Effectiveness of specific exercises on improving Physical abilities performance level of some Volleyball similar performance attack skills

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Introduction

Volleyball characterized with diversity of its basic motor skills, which is of the important aspects game tactical aspects built on it. Success of any team in winning depend basically on players mastering basic skills performance and their ability to implement its various types with large coordination and lowest errors; thus increase chances to win tournaments. Volleyball basic motor skills are divided into attack skills (serve – passing – spike – attack block) and defense skills (serve receiving - defensive block – playground defense) (Hassan, 1998, 211)

Attack skills differ in their importance in terms of getting match points; but they all are equal in that players should master. It also may be different or similar in technical performance method or some of its phases. While attack block performance differ than spike, spike is similar to spike serve in technical performance phases. Tactical use of skill performance and game rules developments resulted in multiple types of those similar skills like back row attack and float jump serve.

Volleyball player's motor and skill performance level depend on player's ability to exploit his physical abilities to achieve skill objectives, according to its motor construction and requirements. The relationship between volleyball basic and various physical requirements (general and specific) is close relationship, which should be taken into account in players' preparation. This is possible by using exercises, which coincide with skill motor performance nature, through using same working muscles and motor path for the skill; which have greatest effect on improving physical abilities and thus in turn motor skills performance level. (Al-Geyoshy, 1999, 4)

Specific exercises play important role in raising skill performance level skills and access high performance levels, as they provide good opportunity to raise performance level. It is a set of exercises and drills similar in motor and dynamic composition with skill performance, therefore they achieve maximum specialization in skill performance development in terms of quality, type and time, in accordance with intraday using of muscles or working muscle groups in performance. These exercises as helping exercises aim to prepare and develop specific motor skills for sports activity attempting to run and build body with what commensurate with skills requirements. (Qasem, 1999, 22) (Qutb, 2004, 6)

Specific exercises also contribute to correct body positions in skill performance, which reflected on motor skills performance Technique. It also used for preparation purpose to learn various sports movements and skills (Al-Gebali, 2000, 138), (Qutb, 2004, 19)

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Due to importance of each serve and attack spike and their influence on games results, and through researchers work in volleyball coaching and teaching volleyball curriculum at Faculty of Physical Education, they observed variance in volleyball jump similar skill performance level. Despite of motor path similarity, there are many shortcomings, especially low technical performance level of some of them, or emergence of many errors during technical performance stages of one of the skills and not in others. In addition researchers noted that Egyptian men team occupied late ranking in the latest world cup championships; 12^{th} and last rank in 2003and 2011 and 10^{th} rank in 2007. This sparked researchers thinking about low level of Volleyball Egyptian team and called them to conduct this study to identify effectiveness of Volleyball skills in general (spike- serve-attack block and passing), and in particular similar performance attack skills (spike- back row attack – spike serve – jump float serve) for volleyball teams participated in Japan 2011 volleyball world cup. As per teams final rank Egypt team skill effectiveness was low, compared to other teams in volleyball similar performance attack skills in that world cup champion. (Federation International De Volleyball, 2011)

In spite of that there are many studies addressed volleyball attack skills from many research trends and various aspects and work to build training programs to upgrade its technical level, however, such studies did not address identifying the effect of specific exercises on some similar performance attack skills.

That prompted researchers to make reference survey about scientific studies on building training programs to upgrade similar performance attack skills (spike- back row attack-spike serve-jump float serve) based on specific exercises. As far as researchers know, there is no study addressed that area, the matter which called the researchers to conduct this study to identify effect of specific exercise on some similar performance attack skills, to help in simplifying training and teaching procedures measures on one hand, and raise performance level on the other hand. Researchers believe that volleyball, same as other activities need using scientific method to develop and follow-up its players' preparation programs.

Research objective:

General aim is to identify effectiveness of specific exercises on improving performance level of some Volleyball similar performance attack skills, which may achieved through the following:

1- Identify difference significance between pre and post physical abilities measurements for volleyball players experimental group

2- Identify difference significance between pre and post some volleyball similar performance attack skills measurements for volleyball players experimental group

Research hypotheses:

1- There are statistically significant difference between pre and post physical abilities measurements for volleyball players experimental group in favor of post measurement.

