

Effect of a Program of Dynamic and Plyometric Exercises on Improving the Level of Performance of Dancing Elements in Artistic Gymnastics

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Research introduction and problem:

Assisting young athletes to get higher levels in different sports represents a practical product from the scientific research depends on planning to discover new training methods and techniques to fulfill sports achievements and to upgrade the level of the player maximally as possible. Essam Abdel Khalek (2005) indicated that the skill performance closely associated with special physical abilities. Mastery of the skill performance depends on the extent of the development of the requirements of such performance of special physical and dynamic abilities (12: 171).

The sport of artistic gymnastics has been developed quickly on the four apparatus for girls and the dynamic statement on floor exercise apparatus represents an associated blend of acrobatic skills and dancing elements

connected together to show the most precise performance (29: 150), (15: 14).

Dancing elements and vaults are essential in the floor statement having grades of difficulty as the exercise on the apparatus consists of acrobatic elements of minimum (3) elements, dancing elements of minimum (3) element, (2) optional elements (29: 150). In this context, Abdel Raouf Al-Hagrasi and Hadrat Hassanein (2010) showed that dancing elements were important as they were essential skills on the floor exercise apparatus and the its artistic performance needed moving in different directions and levels and coordinating body and arms movement. They also indicated that improving flexibility and strength should be considered in early age when training young female athletes (9: 469). The International Women's Judgment Act (2013-2016)

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zelements into (vaults, twists, swings and circles and balance) having four levels of difficulties A, B, C, D. The act stated sanctions and penalties

to the female player if missed such elements. Table (1) shows skills of dancing elements and their level of difficulties.

Table (1)
Group of dancing elements and their levels of difficulty on the floor

Difficulty level Dynamic groups	A	B	C	D	E	F	G	Total
Jumps, loops, vaults	١٢	١٣	٦	-	-	-	-	٣١
Twists	١	٦	٥	١	-	-	-	١٣
Total	١٣	١٩	١١	١				٤٤

Data in Table (1) illustrate the following:

1- The 1st group (loops, jumps, vaults) contains (31) gymnastic skills graduated in difficulty from (A) to (C).

2- The 2nd group (twists) contains (13) twists graduated in difficulty from (A) to (D) i.e. it is graduated in difficulties having the following values:

A= 0.10 score.

B= 0.20 score.

C= 0.30 score.

D= 0.40 score.

Thus, indicating the importance of the group of dancing elements in raising values of dynamic movements

together with assuring their best performance (29: 182).

Mohammed Ibrahim Shehata and Sabah Kuarouz (2007) confirmed that dancing elements were important for female artistic gymnasts who should train on all details of such elements and they should improve the relevant physical fitness components i.e. flexibility, strength and balance (16: 63).

Also many specialists in the field of gymnastic training confirmed that dynamic skills were associated with physical fitness and well organized physical preparation and reaching several techniques for

developing other physical properties such as flexibility and balance on devices in general and floor exercise apparatus in particular as Bart Coner (2002) and Peter & Werner (2003) indicated that goals of physical and skill preparation in gymnastics should be abstracted in the training process to get the maximum value of elements of evaluation of performance on apparatus and exercises used should be originated from the nature of performance of gymnastic skills (33, 89), (24,45).

Nariman Al-Khatib & Abdel Aziz (2015), Abdel Raouf Al-Hagrasi (2010) and Mohammed Ibrahim Shehata (2013) agreed that general and ,developing gymnastic dynamic skills and they also agreed that loads should be rated to suit player's possibilities and to achieve a developed and consistent body (18: 19-22) (9: 54,55)(15: 40).

Several researchers achieved that training should be integrated and not individualized and more than one type of exercises should be mixed for reaching strength such as mixing plyometric

and weight training or aerobic and anaerobic training and this mixing allowed achieving higher physical loads than training individually, hence, producing a greater amount of power and flexibility as Donald Chu (2000) and David & Waddle (2002) thought that it would be a surprise if muscle strength exercises could be performed with flexibility and stretching exercises in the same program because strength could depend on muscle stretch and joints (26: 65), (25: 57: 503).

ariman Al-Khatib et al (c. f. Wilmore (1997) confirmed that limited flexibility at a joint and short working muscles led to shorter dynamic range and hence, missing some of strength distinguished by speed. Amira Mattar et al (2015) and Naila Khalifa et al (2014) agreed to balance between stretching and strength and to mix them to decrease overload and conditioning the body with the requirements of the skill level (19: 199), (20: 182), (3: 150).

oke (1998) confirmed that in spite of applying stretching and strength exercises on purpose to

increase dynamic range in joints, researches of the effect of this development on the level of performance were still few (32: 411).

