

Comparing Two Methods of Maintaining Specific Physical Fitness Abilities Level During the Volleyball Junior's Competitive Season

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Abstract: This study compares between two methods to maintain the physical abilities level during the volleyball junior competitive season, one only uses muscular power program, where the other uses the same program in addition to speed, agility and cardiovascular endurance program. Twenty-four juniors under 17 years old divided into two experimental groups, the first group used the comprehensive program and the second group only used the muscular power program. The research included pre-measurement at the end of the specific preparation period and post-measurement at the end of competitions. The two methods were applied for 19 competitive weeks. The results illustrated that both methods led to maintaining the specific physical fitness level of the volleyball juniors during the competitions period. Moreover, the first group surpassed the second one in the entire physical fitness-changing rate.

Key words: Competitive season % Maintains programs % Physical fitness abilities % Volleyball

INTRODUCTION

The physical training main aim during competitions is to reduce the rate of the physical abilities level loss, maintain what has achieved in the preparation period and to best benefit during the competitions period [1-3].

Volleyball matches depends on the importance of providing high level of the specific physical abilities of the volleyball player such as muscular power, agility, motor speed and performance endurance and employing these abilities to serve tactical and skills performance as efficiently as possible.

The muscular power has its importance in the jumping, throwing, preparing, attacking, blocking and defense skills. Moreover, through developing speed and agility can improve the speed and accuracy of the game with all of its forms during the competitions [4, 5].

According to its utmost importance influence on the different technical aspects, the physical fitness maintenance program as a preventive procedure during the competition period reduces the physical abilities losing rate level and maintaining them for as long as possible, other wise disturbance and disorder may occur in the biological state of the muscular cells and different body organs and members. In addition, the testosterone hormone level and beta-endorphin reduced-that hormone-

like compound-that works with the nervous system to improve the mood and sense of recovery, thus the player's physical and technical level reduces for the duration of the competition [4-6].

The researcher noted the high physical condition at the beginning of the competitions period, while the situation changes in the middle and near the end of the competitions period, where the physical level reduces followed by the technical level, followed by the high incidence of injury. In addition to the instability of junior's level from match to another, where the player acts in good form in one match then appears at a lower level in another, that explains the lack of sufficient attention in maintaining the junior's physical condition, leading to not benefiting from the reached level during the preparation period. The researcher also noted the uncertainty vision of many coaches in determining the priority of any of the general and specific physical abilities trained during the season, which therefore prompted the researcher to conduct this study. The study aimed to compare two different methods for maintaining the volleyball junior's physical abilities during the competitive season, through designing two suggested training programs, as the first is only for the muscular power and the second combines each of the muscular power, speed, agility and cardiovascular endurance.

MATERIALS AND METHODS

Method of the Research: The researcher used the experimental design with two experimental measurements of pre-and post-measurements.

Sample of the Research: The sample included 24 volleyball players under 17 years old of the participants in the Egyptian volleyball league, intentionally selected and divided to two experimental groups. Both groups average ranged between 16.33-16.5 years in the age variable and between 184.3-185.2 cm in the height variable and between 80.58-81.08 kg in the weight variable and between 6.25-6.92 years in the training age variable.

Measurement Tools: Weights equipment of Technogym brand-medical scale-restameter to measure total body length-electronic stopwatch-chalk-colors

Measurements of the Research: The research included pre-and post-measurements. The pre-measurement of the sample of the research was the final measure for the specific preparation period for both groups, which is the final limit reached by the players at the top of their training level, while the post-measurement was at the end of the competition period.

The research measurements included muscular power, maximum power, speed, agility and cardiovascular endurance variables. The muscular power measured using weights through measuring the maximum weight rose for three repetitions maximum (3RM) of half-squat exercise and power snatch, as well as measuring the legs muscular power by measuring the vertical jump distance from stability. The maximum power measured using weights through measuring the maximum weight rose for one repetition maximum (1RM) on the weights devices of leg press and chest press, where both measurements considered as an indicator of maximum power for each of the body upper and lower limbs. Moreover, transition speed of running 20 meters measured in addition to measuring agility by the Barrow test and the cardiovascular endurance measured by the Cooper test [4, 7-10].

Planning the Training Program During the Competitions Period: The main objective of the training program in the competitions period is to maintain the level of physical abilities previously acquired during the period of preparation, while the variables of the training program

of the physical abilities during the competitions period characterized by decreasing the total volume of training with the increased level of intensity.

Recovery continues for several days, as recovery time is relatively short after speed training, while being longer after endurance training. Muscular power, speed and agility could maintain 48 hours before the match to allow improving the specific work of the central nervous system, where the nervous cells ability to work are raised days before the matches and achieves its highest levels in the competitions days then afterwards decline to normal and in some cases to less than the normal level. The training intensity of 90-95% considered the most appropriate training intensity during the competitions period to maintain the different physical abilities [7, 8, 11, 12].

The maximum limit of the physical abilities at the end of the preparation period is the only indicator for the implementation of the maintenance program during the competitions period. The preparation period took twelve weeks, while the competitive season took continuously 19 weeks at a rate of one match on Monday of each week. