



The effect of ballistic training on the development of some specific physical abilities to improve the skill performance of front acrobatic series on floor exercises for gymnasts under 13 y.d.

Prof. Dr/ Ashraf Abdelal Alzohary⁽¹⁾, Prof. Dr / Mona Al-Sayed Abdel Aal⁽²⁾, Prof. Dr/Eslam Mohamed Mahmoud Salim⁽³⁾

(1) Professor of Gymnastics Training and Head of the Training and Gymnastics Training Department - Faculty of Physical Education for Boys - Alexandria University.

(2) Professor of Exercise Training Department of exercises, gymnastics and kinetic expression - Faculty of Physical Education - Zagazig University.

(3) Professor of Exercise Training and Sports Shows, Department of Training and Gymnastics Training - Faculty of Physical Education for Boys - Alexandria University.

Abstract

This research aims to identify the effect of using ballistic training in developing some specific physical abilities and improving the performance level in the front acrobatic series (handspring to forward somer sault straight to forward somer sault straight with half twist) in floor exercises for gymnasts under 13 Year.

As the experimental method was used for its suitability to the nature of the study, the basic study was applied to an intentional sample of (10) gymnasts from Alexandria, they were divided into two groups, one of them experimental which was subject to a training program using ballistic training (weight training and ballistic resistance), and control group is subjected to the program followed by the Military Sports Institution in Alexandria (Al-Jaish Club), each group was (5) gymnasts, and the two groups have been organized to train for a period of (12) weeks at (36) units (3 weekly units) to implement the training programs.

Conclusions :

- *The effectiveness of using ballistic training in developing some specific physical abilities, and improving the level of skill performance in the front acrobatic series (handspring to forward somer sault straight to forward somer sault straight with half twist) in floor exercises for gymnasts under 13 Years where they excelled The experimental group over the control group in all measurements of physical variables and skill level performance.*
- *There is a high correlation between developing physical abilities and improving the level of skill performance.*

Recommendations :

- *The use of ballistic training (ballistic resistance exercises) in developing physical abilities, and improving the level of skill performance of gymnasts under 13 years.*
- *Carrying out studies to identify the different training effects of ballistic training in various sporting activities.*

Keywords : (ballistic training , physical abilities , gymnasts)

Introduction:

Gymnastics is from the technical sports that have reached high level of accuracy and mastery required for performance, through following modern scientific methods, proper planning, and designing training programs using appropriate physical exercises in order to improve the level of performance.

In recent years, a new method called ballistic training has emerged, linking training with weights and plyometric training by lifting relatively light weights at high speeds. (10: 4), (13: 11), (25: 5), and includes explosive movements against resistance at full speed to overcome the lack of speed resulting from weight training, so it maintains special coordination. (3:16) Movements that perform at full speed, and are characterized by high starting rates and short contracting times can be considered ballistic movements, the characteristics of the working muscle is the violent

effort that occurs during the movement, while in the low muscle effort a decrease in the electrical activity of the working muscle (the period of serenity), before the Ballistic contraction and paves the way for this period to raise the amount of strength and speed for the next contraction. (15:25)

The ballistic movement is divided into three main stages, the first of which is the initiation of movement through muscular contractions by shortening, then the regression or decline depending on the wheel (the amount of movement) resulting from the first stage, and finally the phase of decreasing velocity accompanied by muscular contractions by lengthening. (2:46)

And some studies have proven that the intensities that range between (30 - 50)% of the maximum weight the player can lift are the most effective in increasing the outputs of mechanical ability, while other studies have shown that the

intensities with heavy loads ranging between (80 - 90)% of the maximum weight It can be raised to improve dynamic performance. (10), (19), (36)

The design of training programs specified for skills in gymnastics needs introducing and inventing special methods related to the nature of skill performance, which prompted researchers to use ballistic resistance training to develop some physical and skill capabilities as one of the special methods associated with the nature of the performance of the front acrobatic series under consideration, where this type of Exercises are based on quick stretching of the muscle, such as direct contraction that results in a strong explosive contraction, improve the level of elevations. (23: 526)

The front acrobatic series is considered to be a group of somersaults and rotations and it is one of the basic groups complex in floor exercises and is considered a basic requirement in the routine according to FIG code of points. (8:36)

This pushed the Egyptian Gymnastics Federation to put some of these front acrobatic series at different age stages, including the series in our research, which is (handspring to forward somer sault straight to forward somer sault straight with half twist)

Through the work of one of the researchers as a technical director and international referee, he noticed the inability of many players participating in the national championships to perform the front series in particular by not linking the parts of the series, and thus leads to a lack of their points, which makes them outside the competition for the apparatus of floor exercises , Despite the high level of performance on other apparatuses.

Since physical and skill preparation is one of the most important pillars for raising the level of gymnasts, in addition to the ability to compete and achieve championships, this purpose can be achieved through training using exercises with ballistic resistance.

Research Objective::

identify the effect of using ballistic training in developing some specific physical abilities and improving the performance level in the front acrobatic series (handspring to forward somer sault straight to forward somer sault straight with half twist) for floor exercises of gymnasts under 13 Year.