The researcher thinks that dancing elements are greatly important in preparing young female artistic gymnasts as such skills have special effect on evaluation. The value of dancing elements on the floor exercise apparatus is (0.50) score when performed and this value is decreased when excepted in addition to the important role played by dancing element group in the connection value on the apparatus of (0.10) to (0.2) of the connection score. In the light of the levels of the committee (A) to evaluate the statements of games of difficulty, requirements and values of connection, the coach must design a physical and skill preparation program in respect of most difficulties matching the girl's abilities then placing a plan to master such difficulties and to achieve elements and requirements on the apparatus in addition to benefit from enhancements to raise the level of dynamic statement according to

enforcements stated by the International Judgment Act. The researcher thinks that stretching exercises particularly dynamic stretching exercises have an active role in developing dancing element skills (29: 152). The International Judgment Act (2013-2016) indicates that factors of evaluation of dynamic The International Judgment Act (2013-2016) indicates that factors of evaluation of dynamic The International Judgment Act (2013-2016) indicates that factors of evaluation of dynamic statement are (difficulties, performance requirements, enhancements) of a committee (A) and a committee (B). On the basis of the foregoing and through her working in the field of gymnastics and judgment, the researcher noticed that most female gymnasts were facing discounts as they were unable to master some dancing elements, lack of continuity, rhythm in the statement, upgrading the level of difficulty and diversity of different dynamic groups. Also the researcher noticed that dancing elements were

essential requirements, however, coaches have not greatly considered them causing a discount in the final score of the statement. Having reviewed the new in the field of gymnastic training, the researcher knew that it was important for the female gymnast to improve strength together with flexibility to improve the skill performance of dynamic statements on the apparatus particularly dancing elements that should be considered to improve the artistic and aesthetic performance. The researcher attributed this decrease to lowering the levels of muscle power and thighs flexibility and lack of stability after dismount from each dancing skill. Therefore, the researcher thinks that mixing stretching exercises with the plyometric are important to improve the range and height in line with what illustrated by Nariman Al-Khatib and Abdel Aziz Al-Nemr (2015) that the prevailing belief that the development of strength negatively affects the level of flexibility has no basis of correctness as it has proved that increasing the level of

flexibility led to improvement of strength (18: 233).

Also Khairy Al-Sokari & Mohammed Braikaa (2005) indicated there were prevailing incorrect concepts about plyometric exercises to train young players as such exercises improved strength, velocity, agility and artistic status in several sports particularly the sport of gymnastics (6: 26).

From these facts the idea of the current research originated to establish a proposed program focusing on strengthening muscles working in the selected skills and stretching the corresponding muscles to upgrade the skill level through blending dynamic stretching exercises with plyometric exercises for legs, buttocks and using assisting tools such as ropes, boxes, balls, Swedish benches and stag leap and to know its effect on improving the level of performance of dancing elements on the floor apparatus.

Research objective:

To design a proposed program of dynamic stretching and plyometric exercises and identify its effect on improving

the level of performance of dancing elements on the floor apparatus.

1- Specific physical fitness represented by (muscle power of legs, flexibility of thighs, dynamic and static balance and coordination.

2- Improving the level of performance of dancing elements on the floor apparatus according to enforcements under 13 years.

Research hypotheses:

The proposed program of dynamic stretching and plyometric exercises effects on the following:

1- There are statistically significant differences between the experimental and control groups in the specific physical variables represented by (muscle power of legs, flexibility of thighs, dynamic and static balance and coordination) and for the benefit of the experimental group.

2- There are statistically significant differences between the experimental and control groups in the Improving the level of performance of dancing elements on the floor apparatus according to enforcements under 13 years.

Research terminology:

1- Dynamic stretching:

Exercises include dynamic parts of the body gradually reach a speed or movement consisting of swings and reaching the body to the intended dynamic range (36).

Nariman Al-Khatib & Abdel Aziz Al-Nemr (2015) defined them that they were exercises to increase the dynamic range of joints and muscles such as rhythmic moves, reverse vault and swings (18: 124).

2- Flexibility and stretching:

- Stretching:

Increasing the range of move of a muscle or a group of muscles (18: 115).