2- There are statistically significant difference between pre and post some volleyball similar performance attack skills measurements for volleyball players experimental group in favor of post measurement

Research procedures:

I - Research methodology:

Experimental methodology used with one experimental group and pre-post measurements as it suits researcher nature and objectives

II - Research sample:

Research sample selected intentionally form Faculty of Physical Education volleyball team participated in universities championship. Sample consisted of (15 players).

III – Research domains:

- Time domain: during the training season from 27/05/2015 to 31/08/2015.
- Spatial domain: Volleyball courts at Faculty of Physical Education for Men Alexandria University.

IV- Research Tools: -

Through scientific references, specialized researches and network information available to researchers in volleyball training and physical exercise filed, research tools identified, namely: (physical abilities tests – similar performance attack skills technical performance tests) (appendix 1), which its reliability and validity determined in many references and studs. (Abdel-Rahman, 2001, Hussein, 2001, Kandil, 2005, (Khalifa, 2007, Al-Tayeb, 2008, Al-Ghandour, 2010, Al-Shalakany, 2011 and Shawki, 2012).

V- Sample homogeneity:

Sample homogeneity insured in basic variables, physical abilities related to volleyball similar performance attack skills, in addition to technical performance klevel of theses attack skills (tables 1 and 2)

Table (1) statistical indicators for basic variables, physical abilities associated with volleyball similar performance attack skills within study sample before experiment

n=15

variables / Statistics			Measuring unit	Mean	Standard deviation	Skewness coefficient	kurtosis	Differentiation coefficient %
Basic variables	Height		(cm)	179.07	3.90	0.18	1.69	2.18
	Weight		(kg)	72.20	2.86	-0.59	-0.58	3.96
	age		(year)	18.95	0.78	0.15	-1.30	4.13
	practice years		(years)	6.20	0.77	0.38-	1.12-	12.49
Force endurance	sitting from lying	30 seconds	(number)	21.84	1.79	0.62	-0.76	8.20
	Bend arms from oblique prostration		(number)	24.36	2.01	-0.17	0.03	8.24
	Trunk lifting high form		(number)	24.93	1.91	-0.39	0.06	7.65
Muscles abilities	Vertical jump from stability		(cm)	51.80	1.66	1.24	1.67	3.20
	Vertical jump from movement		(cm)	55.67	4.08	0.53	0.75	7.33
	Wide Jump from stability		(cm)	2.38	0.03	-0.19	-0.93	1.37
	Pushing 3 kg medical ball	Right arm	(meters)	7.58	0.33	-1.07	-0.20	4.29
		Left arm	(meters)	7.20	0.08	0.31	-1.58	1.15
		Both hands	(meters)	7.85	0.32	-0.63	0.31	4.14
speed	Maximum	20 m running	(seconds)	2.88	0.23	-0.92	-0.07	8.06
	Motor	run in place 15 seconds	(number)	27.47	1.96	0.68	0.63	7.13
Flexibility	trunk bend back from prostration		(cm)	32.93	3.75	-0.25	-1.29	11.39
	trunk slant forward from setting		(cm)	10.27	0.12	-1.83	2.57	1.16
agility	(9-3-6-3-9) bend		(seconds)	8.83	0.04	-2.30	1.40	0.47
	Zigzag running		(seconds)	15.16	0.14	0.30	-1.00	0.95
coordination	tennis ball throwing and receiving on wall		(number)	18.25	0.18	-0.39	-1.84	0.97

Table (1) results indicate that skewness coefficient range between (-2.30) and (1.24), values between (±3); this confirms that sample is free from abnormal distributions defects. It is also clear that differentiation coefficients range between (0.47%, 12.49%), a value less than 20% of the average, the matter that shows sample homogeneity in all variables under consideration.

