	Sets Number
1	1	3	55.85	4.33
2	2	3	55.85	4.33
3	3	3	55.85	4.33
4	4	3	55.85	4.33

Table 9: Identify dose each exercise at each station

Station	Exercises	Performance Time (Min)	Rest Time (min)	Sets Number
1	1	4	1	3
2	2	4	1	3
3	3	4	1	3

Table 10: Identify dose each exercise at each station

Station	Exercises	Performance Time (Min)	Rest Time (min)	Sets Number
1	1	3	1	4.33
2	2	3	1	4.33
3	3	3	1	4.33
4	4	5.1	1	4.33

Table 11: Identify dose each exercise at each station

Station	Exercises	Performance Time (Min)	Rest Time (min)	Sets Number
1	1	3	1	3
2	2	3	1	3
3	3	3	1	3
4	4	5.1	1	3

Table 12: Identify dose each exercise at each station

Station	Exercises	Performance Time (Min)	Rest Time (min)	Sets Number
1	1	3	55.85	4.33
2	2	3	55.85	4.33
3	3	3	55.85	4.33
4	4	3	55.85	4.33

Table 13: Identify dose each exercise at each station

Station	Exercises	Performance Time (Min)	Rest Time (min)	Sets Number
1	1	4	1	3
2	2	4	1	3
3	3	4	1	3

Table 14: Identify dose each exercise at each station

Station	Exercises	Performance Time (Min)	Rest Time (min)	Sets Number
1	1	3	1	4.33
2	2	3	1	4.33
3	3	3	1	4.33
4	4	5.1	1	4.33

Table 15: Identify dose each exercise at each station

Station	Exercises	Performance Time (Min)	Rest Time (min)	Sets Number
1	1	3	1	3
2	2	3	1	3
3	3	3	1	3
4	4	5.1	1	3

Table 16: Identify dose each exercise at each station

Station	Exercises	Performance Time (Min)	Rest Time (min)	Sets Number
1	1	3	55.85	4.33
2	2	3	55.85	4.33
3	3	3	55.85	4.33
4	4	3	55.85	4.33

Table 17: The arithmetic mean, standard deviation and upper and lower limits and the range for each variable under study in post-test (n = 24 students).

Particulars	Measure unit	M	SD	Maximum	Minimum	Range
Explosive power	m	1.9830	0.1776	1.70	2.40	0.70
Flexible thighs joint and spine	cm	6.5920	1.2507	4.90	9.50	4.60
Penalty kick accuracy	Point	6.9210	0.8998	6.20	8.20	2.00