- Flexibility:

Increasing the range of move of a joint or a group of joints (Nariman: 119).

3- Plyometric exercise:

Bastawisi Ahmed (2014) defined it as a technique and a system of a group of exercises depended on the muscle elasticity to gain it a high dynamic power through the highest strength and the highest possible velocity (4: 193).

Nariman Al-Khatib & Abdel Aziz Al-Nemr (2015) defined it as exercises that require

performing stretching muscular work followed by shortening muscular work to develop the explosive power (18: 179).

Dancing elements:

They are a sort of skills where the body moves in different directions and levels requiring coordination between the body and arms movements (9: 469).

They are a dynamic gymnastic group including jumps, loops, vaults, twists, balancing movements and elements of difficulty in the dynamic statement in addition to the connecting element (procedural definition).

Research procedures:

I. Method:

To achieve the research objectives, the researcher used the experimental method of the pre and post-measurements and for experimental and control groups.

II. Research community:

Young females of Egyptian Gymnastics Academy at Faculty of Physical Education for Girls, Jezira under 13 years in 2013/2014 academic year.

Sample:

The researcher selected the research sample intentionally including (20) young female artistic gymnasts under (13) years of (145) cm in height and (41) kg in weight. The sample was divided into two groups of (10) girls each to represent the experimental and control groups.

Pre-measurement

The researcher conducted the pre-measurements of the sample in the following physical variables:

- **Measurement of height.**
- **Measurement of weight.**
- **Training age.**

Also the researcher carried out homogeneity between age, height and weight as stated in Table (2):

**Table (2)
Characteristics of the research sample**

Variables	Units	X	SD	M	Skewness coe.
Age	Yr.	13.79	1.34 ±	13.6	0.10
Height	cm	151.6	7.6 ±	147.11	0.97-
Weight	cm	40.47	4.01 ±	40.78	0.46

Data in Table (2) show that values of skewness coefficients are in the limit between (±3)

indicating that the research sample is homogeneous.

Physical variables:

- Power of muscles of legs.
- Thigh flexibility.
- Dynamic balance.
- Static balance.
- Test of skipping rope (coordination).
- Test of twisting accurately.
- Measuring the level of performance of dancing elements in the statement of the floor movements listed in enforcements stated by the International Judgment for young females under (13) years and those are:
 - 1- 180° straddle leap in cross position.
 - 2- Bent straddle vault skill.
 - 3- 180° straddle leap with leg change.
 - 4- Circle leap.
 - 5- Circle leap with leg change.

The level of skill performance was evaluated by four judges having certificates of artistic gymnastic judgment. They are members of teaching board at Faculty of Physical Education for Girls, Al-Jezira for young females under (13) years. Each judge gave a score for dancing element skills of total five scores for each skill.

Applying the program:

It was applied in the hall of Egyptian Gymnastics Academy, Al-Jezira, in the period from Sunday, 8/12/2013 to Thursday, 6/2/2014. The

researcher supervised the program application throughout the training duration.

The program content:

The program lasted (12) weeks of dynamic stretching and plyometric exercises by three training units a week of total (36) training units for (50 to 60) min per training unit according to exercises in its content and training load in each unit containing the following:

- I- Warm-up:
- II- Other stretching exercises then dynamic stretching exercises.
- III- Weight exercises then plyometric exercises.
- IV- Exercises on dancing elements (skill part).
- V- Stretching exercises then calm down.

Post-measurements:

The researcher conducted the post-measurements of the research sample in the three variables and the level of performance of dancing elements within one week after the end of the training program on Wednesday, 12/2/ 2014 and Thursday, 13/2/2014 similarly as done in the pre-measurements.

Statistical treatments:

- They were as follows:**
- Arithmetic mean.
 - Standard deviation.
 - Skewness coefficient.