Table (2) statistical indicators for volleyball similar performance attack skills within study sample before experiment (n=15)

variables / Statistics			Measuring unit	Mean	Standard deviation	Skewness coefficient	kurtosis	Differentiation coefficient %
back Row Attack	From Position 1	to position 1	(marks)	7.67	0.62	0.31	-0.40	8.05
		to position 5	(marks)	7.67	0.72	0.63	-0.65	9.44
		to position 6	(marks)	6.53	0.92	-0.76	-0.36	14.01
	From Position 6	to position 1	(marks)	6.47	0.74	1.34	0.47	11.49
		to position 5	(marks)	5.93	0.96	0.15	-2.09	16.20
		to position 6	(marks)	5.07	0.70	-0.09	-0.67	13.89
Spike	From Position 2	to position 1	(marks)	6.53	1.06	-0.10	-1.07	16.23
		to position 5	(marks)	6.40	0.99	0.06	-0.81	15.40
		to position 6	(marks)	5.80	1.01	1.40	1.40	17.49
	From Position 4	to position 1	(marks)	5.87	0.92	0.94	0.52	15.60
		to position 5	(marks)	6.47	0.83	0.55	-0.04	12.89
		to position 6	(marks)	5.93	0.96	1.26	1.42	16.20
Jump serve	Jump spike serve		(marks)	17.67	2.66	0.13	-1.44	15.08
	Jump float serve		(marks)	15.47	2.39	0.85	0.60	15.43

Table (2) results indicate that skewness coefficient range between (-0.76) and (140), values between (±3); this confirms that sample is free from abnormal distributions defects. It is also clear that differentiation coefficients range between (8.05%, and 17.49%), a value less than 20% of the average, the matter that shows sample homogeneity in all variables under consideration.

VI- The proposed training program: -

Training program standardization:

- **Appropriate training phase** to implement the training program determined to be in preparation phase.
- **Time** (number of weeks) appropriate for training program implementation determined to be (12) weeks, distributed on general preparation, specific preparation and preparation for competition phases.
- **Training sessions per week** determined to be (4) training sessions/week.
- **Daily training session time:** 120 minutes
- **Daily training session components** training sessions divided into
  - **Warm-up**: aiming to body general preparation (15 minutes)
  - **Main part**: aiming to achieve session objectives, it includes physical, skill and tactic preparation (100 minutes).
  - **Cool-down**: aiming to return to normal state through relaxation exercises (5 minutes).
- **Training method**: periodical training with low and high intensity as it appropriate to research nature and objective
- **Training load during training sessions:** (1: 1) - (1: 2) system.
- **Training loads**: Maximal, sub-maximal, and average loads determined as illustrated in table (3)

Table (3) Training load used in training program, percentages and exercise Repetition

Load intensity	Percentage		Repetition	
Maximal	90-100%	98-100%	1-5 times	once
		96-98%		twice
		94-96%		(3) times
		92-94%		(4) times
		90-92%		(5) times
Sub Maximal	75-90%	87-90%	6-10 times	6 times
		84-87%		(7) times
		81-84%		(8) times
		78-81%		(9) times
		75-78%		(10) times
Average	50-75%	72.5- 75%	11-20 times	(11) times
		70. 72.5%		(12) times
		67.5- 70%		(13) times
		65- 67.5%		(14) times
		62.5- 65%		(15) times
		60-62.5%		(16) times
		57.5- 60%		(17) times
		55-57.5%		(18) times
		52.5- 55%		(19) times
		50 52.5%		(20) times

Training load distribution during the proposed program: -

- **Training load intensity distribution as per training phases and proposed program weekly training sessions**

  Researchers distributed Training load for training phases and proposed program weekly training sessions as illustrated in the following figure

Training phases		General Preparation (Establishing)			Specific Preparation					Preparation for competitions			
Weeks		1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th	11th	12th
Weekly session load intensity	Maximal												
	Sub Maximal												
	Average												
Percentage		65%	70%	75%	70%	85%	90%	70%	90%	85%	70%	80%	75%

Figure (1) Training load intensity distribution as per training phases and proposed program weekly training sessions

- **Training load intensity distribution as per training phases and proposed program daily training sessions**

  Researchers distributed Training load for training phases and proposed program daily training sessions as illustrated in the following figures

Weeks		1st				2nd				3rd			
Daily training session		1	2	3	4	5	6	7	8	9	10	11	12
Daily session load intensity	Maximal												
	Sub Maximal												
	Average												
Percentage		50%	75%	60%	75%	70%	75%	85%	70%	80%	70%	85%	65%

Figure (2) Daily Training loads for the proposed training program during general preparation period