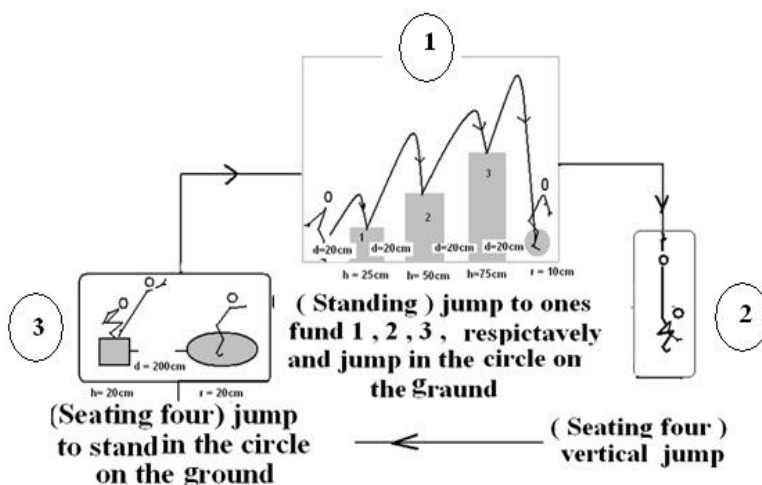


Fig. 1: Training unit for first circuit (Gr₁) in the first month

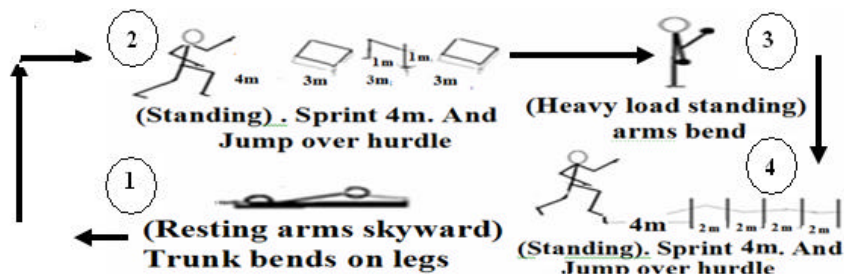


Fig. 2: Training unit for second circuit (Gr₂) in the first month

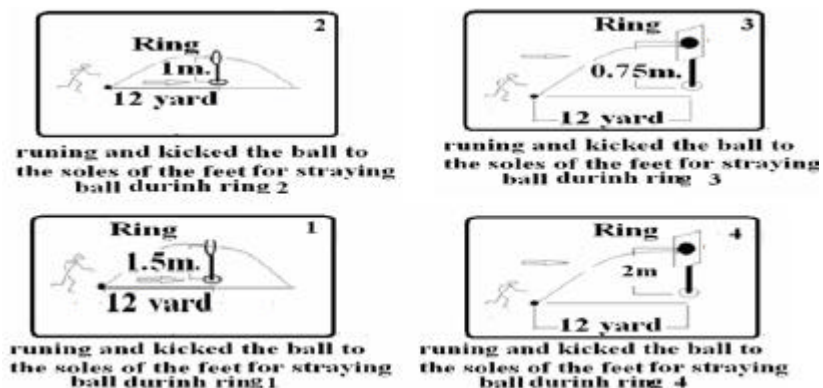


Fig. 3: Training unit for third circuit (Gr₃) in the first month

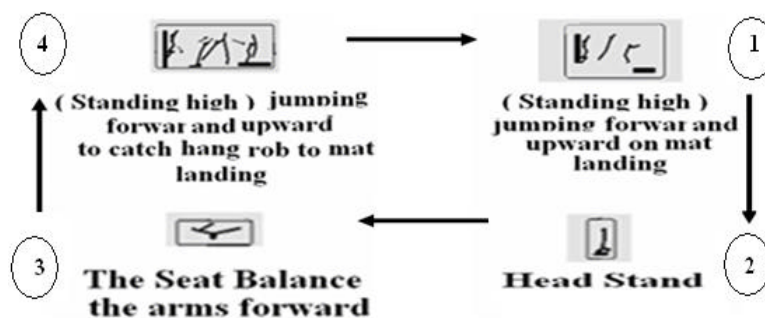


Fig. 4: Training unit for fourth circuit (Gr₄) in the first month

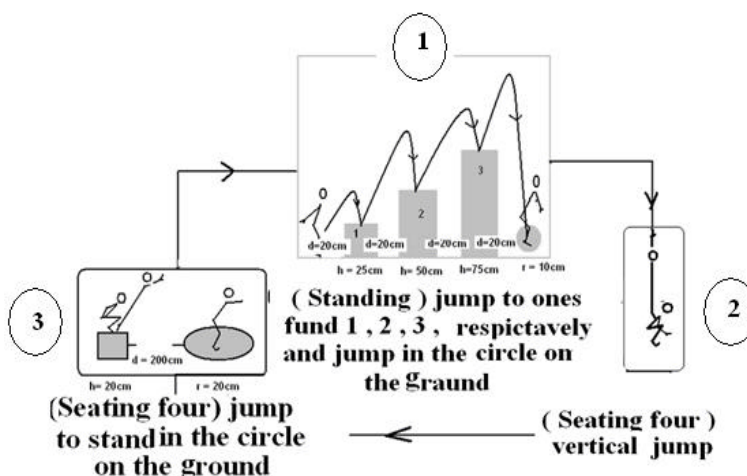


Fig. 5: Training unit for first circuit (Gr₁) in the second month

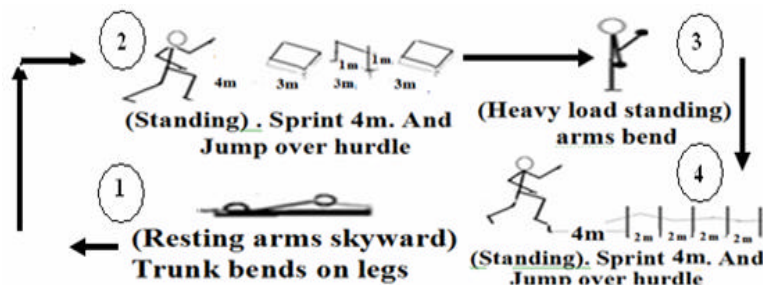


Fig. 6: Training unit for second circuit (Gr₂) in the second month