Research hypotheses:

- There are statistically significant differences between the pre and post measurements of the experimental group, and the control group in the variables of special physical abilities and the skill performance of the front acrobatic series under study, in favor of the post measurements.
- There are statistically significant differences between the experimental group and the control group in the post measurements of the variables of special physical abilities and the skill performance of the front

acrobatic series under study, in favor of the experimental group.

Research terms:

Ballistic training (weight training and ballistic resistance exercises):

- Explosive movements against resistance as quickly as possible. (2:46)
- The ability of muscles to perform movements as quickly as possible when there are resistances. (3:20)
- The movements that is characterized by increasing in speed for maximum range while throwing a heavier weight into a vacuum. (26:13)

Search procedures :

Research Methodology :

The experimental method was used to suit the nature of the research.

The human domain:

Gymnastics players in the Alexandria area under 13 years old, which are (10) players.

Time domain:

The study was conducted from 8/6/2019 to 26/9/2019 as follows:

1. The surveys were conducted from 8/6/2019 to 17/6/2019.
2. The pre-measurements were carried out from 22/6/2019 to 27/6/2019.
3. The basic study was conducted during the period from 29/6/2019 to 19/9/2019.
4. The post measurements were carried out from 9/21/2019 to 26/9/2019.

Location:

Gymnastics hall at the Military Sports Institution in Alexandria (Al-Jaish Club).

Research Sample:

The basic study was applied to an intentional sample of (10) gymnasts, in Alexandria, who were divided into two groups (one is experimental and the other is control), the strength of each group (5) players.

While surveys were applied to a random sample of (5) gymnasts in the Alexandria region.

Pilot studies:

First pilot study:

The selection and identification of the most appropriate physical and skill tests and measurements, and resulted in the identification of the most appropriate physical and skill tests. The tests and measurements applied for the physical variables under study:

- Test (bend the trunk forward in front of the bottom, the dome, the leg lifted from the back to a Swedish seat) to measure flexibility.
- A test (vertical jump, long jump) to measure the force distinguished by the speed of the two legs.
- Arm flexing (attachment) in 10s, (attachment) of arms folded in 10s to measure the force marked by the velocity of the arms.

- Test (flatness) lifting the trunk with the arms, (attached) Lifting the legs to measure the force marked by the speed of the trunk.
- Skill tests under study:
 - Handspring.
 - Forward somer sault straight.
 - forward somer sault straight with half twist
 - Evaluating front acrobatic series skills.

second pilot study:

- Choosing and defining the appropriate exercises for the ballistic training program (ballistic resistance exercises) directed to develop some physical abilities in order to improve the level of performance in the

front acrobatic series under study, and resulted in the identification of exercises for the program (weight training and ballistic resistance).

- Define the warm-up and end exercises for the experimental and control groups.

Statistical treatments:

The SPSS statistical program was used to extract the following statistical treatments: Arithmetic mean - standard deviation - difference coefficient - torsional coefficient - difference between the two averages - value (T) - correlation coefficient - effect size - percentage improvement

Homogeneity of the sample:**Table (1)****Statistical indications of basic and physical variables of the total research sample before experiment n = 10**

variables		statistics	measurement unit	Mean	Standard deviation	Skewness coefficient	Coefficient kurtosis	Coefficient of variation%
Basic variables		Age	Year	12.83	0.51	-0.67	-1.18	4.01
		Height	cm	142.90	2.08	-0.30	-1.62	1.45
		Weight	Kg	38.50	3.37	-0.17	-1.01	8.77
Flexibility		The torso folded downwards	mark	12.50	0.53	0.00	-2.57	4.22
		The dome	cm	5.40	0.70	1.66	2.05	12.95
		(Getting down on a Swedish seat) The man lifted a successor	mark	22.30	2.50	0.16	-2.36	11.20
Force marked with speed	legs	Vertical jump	cm	40.90	0.99	0.24	-2.30	2.43
		long jump	cm	209.00	0.82	0.00	-1.39	0.39
	Arms	(Attached) Bend the arms by 10s	Number	9.30	0.67	-0.43	-0.28	8.13
		(Pivot) arms fold on the 10th	Number	9.30	0.48	1.04	-1.22	5.19
	trunk	(Flatness) Lift the torso with the arms	Number	15.30	0.48	1.04	-1.22	3.16
		(Attached) Lift the two men	Number	7.10	0.32	3.16	10.00	4.45

It is clear from Table (1) for the statistical significance of the basic variables and physical measurements of the total research sample before conducting the experiment that the values of the convolution and kurtosis coefficients are between (± 3), which indicates their occurrence under the equinox curve, and that the values of the difference coefficients are confined between (0.39% - 12.95 %) It is a value less than 20% of the average, which indicates the homogeneity of the research personnel in all variables under investigation.

Table (2)**the statistical significance of the skill level performance of the total research sample before the experiment**

variables	statistics	measure ment unit	Mean	Standard deviation	Skewness coefficient	Coefficient kurtosis	Coefficient of variation%
Handspring		mark	3.90	0.74	0.17	-0.73	18.97

Forward somer sault straight	mark	3.40	0.59	1.66	2.05	17.35
Half forward somer sault straight	mark	3.58	0.63	1.24	1.96	17.60
Evaluating front acrobatic series skills	mark	2.80	0.48	0.41	-1.07	17.14

It is clear from Table (2) for the statistical significance of the level of skill performance of the total research sample before conducting the experiment that the values of twisting and kurtosis coefficients are between (± 3), which indicates their occurrence under the equinox curve, and that the values of the coefficients of difference are between (17.35%, 18.97% It is a value less than 20% of the average, which indicates the homogeneity of the research personnel in all variables under investigation.