Weeks		4th				5th				6th				7th				8th			
Daily training session		13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
Daily session load intensity	Maximal																				
	Sub Maximal																				
	Average																				
Percentage		60%	80%	65%	75%	85%	95%	75%	85%	95%	85%	95%	85%	95%	75%	75%	65%	85%	95%	85%	95%

Figure (3) Daily Training loads for the proposed training program during specific preparation period

Weeks		9th				10th				11th				12th			
Daily training session		33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48
Daily session load intensity	Maximal																
	Sub Maximal																
	Average																
Percentage		80%	85%	90%	85%	95%	70%	75%	70%	85%	85%	70%	75%	70%	85%	80%	65%

Daily training session time and percentage distribution during program phases

In light of training session time (120 minute), Warming time determined to be 5nutes and cool-down to be 15 minutes, so main part determined to be 100 minutes, training session components illustrated in the following table

Table (4)

Daily training session time and percentage distribution during program phases

(Time in minutes)

program phases		Number of weeks/ Phase	daily training session components												total
			Warm -up	Main part										Cool down	
			Total time	Physical preparation			Skill Preparation			Tactic Preparation			Main part total time	Total time	
				%	Time/ session	Time/ phase	%	Time/ session	Time/phase	%	Time/ session	Time/phase			
Program Phases	General preparation	3	180	70%	70	840	30%	30	360	-	-	-	1200	60	1440
	Specific preparation	5	300	35%	35	700	45%	45	900	20%	20	400	2000	100	2400
	preparation for competitions	4	240	20%	20	320	20%	20	320	60%	60	960	1600	80	1920
Total		12	720	1860			1580			1360			4800	240	5760

Research nature determined volleyball similar performance attack skills as dependent variable and specific exercises as experimental (independent) variable, so it performed in each session during physical and skill preparation time

VII Statistical Analysis:

SPSS statistical program used for statistical analysis to extract the following: Mean, Standard Deviation, Skewness coefficient, Kurtosis coefficient, differentiation coefficient, Paired T test.

VIII Results and discussion

Results:

Table (5)

Statistical indicators for physical abilities associated with the volleyball similar performance attack skills within research sample before and after experiment

variables \ Statistics			Measuring Unit	Pre Measurement		Post Measurement		Differences Mean	Differences Deviation	T value	Improvement %
				Mean	SD	Mean	SD				
Force endurance	sitting from lying	30 seconds	(number)	**21.84**	**1.79**	**31.20**	**4.02**	**-9.36**	**4.57**	**7.93****	**42.88**
	Bend arms from oblique prostration		(number)	**24.36**	**2.01**	**32.93**	**2.66**	**-8.58**	**2.73**	**12.14****	**35.21**
	Trunk lifting high form		(number)	**24.93**	**1.91**	**34.73**	**1.79**	**-9.80**	**2.73**	**13.90****	**39.30**
Abilities	Vertical jump from stability		(cm)	**51.80**	**1.66**	**58.33**	**2.29**	**-6.53**	**2.97**	**8.51****	**12.61**
	Vertical jump from movement		(cm)	**55.67**	**4.08**	**61.33**	**3.99**	**-5.67**	**1.95**	**11.24****	**10.18**
	Wide Jump from stability		(cm)	**2.38**	**0.03**	**2.52**	**0.04**	**-0.14**	**0.04**	**12.52****	**5.71**
	Pushing 3 kg medical ball	Right arm	(meters)	**7.58**	**0.33**	**8.19**	**0.13**	**-0.61**	**0.26**	**8.99****	**8.09**
		Left arm	(meters)	**7.20**	**0.08**	**7.69**	**0.24**	**-0.49**	**0.22**	**8.47****	**6.81**
		Both hands	(meters)	**7.85**	**0.32**	**9.23**	**0.09**	**-1.37**	**0.33**	**16.18****	**17.48**
speed	Maximum	20 m running	(seconds)	**2.88**	**0.23**	**2.46**	**0.18**	**0.42**	**0.23**	**7.07****	**14.67**
	Motor	run in place 15 seconds	(number)	**27.47**	**1.96**	**35.47**	**2.17**	**-8.00**	**2.36**	**13.13****	**29.13**
Flexibility	trunk bend back from		(cm)	**32.93**	**3.75**	**40.07**	**3.39**	**-7.13**	**3.04**	**9.08****	**21.66**
	trunk slant forward from setting		(cm)	**10.27**	**0.12**	**12.80**	**0.21**	**-2.53**	**0.29**	**33.24****	**24.62**
agility	(9-3-6-3-9) bend		(seconds)	**8.83**	**0.04**	**8.35**	**0.24**	**0.48**	**0.26**	**7.08****	**5.42**
	Zigzag running		(seconds)	**15.16**	**0.14**	**14.53**	**0.32**	**0.63**	**0.40**	**6.06****	**4.15**
coordination	tennis ball throwing and receiving on wall		(number)	**18.25**	**0.18**	**19.67**	**0.20**	**-1.42**	**0.37**	**14.92****	**7.80**