- T-Test.
Presentation and discussion of results:
I- Presentation of results:

Table (3)
Differences between the experimental and control groups in the pre-measurement n=20

Items	Tests	Experimental group		Control group		t-value	Sig.
		X ⁻	SD	X ⁻	SD		
Physic	Repeated vault (leg ability)	1.1.1.	1.1.1.	1.1.1.	1.1.1.	0.000.	1.000.
	Swinging legs in directions, thigh flexibility	2.5.0.	0.270.	2.3.0.	0.270.	0.880.	0.380.
	Leg split (flexibility)	6.0.0.	0.170.	6.0.0.	0.170.	0.000.	1.000.
	Walking over a low beam (dynamic balance)	5.0.0.	0.670.	4.9.0.	0.670.	3.180.	0.080.
	Stork or heron stand (static balance)	2.5.0.	0.270.	2.1.0.	0.270.	1.39.	0.180.
	Skipping rope (coordination)	2.3.0.	0.270.	2.3.0.	0.270.	0.000.	1.000.
	Accuracy of twisting	1.45.	0.370.	1.45.	0.370.	0.000.	1.000.
Dancin	Straddle leap skill	8200.	2000.	9000.	1740.	8780.	3910.
	Leap with leg change	7500.	1670.	7700.	1840.	3180.	0.080.
	Circle leap	8000.	2290.	9000.	2290.	1.4.	0.170.
	Circle leap with change	7200.	1840.	7200.	1840.	0.000.	1.000.
	Bent straddle vault	9000.	1080.	9700.	0.790.	4470.	0.600.

Calculated T = 2.09
 Data in Table (3) indicate that there are no significant differences between the experimental and control

Significant level at 0.05 groups in the pre-measurement indicating that the two groups are equivalent.

Table (4)
Differences between the experimental and control groups in the post-measurement n=20

Items	Tests	Experimental group		Control group		t-value	Sig.
		X ⁻	SD	X ⁻	SD		
Physical variables	Repeated vault (leg ability)	١٤.٨٠	٤٢١0.	١٠.٩٠	٨٧٥0.	*١٢.٦٩	.٠٠٠
	Swinging legs in directions, thigh flexibility	٥.٠٠	٠٠٠0.	٢.٦٠	٥١٦0.	٠٠٠0.*	.٠٠٠
	Leg split (flexibility)	٣.٣٠	٤٨٣0.	٦.٢٠	٦٣٢0.	*١١.٥٢	.٠٠٠
	Walking over a low beam (dynamic balance)	٩.٨٠	٤٢١0.	٥.٦٠	٥١٦0.	*١٩.٩٢	.٠٠٠
	Stork or heron stand (static balance)	٥.٥٠	٥٢٧0.	٢.٤٠	٧٣٧0.	*١٣.٢٨	.٠٠٠
	Skipping rope (coordination)	٥.٠٠	٠٠٠0.	٢.٥٠	٥٢٧0.	*١٥.٠٠	.٠٠٠
	Accuracy of twisting	٤.٠٠	٠٠٠0.	٢.٣٠	٤٨٣0.	٠٠٠0.*	.٠٠٠
Dancing elements	Straddle leap skill	١.٩٠	٢١٠0.	١.٠٢	٠٧٩0.	*١٢.٢٨	.٠٠٠
	Leap with leg change	١.٨٥	٢٤١0.	٩٥٠0.	١٠٥0.	*١٠.٨٠	.٠٠٠
	Circle leap	١.٨٥	٢٤١0.	٩٠٠0.	١٢٩0.	*١٠.٩٧	.٠٠٠
	Circle leap with change	١.٩٥	١٥٨0.	١.٠٠	٠٠٠0.	*١٩.٠٠	.٠٠٠
	Bent straddle vault	١.٩٥	١٥٨0.	١.٠٥	١٠٥0.	*١٤.٩٧	.٠٠٠

Calculated T = 2.09

Data in Table (4) illustrate that there are significant differences between the experimental and control

Significant level at 0.05

groups in the post-measurement in all variables under investigation.

Table (5)
Differences between the pre- and post-measurements and percentages of improvement in the experimental group
n=10

Items	Tests	Experimental group		Control group		t-value	Sig.	Impr. %
		X ⁻	SD	X ⁻	SD			
Physical variables	Repeated vault (leg ability)	10.10	1.10	14.80	4210.	*12.81	....	47.0
	Swinging legs in directions, thigh flexibility	0.00	0270.	0.00	0000.	*10.00	....	100.0
	Leg split (flexibility)	7.00	8160.	3.30	4830.	*8.06	....	40.00
	Walking over a low beam (dynamic balance)	0.00	7660.	9.80	4210.	*37.00	....	97.00
	Stork or heron stand (static balance)	2.00	0270.	0.00	0270.	*10.06	....	120.0
	Skipping rope (coordination)	2.30	4830.	0.00	0000.	*17.77	....	117.4
	Accuracy of twisting	1.40	4270.	4.00	0000.	*18.41	....	170.8
Dancing elements	Straddle leap skill	8200.	2000.	1.90	2100.	*12.83	....	130.0
	Leap with leg change	7000.	1660.	1.80	2410.	*14.40	....	147.7
	Circle leap	8000.	2290.	1.80	2410.	*12.87	....	131.2
	Circle leap with change	7200.	1840.	1.90	1080.	*10.08	....	169.0
	Bent straddle vault	9000.	1080.	1.90	1080.	*13.41	....	100.2