Parity between the two groups:

Parity between the two groups was found in each of the basic variables (age - height - weight), physical and skill variables, and that is shown in my tables (3) and (4).

Table (3)

Statistical indications of basic and physical variables between the experimental group and the control group before the experiment

Statistics		measurement unit	Experimental group		Control group		Mean difference	T Values	Significance level	
			Mean	SD	Mean	SD				
Basic variables	Age	Year	12.69	0.53	12.96	0.52	-0.27	-0.82	0.44	
	Height	cm	143.00	2.12	142.80	2.28	0.20	0.14	0.89	
	Weight	Kg	39.00	4.42	38.00	2.35	1.00	0.45	0.67	
Flexibility	The torso folded downwards	mark	12.60	0.55	12.40	0.55	0.20	0.58	0.58	
	The dome	cm	5.40	0.89	5.40	0.55	0.00	0.00	1.00	
	(Getting down on a Swedish seat) The man lifted a successor	mark	23.00	2.74	21.60	2.30	1.40	0.88	0.41	
Force marked with speed	legs	Vertical jump	cm	40.80	1.10	41.00	1.00	-0.20	-0.30	0.77
		long jump	cm	209.00	1.00	209.00	0.71	0.00	0.00	1.00
	Arms	(Attached) Bend the arms by 10s	N	8.00	0.71	8.60	0.55	-0.60	-1.50	0.17
		(Pivot) arms fold on the 10th	N	9.20	0.45	9.40	0.55	-0.20	-0.63	0.54
	trunk	(Flatness) Lift the torso with the arms	N	15.20	0.45	15.40	0.55	-0.20	-0.63	0.54
	(Attached) Lift the two men	N	7.00	0.00	7.20	0.45	-0.20	-1.00	0.35	

*Significant at 0.05 level (T significant = 2.306)

It is clear from Table (3) for the statistical significance of the basic variables and physical measurements of the two research groups before the experiment, the absence of statistically significant differences at the level of 0.05 in all the applied measurements and tests, which indicates their equivalence.

Table (4)

Statistical indications of the level of skill performance between the experimental group and the control group before the experiment

variables	Statistics	measurement unit	Experimental group		Control group		Mean difference	T Values	Significance level
			Mean	SD	Mean	SD			
	Handspring	mark	3.80	0.84	4.00	0.71	-0.20	-0.41	0.68
	Forward somer sault straight	mark	3.20	0.45	3.60	0.89	-0.40	-0.89	0.40
	Half forward somer sault straight	mark	3.09	0.51	3.62	0.68	0.53	0.64	0.49
	Evaluating front acrobatic series skills	mark	2.60	0.55	3.00	1.00	-0.40	-0.78	0.46

*Significant at 0.05 level (T significant = 2.306)

It is clear from Table (4) for the statistical significance of the level of skill performance in the two research groups before the experiment, the absence of statistically significant differences at the level of 0.05 in all the applied measurements and tests, which indicates their equivalence.

Program Design:

- Use the principle of load and rest as a basis for the exercise, taking into account the individual loading of the sample members, each according to his physical ability. (21: 101), (22: 45).
- The increase in load was taken into consideration through the gradual increase in load, continuity. (9: 65), (14: 76)
- The experiment was applied for a period of (12) weeks, with 36 units (3 weekly units) to implement the ballistic resistance training program, and the control group organized for the same period and the number of training units to implement the program followed at the The Army Club.

- Average training unit time (60-90) minutes, (17) weight training exercises were identified, (25) ballistic resistance training exercises.
- The duration of the program was divided into two periods as follows:

First stage: foundation (weight training):

Intensity of (80-90)%, average repetition (3-5), average rest between exercises (60-90) seconds, groups (2-4), average rest between groups (120-180) seconds.

The second stage (ballistic resistance exercises):

Intensity of (80-90)%, average repetition (6-8), average rest between exercises (60-90) seconds, groups (3-4), average rest between groups (90-180) seconds.

Assessing the skill level:

Through a panel of arbitrators registered in the arbitration records of the Egyptian Gymnastics Federation

Results and discussion:

Results:

*Table (5)
statistical indications of physical variables for the experimental group before and after the experiment*

variables	Statistics	measurement unit	Pre measurement		Post measurement		Mean difference	T Values	Improvement %	
			Mean	SD	Mean	SD				
Flexibility	The torso folded downwards	mark	12.60	0.55	16.20	0.45	3.60	14.70*	28.57	
	The dome	cm	5.40	0.89	0.90	0.22	-4.50	-9.00*	83.33	
	(Getting down on a Swedish seat) The man lifted a successor	mark	23.00	2.74	37.00	2.74	14.00	14.00*	60.87	
Force marked with speed	legs	Vertical jump	cm	40.80	1.10	50.80	1.79	10.00	11.18*	24.51
		long jump	cm	209.00	1.00	222.00	2.74	13.00	8.76*	6.22
	Arms	(Attached) Bend the arms by 10s	N	8.00	0.71	10.40	0.55	2.40	6.00*	30.00
		(Pivot) arms fold on the 10th	N	9.20	0.45	10.80	0.45	1.60	6.53*	17.39
	trunk	(Flatness) Lift the torso with the arms	N	15.20	0.45	17.20	0.45	2.00	4.58*	13.16