T significant at 0.05 level = 2.144 and at 0.01 = 2.976

Table (5) results reveal statistically significant differences at 0.01 between pre and post measurements in favor of post measurement in all physical abilities under study, T value ranged between 6.06 and 33.24), and improvement percentages ranged between (4.15% and 42.88%)

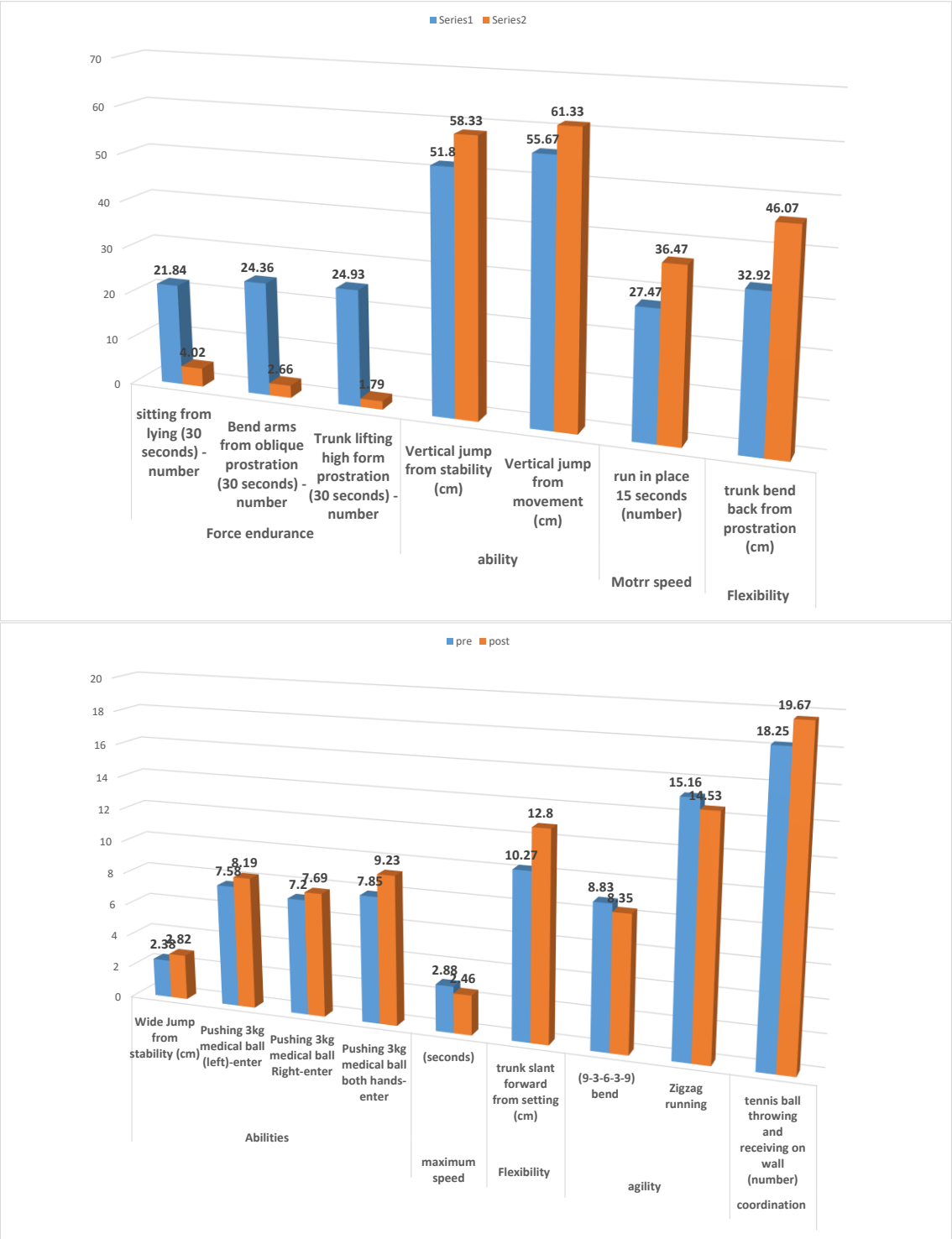

Fig (1) Physical abilities pre and post measurement averages for experimental group

Table (6)
Statistical indicators for physical abilities associated with the volleyball similar performance attack skills within research sample before and after experiment
(n = 15)

variables / Statistics			Measuring unit	Pre measurement		Post measurement		Differences Average	Differences Deviation	T Value	Improvement percentage
				Mean	Standard deviation	Mean	Standard deviation				
Back Row Attack	From Position 1	to position 1	(marks)	7.93	0.96	9.13	1.36	-1.20	1.08	4.29**	15.13
		to position 5	(marks)	7.93	0.70	8.60	0.51	-0.67	0.62	4.18**	8.40
		to position 6	(marks)	7.13	0.64	7.93	1.28	-0.80	1.15	2.70 *	11.21
	From Position 6	to position 1	(marks)	6.60	1.76	8.73	1.98	-2.13	1.73	4.79**	32.32
		to position 5	(marks)	5.60	1.99	7.40	1.64	-1.80	2.18	3.20**	32.14