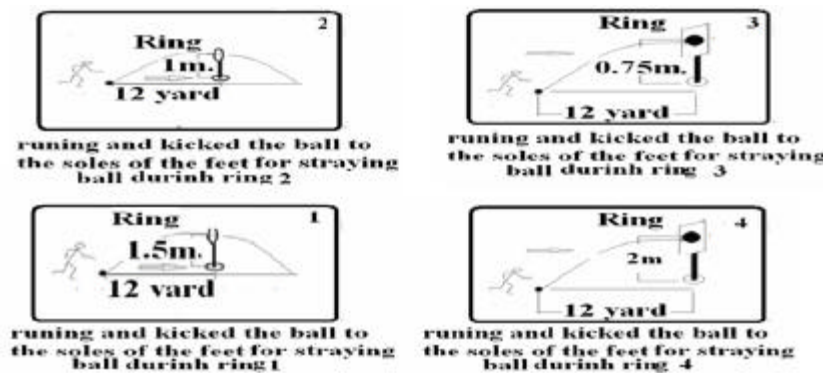


Fig. 7: Training unit for third circuit (Gr₃) in the second month

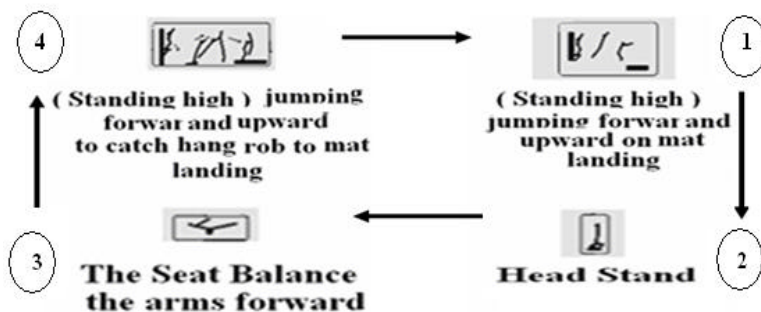


Fig. 8: Training unit for fourth circuit (Gr₄) in the second month

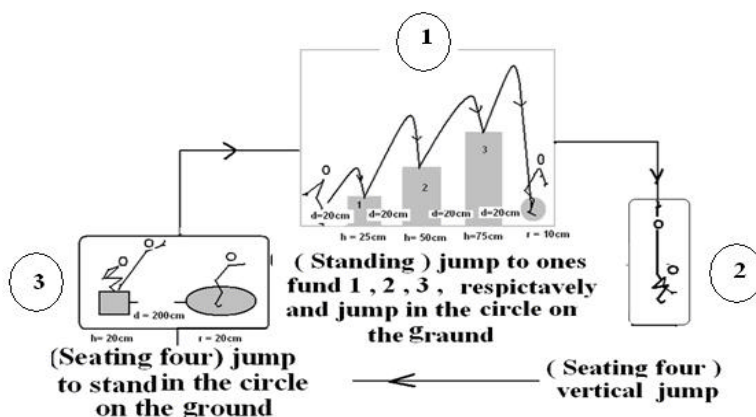


Fig. 9: Training unit for first circuit (Gr₁) in the third month

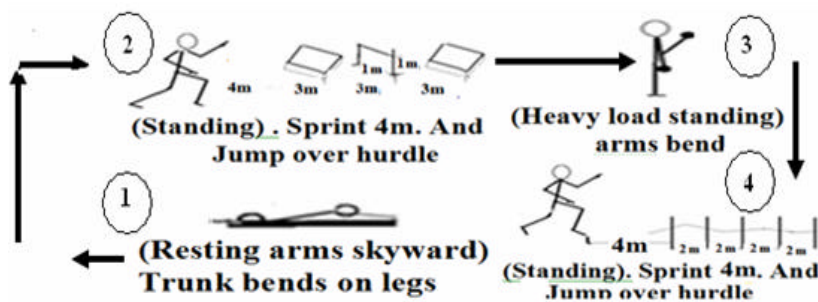


Fig. 10: Training unit for second circuit (Gr₂) in the third month

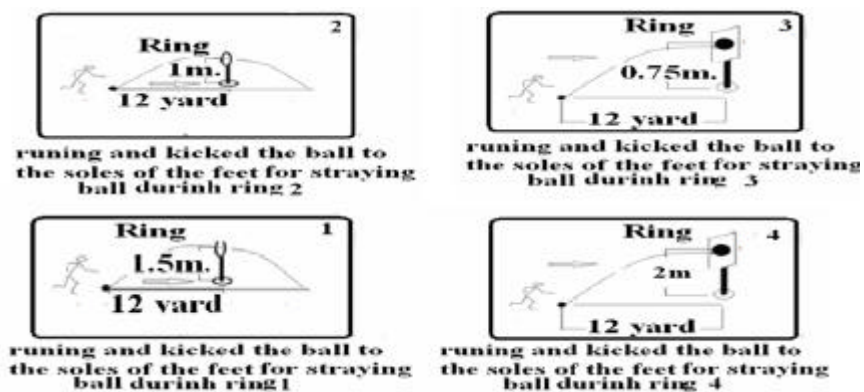


Fig. 11: Training unit for third circuit (Gr₃) in the third month

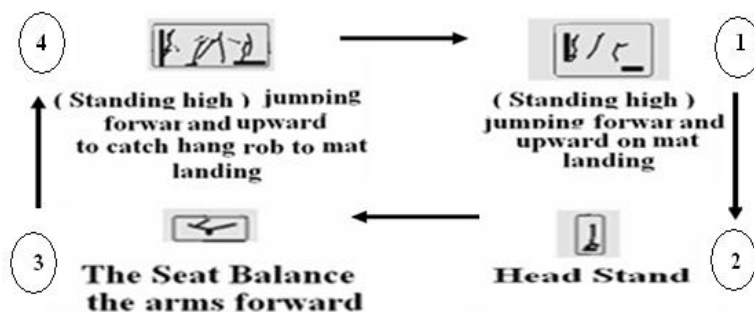


Fig.12: Training unit for fourth circuit (Gr₄) in the third month

- C Upper and lower limits
- C Range
- C Skew coefficient
- C T-Test for dual views.

RESULTS

Tables from 17-19 shows the results of each Post-test in barometers under study after the implementation of the program and the significant differences between Pre-Post Tests and the percentage of improvement in the variables under study.

Table 18 shows that the value of calculated T-test in pre-post tests for explosive power, penalty kick accuracy, flexible thighs and spine joints during penalty kick performance is statistically significant at 0.01 and this suggests that the differences of pre-post tests of the parameters under study are true and in favor of the posttest.