	(Attached) Lift the two men	N	7.00	0.00	9.20	0.45	2.20	11.00*	31.43
--	-----------------------------	---	------	------	------	------	------	--------	-------

*Significant at 0.05 level (T significant = 2.766)

It is clear from Table No. (5) concerning the statistical significance of physical measurements and tests in the experimental group before and after the experiment, that there are differences with statistical significance at the level (0.05) in all measurements, where the calculated value of

(T) ranged between (4.58 to 14.70) which is greater than Table (T) value, and the improvement rates ranged between (6.22% to 83.33%) in favor of the dimensional measurement

Table (6)
statistical indications of the skill level of the experimental group before and after the experiment

variables	Statistics	measurement unit	Pre measurement		Post measurement		Mean difference	T Values	Improvement %
			Mean	SD	Mean	SD			
Handspring		mark	3.80	0.84	9.20	0.27	5.40	12.55*	142.11
Forward somer sault straight		mark	3.20	0.45	8.20	0.27	5.00	18.26*	156.25
Half forward somer sault straight		mark	3.09	0.51	8.12	0.68	5.03	17.35*	162.78
Evaluating front acrobatic series skills		mark	2.60	0.55	9.00	0.35	6.40	17.42*	246.15

*Significant at 0.05 level (T significant = 2.766)

It is clear from Table No. (6) on the statistical significance of the level of skill performance of the experimental group before and after the experiment, that there are differences with statistical significance at the level (0.05) in all measurements, where the calculated value of (T) ranged between (12.55 to 18.26) which is greater than The value of the (T) tabular, and the improvement rates ranged between (142.11% to 246.15%) in favor of the dimensional measurement.

Table (7)
statistical indications of physical variables in the control group before and after the experiment

variables	Statistics	measurement unit	Pre measurement		Post measurement		Mean difference	T Values	Improvement %	
			Mean	SD	Mean	SD				
Flexibility	The torso folded downwards	mark	12.40	0.55	13.40	0.55	1.00	2.24	8.06	
	The dome	cm	5.40	0.55	0.80	0.45	- 2.45	- 0.55	- 11.11	
	(Getting down on a Swedish seat) The man lifted a successor	mark	21.60	2.30	27.80	2.59	6.20	3.50*	28.70	
Force marked with speed	legs	Vertical jump	cm	41.00	1.00	42.80	1.30	1.80	4.81*	4.39
		long jump	cm	209.90	0.71	209.60	0.55	0.60	1.50	0.29
	Arms	(Attached) Bend the arms by 10s	N	8.60	0.55	7.80	0.45	-0.80	- 2.14	- 9.30
		(Pivot) arms fold on the 10th	N	9.40	0.55	9.80	0.84	0.40	1.63	4.26
	trunk	(Flatness) Lift the torso with the arms	N	15.40	0.55	15.60	0.55	0.20	1.00	1.30
	(Attached) Lift the two men	N	7.20	0.45	7.60	0.55	0.40	1.63	5.56	

*Significant at 0.05 level (T significant = 2.766)

It is clear from Table No. (7) concerning the statistical significance of physical measurements and tests in the control group before and after the experiment, that there are no statistically significant differences at the level (0.05) in most of the measurements, although the mean differences in these measurements that did not show significant differences were in favor of the dimensional measurements This group had an improvement in these measurements but did not reach the limits of significance, while there are differences with statistical significance in (a leg lift test to measure elasticity, a

vertical jump test to measure the force distinguished by the speed of the two legs), where the calculated value of (t) was (3.50, 4.81), respectively, which is greater than the tabular value (T), and the improvement rates ranged between (0.29% to 28.70%) in favor of the dimensional measurement.

Table (8)
statistical indications of the level of skill performance of the control group before and after the experiment

variables	statistics	measurement unit	Pre measurement		Post measurement		Mean difference	T Values	Improvement %
			Mean	SD	Mean	SD			
	Handspring	mark	4.00	0.71	5.60	0.55	1.60	7.00*	40.00
	Forward somer sault straight	mark	3.60	0.89	4.60	0.89	1.00	4.31*	27.78
	Half forward somer sault straight	mark	3.62	0.68	4.78	0.62	1.16	4.13*	32.04
	Evaluating front acrobatic series skills	mark	3.00	1.00	4.80	0.76	1.80	5.31*	60.00

*Significant at 0.05 level (T significant = 2.766)

It is clear from Table No. (8) concerning the statistical significance of the level of skill performance in the control group before and after the experiment, that there are statistically significant differences at the level (0.05) in all measurements, where the calculated value of (T)

ranged between (4.13 to 7.00) which is greater than Table (T) value, and the improvement rates ranged between (27.78% to 60.00%) in favor of the dimensional measurement.

Table (9)
statistical indications of physical variables for both experimental and control groups after the experiment

variables	statistics	measurement unit	Experimental group		Control group		Mean difference	T Values	Percent age difference %	
			Mean	SD	Mean	SD				
Flexibility	The torso folded downwards	mark	16.20	0.45	13.40	0.55	2.80	8.85*	17.28	
	The dome	cm	0.90	0.22	4.80	0.45	- 3.90	17.44*	433.33	
	(Getting down on a Swedish seat) The man lifted a successor	mark	37.00	2.74	27.80	2.59	9.20	5.46*	24.86	
Force marked with speed	legs	Vertical jump	cm	50.80	1.79	42.80	1.30	8.00	8.08*	15.75
		long jump	cm	222.00	2.74	209.06	0.55	12.40	9.93*	5.59
	Arms	(Attached) Bend the arms by 10s	N	10.40	0.55	7.80	0.45	2.60	8.22*	25.00
		(Pivot) arms fold on the 10th	N	10.45	0.45	9.80	0.84	0.65	2.36*	6.22
	trunk	(Flatness) Lift the torso with the arms	N	17.20	0.45	15.60	0.55	1.60	5.06*	9.30
		(Attached) Lift the two men	N	9.20	0.45	7.60	0.55	1.60	5.06*	17.39

*Significant at 0.05 level (T significant = 2.306)

It is clear from Table No. (9) and graph No. (1) of the statistical significance of the physical variables of the experimental and control research groups after the experiment, that there are statistically significant differences at the level of (0.05), where the calculated value of (T) ranged between (2.36 to 17.44) It is greater than the value of the tabular (T) at the level of (0.05), and the differences in the improvement rates ranged between (5.59% to 433.33%) in favor of the experimental group in all physical variables under consideration.

Table (10)
significance of the effect size in the levels of physical variables under investigation in the experimental and control groups according to Cohen equations

variables		statistics	Measurement unit	T Values	Significance level	ETA 2	Effect size	The significance of the effect
Flexibility	The torso folded downwards		mark	8.85*	0.00	0.91	5.60	High
	The dome		cm	-17.44*	0.00	0.97	-11.03	High
	(Getting down on a Swedish seat) The man lifted a successor		mark	5.46*	0.00	0.79	3.45	High
Force marked with speed	legs	Vertical jump	cm	8.08*	0.00	0.89	5.11	High
		long jump	cm	9.93*	0.00	0.92	6.28	High
	Arms	(Attached) Bend the arms by 10s	N	8.22*	0.00	0.89	5.20	High
		(Pivot) arms fold on the 10th	N	2.36*	0.05	0.41	1.49	High
	trunk	(Flatness) Lift the torso with the arms	N	5.06*	0.00	0.76	3.20	High
		(Attached) Lift the two men	N	5.06*	0.00	0.76	3.20	High

Impact size: 0.2: Low 0.5: Medium 0.8: High

It is clear from Table No. (10) concerning the significance of the effect size in the levels of physical variables under investigation in the experimental and control groups according to Cohen equations, the high significance of the effect size in all physical variables under investigation.

Figure (1)
of the statistical significance of the physical variables of the experimental and control research groups after the experiment

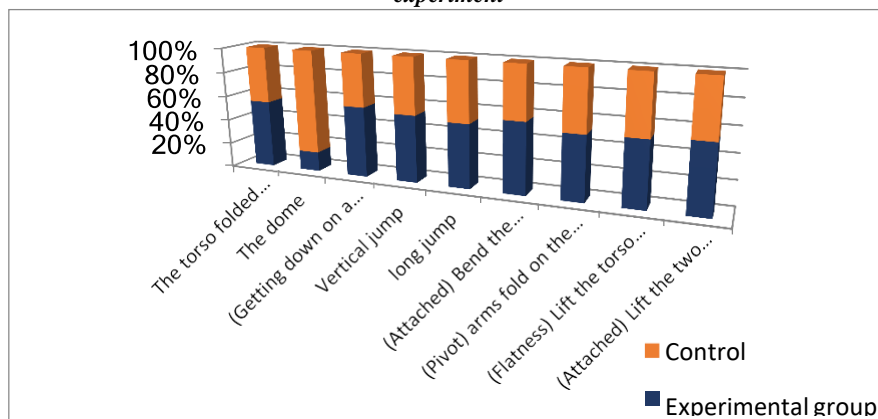


Table (11)
statistical indications of the level of skill performance among the experimental and control research groups after the experiment

variables	Statistics measurement unit	Experimental group		Control group		Mean difference	T Values	Percentage difference %
		Mean	SD	Mean	SD			
Handspring	mark	9.20	0.27	5.60	0.55	3.60	13.15*	39.13
Forward somer sault straight	mark	8.20	0.27	4.60	0.89	3.60	8.61*	43.90

Half forward somer sault straight	mark	8.12	0.68	4.78	0.62	3.34	8.13*	41.13
Evaluating front acrobatic series skills	mark	9.00	0.35	4.80	0.76	4.20	11.22*	46.67

*Significant at 0.05 level (T significant = 2. 306)

It is clear from Table No. (11) and graph No. (2) of the statistical significance of the level of skill performance in the experimental and control groups after the experiment, that there are statistically significant differences at the level of (0.05), where the calculated value of (T) ranged between (8.13 to 13.15) It is greater than the tabular value of (T) at the level of (0.05), and the improvement percentage differences ranged between (39.13% to 46.67%) in favor of the experimental group in all scores of the skill level under consideration.

Table (12)
significance of influence size in the level of skill performance under consideration by the experimental and control groups according to Cohen equations

variables	statistics	measurement unit	T Values	Significance level	ETA 2	Effect size	The significance of the effect
Handspring	mark	13.15*	0.00	0.96	8.31	High	
Forward somer sault straight	mark	8.61*	0.00	0.90	5.44	High	
Half forward somer sault straight	mark	8.13*	0.00	0.88	5.12	High	

Impact size: 0.2: Low 0.5: Medium 0.8: High

It is clear from Table No. (12) concerning the significance of the effect size in the skill performance levels under investigation by the experimental and control groups according to Cohen equations, the high significance of the effect size in all the degrees of the skill performance level under investigation.

Figure (2)
for the statistical indications of the level of skill performance of the experimental and control research groups after the experiment

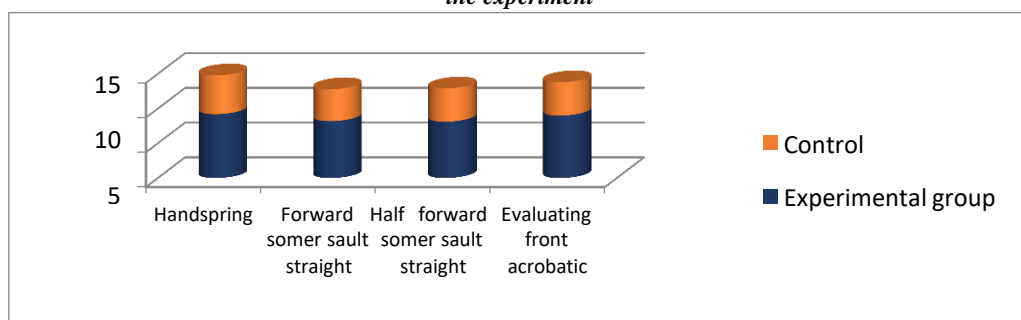


Table (13)
correlation coefficient between the physical variables and the skill level of the research sample

variables	statistics	Measurement unit	Handspring	Forward somer sault straight	forward somer sault straight with half twist	Evaluating front acrobatic series skills
Flexibility	The torso folded downwards	mark	0.971	0.940	0.921	0.956
	The dome	cm	0.925	0.913	0.957	0.923

	(Getting down on a Swedish seat) The man lifted a successor	mark	0.832	0.795	0.896	0.832	
Force marked with speed	legs	Vertical jump	cm	0.934	0.961	0.927	0.969
		long jump	cm	0.887	0.902	0.889	0.887
	Arms	(Attached) Bend the arms by 10s	N	0.119	0.824	0.932	0.124
		(Pivot) arms fold on the 10th	N	0.801	0.853	0.886	0.822
	trunk	(Flatness) Lift the torso with the arms	N	0.883	0.882	0.895	0.895
		(Attached) Lift the two men	N	0.908	0.932	0.913	0.939

It is clear from Table No. (13) of the correlation coefficient between physical variables and the level of skill performance of the research sample, that there is a high correlation between all physical variables and the level of skill performance.

Discussion:

The differences of statistical significance between the tribal measurements and the dimensional measurements of the experimental group in the physical variables and the level of skill performance in the front acrobatic series under study, and in favor of the dimensional measurements are due to the nature of the proposed program using ballistic training, the skill performance is closely related to the special physical and motor capabilities, as mastery of performance depends Skill over the development of the requirements for this physical and motor ability to achieve the desired goal. (29: 220), in addition to regular and continuous training, and repeating performance by (3) units per week for a period of (12) consecutive weeks..

The absence of statistically significant differences between the tribal and the dimensional measurements of the control group in the physical variables in most of the measurements, although the mean differences in these measurements were in favor of the dimensional measurements, an improvement occurred in these measurements but did not reach the moral limits, to the nature of the program The applied differences, while statistically significant differences between the tribal and dimensional measurements of the control group in the level of skill performance in the front acrobatic series under study, and in favor of the dimensional measurements are due to the nature of the applied program, in addition to the regular and continuous training and repetition of performance at (3) units per week for a period of (12) Continuous week.

This is what achieves the results of the first hypothesis, as there are statistically significant differences between the pre and post measurements of the experimental group, and the control group in the special physical abilities variables and the skill performance of the front acrobatic series under study, in favor of the dimensional measurements.

The differences of statistical significance between the experimental group and the control group in the

dimensional measurements of the physical variables and the level of skill performance in the frontal acrobatic series under study, in favor of the experimental group, are due to the preference of using ballistic training with a high intensity of (80-90)% in developing physical capabilities. Ballistic training links training with weightlifting and ballistic training by lifting relatively light weights at high speeds. (10: 4), (19: 11), (25: 5) and include explosive movements against resistance at full speed to overcome the lack of speed resulting from training with heavyweights (3:16), and in the same direction of muscle work required to develop the explosive force, the distinctive force With speed and flexibility, which was a key factor in improving the level of performance in the acrobatic series under discussion, in line with the results of the studies of Yasser Ashour (1999), Maha Amin (2000), Muhammad Shawqi and Al-Busati (2002), Hosni Syed, Hazem Hassan (2003), Ashraf Abdel-Al and Mona El-Sayed (2003), Mohamed Jalal (2004), Asia Soliman (2005), which emphasizes the advantage of using plyometric training to improve explosive power, and the strength marked by speed and thus improve the level of skill performance. (27), (24), (20), (11), (7), (18), (6)

Plyometric Training is one of the effective and ideal training methods that are used in developing explosive force and in developing the muscles of the legs in particular, and it also helps to overcome problems that correspond to developing explosive strength. (34: 96), (31: 22), (1: 22), (28: 122), (12: 5), (4: 9), (18: 5)

Certain exercise tools and devices also helped in developing physical characteristics when used as additional loads to develop strength, as physical exercise programs improve muscle strength if exercises are used with body weight. (29:35), (30: 90)

The improvement in the strength marked by speed is due to the nature of the training program, which contained exercises for speed and strength using ballistic resistors using medical balls and free weights. (31: 81)

As a result of regular training, the muscular capacity improves, especially as it contains rated loads according to the individual abilities of each individual. (1: 134), and the efficiency of the muscular system increases by improving the muscle's ability to contract at a faster rate during the kinetic range of the joint, whether it is kinetic or stationary. (13: 114)

The improvement in flexibility is due to the nature of the training program by performing flexibility exercises in the warm-up and closing part of each training unit. Regular training contributes greatly to the increase and capacity of ligaments and tendons to elongation, which increases the extent of movement in the joints of the body and the development of flexibility. (1: 246)

Exercise tools and devices also contribute to developing joint and muscle work and increasing flexibility. (16: 257), improving the level of motor abilities in general and muscular endurance in particular. (33: 257)

The effectiveness of the training effects of regular exercise programs is to improve job capabilities, in addition to improving (strength, ability, flexibility, agility, endurance, and compatibility), and hence the level of skill performance. (32: 20)

This is consistent with the results of OLSEN (2003), Najwa Mansour (2007), Ahmed Khalifa (2008), Ihab Al-Ghandour (2010), Mohab Mousa (2011), Eslam Salim and Wael Al-Hawi (2013), which emphasized the effectiveness of ballistic exercises in Improving physical capabilities and skill level. (35), (26), (2), (10), (25), (5).

References:

1. **Abdel-Fattah,A,(1997)** : Sports Training - Physiological Basis, Dar Al-Fikr Al-Arabi, Cairo.
2. **Hassan , A. ,K,(2008)**: The effect of using combined-ballistic training on some physical and skill variables for basketball players, PhD thesis, Faculty of Physical Education, Minia University.
3. **Khalaf , A.,F. (2003)**: The effect of a ballistic training program on some physical, skill, and physiological variables of basketball players, Scientific Journal of Physical Education and Sports, Faculty of Physical Education for Boys, Helwan University.
4. **Abdel-Fattah, O. (2004)**: The effect of a training program using plyometric exercises on developing the muscular capacity and effectiveness of the skillful performance of field hockey players, Master Thesis, Faculty of Physical Education, Tanta University.
5. **Salim,E. & Al-Hawi,W.(2013)**: The effect of using ballistic resistance exercises with different intensity in improving some physical abilities among students of basic courses at the Arab Academy for Science and Technology, Theories and Applications Journal, special issue, the 11th International Scientific Conference for Physical Education and Movement Science - Sports between theory and practice , Part Two, Alexandria October 23-25, Scientific Journal of the Faculty of Physical Education - Abu Qir, Alexandria University.
6. **Suleiman, A(2005)**.: The effect of a biometric training program to develop explosive capacity on the technical performance level of the vaulting of the vicious cycle in rhythmic gymnastics, Master Thesis, Faculty of Physical Education for Girls, Alexandria University.
7. **Al Maraghy, A,& Abdel-ALM. (2005)**: The effect of using some muscular work methods to develop strength characterized by speed on the growth dynamics of some physical characteristics and the level of skill performance of the front somersault on a horse jumping, Theories and Applications Journal, No. (46), College of Physical Education for Boys Alexandria University.
8. **International Gymnastics Federation(2006)**: International Arbitration Law for men's gymnastics competitions in world championships, Olympics, regional and continental competitions, and international participations, translation by Salah Askar.

This is what achieves the results of the second hypothesis, as there are statistically significant differences between the experimental group and the control group in the dimensional measurements of the variables of special physical abilities and the skill performance of the front acrobatic series under study, in favor of the experimental group.

Conclusions:

- The effectiveness of using ballistic training in developing some physical specific abilities, and improving the level of skill performance in the front acrobatic series (handspring to forward somer sault straight to half forward somer sault straight) for floor exercises of gymnasts under13 Years where they excelled The experimental group over the control group in all measurements of physical variables and skill level performance.
- There is a high correlation between developing physical abilities and improving the level of skill performance.