		to position 6	(marks)	4.73	2.49	7.40	1.92	-2.67	2.58	4.00**	56.34
Spike	From Position 2	to position 1	(marks)	7.00	2.54	8.33	2.16	-1.33	1.84	2.81 *	19.05
		to position 5	(marks)	7.47	2.26	8.47	1.64	-1.00	1.41	2.74 *	13.39
		to position 6	(marks)	5.87	2.92	7.80	2.14	-1.93	2.31	3.24**	32.95
	From Position 4	to position 1	(marks)	7.33	2.44	9.13	1.51	-1.80	2.34	2.98*	24.55
		to position 5	(marks)	8.20	1.97	9.67	1.91	-1.47	1.25	4.56**	17.89
		to position 6	(marks)	6.87	2.90	9.53	2.39	-2.67	2.13	4.86**	38.83
Jump serve	Jump spike serve		(marks)	18.47	2.67	19.33	3.13	-0.87	1.19	2.83 *	4.69
	Jump float serve		(marks)	16.27	3.08	18.60	3.29	-2.33	3.09	2.93 *	14.34

T significant at 0.05 level = 2.144 and at 0.01 = 2.976

Table (6) results reveal statistically significant differences at 0.01 and 0.05 levels between pre and post measurements in favor of post measurement in volleyball similar performance attack skills (spike, back row attack, jump spike serve, and jump float serve), T value ranged between (2.70 and 4.86), and improvement percentages ranged between (4.69% and 56.34%)

Fig (2a) Volleyball similar performance attack skills pre and post measurement averages for experimental group