Calculated T = 2.09

Data in Table (5) illustrate that there are significant differences between the pre and post-measurements of the experimental group in physical

Significant level at 0.05

and skill tests under investigation in favor of the post-measurement and percentages of improvement

vary towards their response to tests under investigation.

Table (6)
Differences between the pre and post-measurements and
percentage of improvement in the control group
n=10

Items	Tests	Experimental group		Control group		t-value	Sig.	Impr. %
		X̄	SD	X̄	SD			
Physical variables	Repeated vault (leg ability)	10.10	1.10	10.90	1.70	*2.44	0.37	8.00
	Swinging legs in directions, thigh flexibility	2.30	4.83	2.60	0.16	*1.10	279	13.00
	Leg split (flexibility)	6.00	1.16	6.20	6.32	*.688	0.09	3.30
	Walking over a low beam (dynamic balance)	4.90	7.37	0.60	0.16	*2.68	0.20	14.2
	Stork or heron stand (static balance)	2.10	7.37	2.40	7.37	1.40	193	14.2
	Skipping rope (coordination)	2.30	4.83	2.00	0.2	1.00	343	8.7
	Accuracy of twisting	1.40	4.37	2.30	4.83	*6.03	0.00	58.6
Dancing elements	Straddle leap skill	9.00	1.74	10.2	0.79	1.86	0.96	13.3
	Leap with leg change	7.70	1.84	9.00	1.00	*2.68	0.20	22.0
	Circle leap	9.00	2.29	9.00	1.29	0.14	719	0.3
	Circle leap with change	7.70	1.84	10.00	0.00	*4.71	0.01	33.00
	Bent straddle vault	9.70	0.79	10.00	1.00	1.96	0.81	7.7

Calculated T = 2.09

Significant level at 0.05

Data in Table (6) show that there are significant differences between the pre and post-measurements of the control group in favor of the post-measurement in measurement of physical

variables such as repeated vault, walking-over a low beam and accuracy of twisting whereas there are no significant differences in the rest of physical tests. Also there are significant

differences in the skill measurement such as leap with leg change and circle leap whereas there are no significant differences in the rest of skill tests under investigation. Percentages of improvement are varied.

III. Discussion of results:

Data in Table (3) illustrate that there are significant differences between the pre and post-measurements of the experimental group in favor of the post-measurement in all tests of physical variables under investigation represented by leg muscle power expressed by test of vaulting, tests of thigh flexibility expressed by test of swinging legs in direction, tests of coordination expressed by test of skipping rope and test of accuracy of twisting.

The researcher attributed this improvement to use dynamic stretching exercises mixing with plyometric exercises, strengthen the operating muscles and stretch the corresponding muscles by using assisting tools such as wall horizontal bar, Swedish pinches, special balance beam, mats, boxes of different heights, free weights. Such

exercises were selected carefully and intensity, number of repetitions and rest intervals between such exercises were assigned to suit the age of young female gymnasts (13yr) that this age is suitable to use stretching exercises and mixing them with strength exercises represented by plyometric exercises to produce the utmost power, velocity and flexibility. In this context, Abdel Aziz Al-Nemr & Nariman Al-Khatib (2015), Khairyra Al-Sokari & Mohammed Braikaa (2005) and Bastawisi Ahmed (2014) indicated that it should be important to consider the sport of gymnastics in early ages and to develop special skills and dynamic abilities through rating programs of training loads in the sports season to suit possibilities and power of players and to achieve harmonious development Nariman (19-22), (4: 26), (6:50).

Those agreed with the study of Ghidaa Abdel Shakour (2011) (3), Azza Ali Kasem (2011) (11) and Lamiaa Ali (2008) (14) who illustrated that preparatory training programs had a positive role in developing physical variables

of gymnastic apparatus. Data in Table (6) show that there are significant differences between the pre and post-measurements in favor of the post-measurement of the control group with the exception of swinging leg test and static balance and in spite of the weakness of the significance parameter, we could not neglect the effect of the traditional program followed in Egyptian Gymnastics Academy for young female gymnasts.