Recommendations:

- The use of ballistic training (ballistic resistance exercises) in developing physical abilities, and improving the level of skill performance of gymnasts under 13 years.
- Carrying out studies to identify the different training effects of ballistic training in various sporting activities.

9. **Al-Bassati,A(1998):** Principles and Rules for Athletic Training and its Applications, Manshaet Al- Maaref, Alexandria .
10. **Al-Ghandour,E. (2010):** The Impact of a Training Program Using the Methods of Ballistic and Biometric Resistances in Developing the Muscular Ability of the Crushing Hitting Skill for Volleyball Youth, Master Thesis, Faculty of Physical Education, Tanta University.
11. **Ahmed,H.& Abdullah,H.(2003) :** The effect of special bio-training on developing explosive force and improving the technical performance of the front somersault followed by a half and forward rotating round on a jumping horse, Assiut Journal of Sports Science and Arts, Issue XVII, Part Two, Assiut University, November.
12. **Darwish,Z. (1998):** The Plyometric Training (Its Development - Its Concept - Its Use), Dar Al-Fikr Al-Arabi, Cairo.
13. **Al-Nimer,A,& Al-Khatib, N.(2007):** Weight Training - Designing Power Programs and Planning a Training Season, Markz AL-Ketab, Cairo.
14. **Abdel-Khalek, E.(2000):** Mathematical Training, Theories and Applications, Tenth Edition, Dar Al- Maaref, Alexandria.
15. **Talaat, A.(2003):** The effect of using ballistic resistance on some physical and skill variables of basketball players, Master Thesis, Faculty of Physical Education, Helwan University.
16. **Zahran,L. (1997):** Scientific and Practical Foundations for Exercises and Technical Exercises, Dar Al-Fikr Al-Arabi, Cairo.
17. **Allawi,M. & Radwan,M(2001):** Kinetic Performance Tests, Dar Al-Fikr Al-Arabi, Cairo.
18. **Galal,M.(2004):** The effect of the plyometric training on developing the distinctive force of speed and its relationship to the effectiveness of some of the most common offensive skills among karate players (11-13) years, Master Thesis, Faculty of Physical Education for Boys, Alexandria University.
19. **Ali,M.(2010):** The effect of a training program using ballistic resistance to improve muscle capacity and the digital level of the player pushing the shot, Master Thesis, Faculty of Physical Education, Tanta University.
20. **Al-Sebaei,M.& Al-Bisati ,A. (2002):** A study of the effect of plyometric exercises in the horizontal and vertical direction on the level of explosive power and speed compounds among some athletes. Theories and Applications Journal, No. (44) College of Physical Education for Boys, University of Alexandria .
21. **Hassanein,M.(2005):** Measurement and Evaluation in Physical Education and Sports, Part One, Sixth Edition, Dar Al-Fikr Al-Arabi, Cairo.
22. **Othman,M. (2000):** Training load, adaptation, and physiological responses to the stresses of training loads between theory and practice, first edition, Dar Al-Fikr Al-Arabi, Cairo.
23. **El-Shafei,M.(2005):** The effect of using bluefoot training on developing muscle ability and some offensive and defensive skills in handball, Journal of Theories and Applications, No. (55), Faculty of Physical Education for Boys, Alexandria University.
24. **Amin,M.(2000):** The Impact of Pleomeric Training on Some Biomechanical Variables and Improving the Performance of Front-End Skipping Skills on Hands, PhD Thesis, Faculty of Physical Education for Girls, Alexandria University.
25. **Mousa,M.(2011):** The Impact of Ballistic Resistance Training on the Effectiveness of Technical Performance of Squash Players, Master Thesis, Faculty of Physical Education, Mansoura University.
26. **Mansour,N.(2007):** The effect of two ballistic and cross training programs on some physical and motor variables of the handball beginners, Ph.D. thesis, Faculty of Physical Education, Minia University.
27. **Ashour,Y.(1999):** The effect of a proposed training program for developing the muscular capacity of the arms on the level of performance of the front somersaults on the gymnastics apparatus, Master Thesis, Faculty of Physical Education for Boys in Cairo, Helwan University.
28. **Dinitman, G.. et al (1998):** Sport speed, Second Edition, human kinetics publisher, champagne, Illinois .
29. **Gallahue, D. (1993):** Development Physical education of Today's Children, Second edition, Brown and Bench march, I.N.C, library of congress, U.S.A.
30. **Grenee, L. & Pate, R. (1997):** Training for Young distance runners, Human kinetics, Champion, U.S.A.
31. **Hebert, M(1991):** Insights and strogies fir minning Volleyball : university of Illinois Pres, Chompaing. Illinois.
32. **Jackson, L (1999):** Physical activity for health and Fitness, Human kinetics, U.S.A.
33. **Magill, R. (2001):** Motor Learning concepts and applications, 6th edition, MC Graw - Hill, New York, U.S.A.
34. **Moron, G & Meglynn, G.(1990) :** Dymonic of Strength Training Sports and Fitness, Bronn Publishers Dubuque Lowe .
35. **Olsen,P.D (2003) :** the effect of attempted ballistic training on the force and speed of movement, the journal of strength.may.
36. <http://www.sport.ta4a.net>