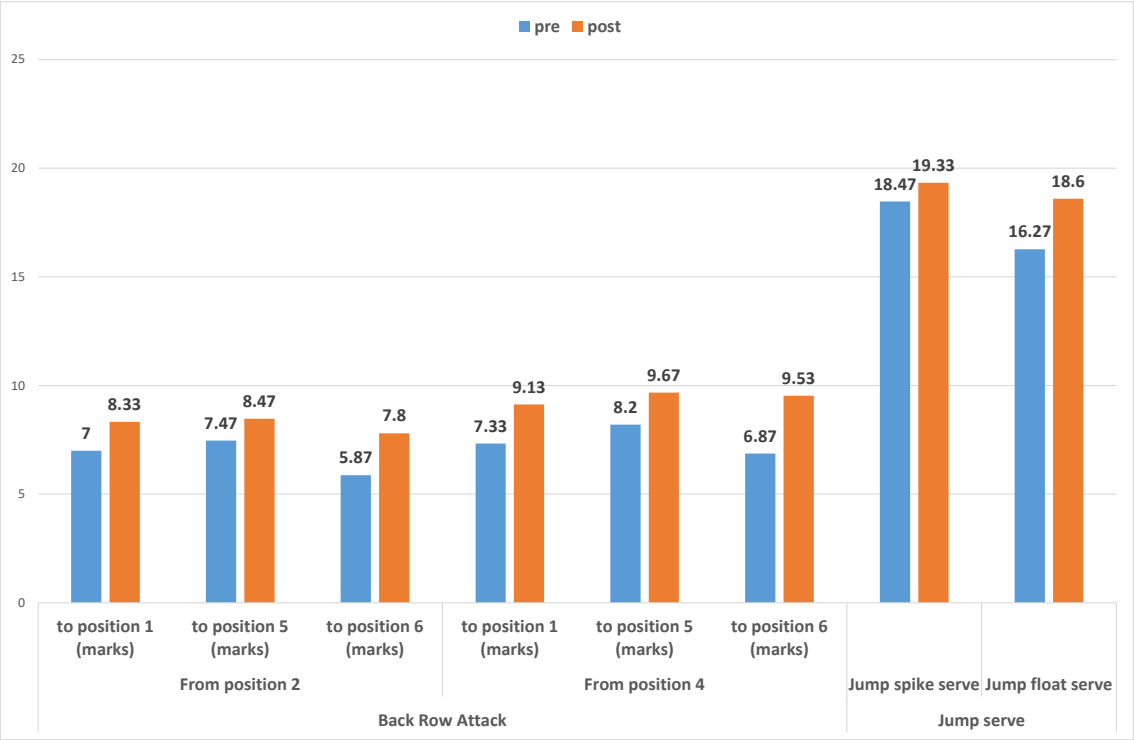

Fig (2b) Volleyball similar performance attack skills pre and post measurement averages for experimental group

Discussion

Previous presentation, together with research results In light of research objectives, hypotheses and methodology, and guided related previous studies results and scientific references;

Table (5 and 6) results reveal statistically significant differences at 0.05 level between pre and post measurements in favor of post measurement in all physical abilities under study, and in volleyball similar performance attack skills (spike, back row attack, jump spike serve, and jump float serve). Improvement percentages for physical abilities ranged between (4.15% and 42.88%) and for volleyball skills ranged between (4.69% and 56.34%)

The researchers attribute these differences in both physical abilities and performance level of volleyball similar performance attack skills to the proposed training program using specific exercises; its preparation method, considering load progression, using periodical training, and formation of rests between exercises and groups. Researchers also return these differences to proposed program exercises, which included flexibility and stretching exercises, and using many tools like as "rubber, Weight jacket, Medical balls, jump boxes and barriers"; which led to significant improvement in physical abilities under study, and in turn contributed in improving performance level of volleyball similar performance attack sills. In addition to exercises diversity (with/without tools and individual/paired exercises), and all exercises were similar to skill performance nature and in same motor path as for volleyball similar performance attack skills (spike, back row attack, jump spike serve, and jump float serve).

Current study results are in consistent with what referred by (Allawi 1992, 103, and Hassan, 1993, 21, and Essam El-Din Abdel-Khalek, 2010, 22, Mustafa 1994, and Al-Nemr & Al-Khatib, 1996, and Hassan, 1998, 54) that specific exercises work on

developing physical and kinetic abilities of specialized practiced activity as well as development of working muscle groups in this specific activity.

Current study results are also in consistent with (Ibrahim & Al-Busatti, 1995, 259 and Shawki, 2012, 14) study results, which confirmed that using exercises similar to skill performance in specific activity is the best way to advance performance, taking into account training load and in-between rests formation. This lead to development of physiological aspects that help to develop physical abilities, also exercises performed in circumstances similar to skill work to improve both skill performance level and physical fitness simultaneously.