The researcher recommended that mixing dynamic stretching exercises with plyometric exercises by applied as they had effective role in improving physical variables related to gymnastic apparatus. Mohammed Ibrahim Shehata (2003) stated that physical preparation of young female beginners was important as the skill was new and not gained and focusing on improving general and special physical fitness to support the skill preparation (15: 24, 247).

Data in Table (4) show that there are significant differences between the experimental and control groups in post-measurement of all tests of essential physical variables of

floor apparatus in favor of the experimental group meaning that the proposed exercises contributed to the positive effect in the experimental group as compared to the program followed by the control group and the researcher attributed this difference to the training plan used as the young female gymnasts in the experimental group passed through grades in loads of general constructive and special exercises suitable for the age of (13) years. Also the researcher used a form to record data to evaluate the level of progress during the preparation phase and to introduce the following phases. Avery, D et al (2000) and Peter & Werner (2003) insisted that the training academic year should be planned and divided into smaller training phases and physical and skill preparation minutes should be considered to assure of success to reach the top in events (33:89), (22: 202).

Those agreed with the study of Brent et al (2006)(23), Azza Ali Kasem (2011) (11), (33), Thomas et al (2007) (34) who insisted on selecting the best method to develop

physical fitness related to the sport of gymnastics and that the plyometric training of high and low intensities led to improve the level of power.

Also Nariman Al-Khatib and Abdel Aziz Al-Nemr (2015) confirmed that stretching exercises were important to increase the dynamic range considered the most important element to improve the skill level and thus achieving the 1st hypothesis stating, “the proposed program of dynamic stretching and plyometric exercises effects on the special physical variables represented by muscle power of legs, flexibility of thighs, dynamic and static balance and coordination”.

Data in Table (5) illustrate that there are significant differences between the experimental and control groups in the post-measurement of the level of performance of dancing elements of enforcements under (13) years on the floor apparatus in favor of the experimental group.

The researcher attributed such differences to the effectiveness of mixing dynamic stretching exercises

with plyometric exercises as the training program consisted of static stretching exercises at the beginning of the program then dynamic stretching such as swings, rhythmic vaults and plyometric exercises used boxes divided into different heights to perform vaults by using Swedish benches and making loops on such boxes and ropes and the special low balance beam.

Twists and turns were trained on the floor apparatus. Physical and skill preparation and dancing skills were mixed and repeated several times represented by twists, vaults, loops, jumps and stability. Abdel Raouf Al-Hagrasi & Hadiat Hassanein (2010) and Mohammed Ibrahim Shehata & Sabah Farouk (2007) indicated that dancing elements were important for gymnasts particularly young female as they played a great role in raising the level of dynamic statement in addition to using such skills to move from skill to another as connecting moves (16:2) (9:469) and those agreed with the study of Azza Ali Kasem (2011) (11), Ghidaa Abdel Shakour (2011) (13), Lamiaa Ali Abdel Rahman

(2009) (14), Dalia Al-Hussari (2011) (7), Faigenbaum, Avery D. et al (2009) (28) and Brent et al (2006) (23) who used most of such studies in flexibility exercises only or in strength exercises only and the current study was unique in using a mix of dynamic stretching exercises with plyometric exercises and the researcher used assisting tools to train on twists, vaults, balancing and stability movements leading to increase the level of skill performance and skills of dancing elements assigned in enforcements of young female under (13) years and thus achieving the 2nd hypothesis stating, “the proposed program of dynamic stretching and plyometric exercises

effects on improving the level of performance of dancing elements on the floor apparatus according to enforcements under 13 years.

Conclusions:

1- The program of dynamic stretching and plyometric exercises had a positive effect on improving physical variables related to young females under (13) years.

2- The program of dynamic stretching and plyometric exercises had a positive effect on improving the level of performance of dancing elements of enforcements of young females under (13) years on the floor exercises apparatus.

Recommendations:

1- The program of dynamic stretching and plyometric exercises should be applied during the preparation phase (the phase of pre-competition).

2- The proposed program should be applied for longer time and to different ages as the program used easy and simple tools and apparatus leading to improve the level of skill performance on gymnastic apparatus.

3- The proposed program should be applied to other apparatus in artistic gymnastics such as balance beam.

4- The results of the current study and program should be directed to persons working in the field of training artistic gymnastics.

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