Table 19 shows that the greatest percentage of improvement as a result of the application of the training program under study was the penalty kick accuracy at 30.32%, followed by flexible thighs joints and spine at 23.41%, then the explosive power at 14.45%.

DISCUSSION

The statistical analysis results (Tables 18 and 19) showed that there are statistically significant differences between Pre-Post tests in the amount of explosive powers of the lower limb muscles, flexible thighs joint, spine and penalty kick accuracy in favor of Post-test. The percentage of improvement was in favor of Post-test after applying the proposed training program under study, which led to improve explosive power of the lower limb muscles, flexible thighs joint, spine and penalty kick accuracy. These results in the light they had set up the training program after the functional analysis of the action of the joints involved in performing penalty kick under study and the muscles working upon, with giving due interest of choosing exercises used in the program according to the requirements of performing penalty kick. As well as, focusing on standardizing appropriate endurance training for all study sample members and focusing on the importance of perceptual motor of penalty kick accuracy during the exercises performance used in the program. These results are consistent with both of those obtained by Maghrabi [2], Abdul Baser [3], Reilly

Table 17: The arithmetic mean, standard deviation and upper and lower limits and the range for each variable under study in post-test (n = 24 students).

Particulars	Measure unit	M	SD	Maximum	Minimum	Range
Explosive power	m	1.9830	0.1776	1.70	2.40	0.70
Flexible thighs joint and spine	cm	6.5920	1.2507	4.90	9.50	4.60
Penalty kick accuracy	Point	6.9210	0.8998	6.20	8.20	2.00

Table 18: Indication of the differences between pre-post tests of variables under study

Variables	M	SD	t	df	Sig. (2-tailed)
Pair (1) Explosive power before Explosive power after	- 0.2575	0.1956	-6.450	23	0.000**
Pair (2) Flexible thighs joint , spine before Flexible thighs joint , spin after	- 1.2500	0.4591	-13.056	23	0.000**
Pair (3) Accuracy penalty kick before Accuracy penalty kick after	- 1.7875	1.1031	-7.939	23	0.000**

Both asterisks ** means the differences are significant at statistical significance level of 0.01.

Table 19: Percentage improvement in explosive power, penalty kick accuracy, flexible thighs and spine joints during penalty kick performance of the study sample

Particulars	Measure unit	Pre-test M	Post-test M	M difference	%
Explosive power	m	1.73	1.98	0.25	14.45
Flexible thighs joint and spine	cm	5.34	6.59	1.25	23.41
Penalty kick accuracy	Point	5.31	6.92	1.61	30.32

[4], Michael and Davis [5], Keswick [6], National Soccer Coaches Association of America [7] and Mielke [8], who unanimously agreed on the importance explosive power of the lower limb muscles, flexible thighs joint, spine and penalty kick accuracy to achieve success during the performance of penalty kick. These findings are also consistent with the opinion of Gerhard [11], Pollock [12] and Wirheard [13], who indicated that the training program based on the scientific foundations and concerned with using standardized exercise in developing capabilities and physical characters lead to positive results.

CONCLUSIONS

Proposed training program has a positive effect on improving the penalty kick accuracy for the students majoring in soccer, faculty of Physical Education for boys and girls in Port Said, Arab Republic of Egypt. The largest percentage of improvement was due to applying the program under study in penalty kick accuracy of 30.32%, followed by flexible thighs joint and spine of 23.41% and explosive power of 14.45%.

RECOMMENDATIONS

- C Applying the program of developing explosive power, shooting accuracy and flexible thighs joint and spine for improving penalty kick accuracy under study of the students majoring in soccer, faculty of Physical Education for boys and girls.
- C When teaching penalty kick to students majoring in soccer in Physical Education faculties, special attention must be given to the development of explosive power, shooting accuracy and flexible thighs, spine joints.

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