In this regard, this study findings are consistent with (Al-Bashihy, 2002, 73, Al-Ghandour, 2010, 18, Albashoty, 2010, 23 and Al-Shalakany, 2011,19) study results, which proofed that using rubber and weight jacket while performing exercises that are similar to performance is of most effective methods to develop motor abilities and skill performance level.

This study is consistent with views of (Hossam-Eldin, 1993, 57 and Al-Desouki, 2002, 62) in that exercises similar to skill performance lead to skill performance improvement and have positive effect on raising performance level.

Shehata (1992, 423) and (Khalifa, 23) argue that exercise similar to skill performance and use activity's same working muscle groups have effective effect on developing sound motor skills performance, as motor path corresponds to motor used in competition and timeline simulation in some performance stages.

This study results, which indicated significant improvement in players' physical level, are in line with what pointed by Allawi (1992, 257), Hussein (2001, 17) and Abdul Khaliq (2010, 173) that physical preparation is closely linked to skill preparation, there is positive correlation between them, i.e. skill performance level increase as physical level increase).

Current study results also in so consistent with Kandil (2005, 18) and Abdul Khaliq (2010, 171) in that mastering skill performance depends developing its requirements from special physical abilities such as power and muscle force.

IX- Conclusions

1- The proposed training program using specific exercises have positive effect on improving physical abilities related to similar performance attack skills under study (spike, back row attack, jump spike serve, and jump float serve).

2- The proposed training program using specific exercises led to improvement in skill performance level of similar performance attack skills under study (spike, back row attack, jump spike serve, and jump float serve).

X- Recommendations

1- Using the proposed training program "Specific exercises" in developing physical abilities related to similar performance attack skills under study (spike, back row attack, jump spike serve, and jump float serve)

2- Using the proposed training program "Specific exercises" in developing skill performance level of similar performance attack skills under study (spike, back row attack, jump spike serve, and jump float serve)

3- Conducting similar studies on other age stage for volleyball juniors using other physical exercises types.

4- References:

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Appendix (1)
Tests of physical abilities related to similar performance attack skills and skill technical performance accuracy for attack skills under study

NO	Physical abilities/skills	Tests	Measuring Unit	Equipment/tools
1	**Abdomen muscles endurance**	sitting from lying (3) seconds	(number)	Stopwatch /mat
2	**Shoulder muscles endurance**	Bend arms from oblique prostration	(number)	Stopwatch /mat
3	**Back muscles endurance**	Trunk lifting high form prostration (30) seconds	(number)	Stopwatch /mat
4	**Muscles' ability**	Vertical jump from stability	(cm)	Sargent device
5		Wide Jump from stability	(cm)	Meter measure tape
6		Pushing 3 kg medical ball (left , right and both arms)	(meter)	3kgm medical ball
7	**Motor speed**	run in place 15 seconds	(number)	Stopwatch
8	**Maximum speed**	20 m running	(seconds)	Stopwatch /track
9	**Flexibility**	trunk bend back from prostration	(cm)	Meter measure tape
10		trunk slant forward from setting	(cm)	Meter measure tape
11	**agility**	(9-3-6-3-9) bend	(seconds)	Meter measure tape/ 4 track and field barriers
12		Zigzag running	(seconds)	Stopwatch / cones
13	**coordination**	tennis ball throwing and receiving on wall	(seconds)	Stopwatch /chalk
14	**Back Row attack accuracy**	Shooting test from position 1 to position 1	(marks)	10 volleyball balls, volleyball net with its holders, volleyball drawn ground, chalk
15		Shooting test from position 1 to position 5	(marks)	
16		Shooting test from position 1 to position 6	(marks)	
17		Shooting test from position 6 to position 1	(marks)	
18		Shooting test from position 6 to position 5	(marks)	
19		Shooting test from position 5 to position 6	(marks)	
20	**Spike Accuracy**	Shooting test from position 2 to position 1	(marks)	
21		Shooting test from position 2 to position 5	(marks)	
22		Shooting test from position 2 to position 6	(marks)	
23		Shooting test from position 4 to position 1	(marks)	
24		Shooting test from position 4 to position 5	(marks)	
25		Shooting test from position 4 to position 6	(marks)	
26	**Jump serve accuracy**	Jump spike serve	(marks)	
27		Jump float serve	(marks)	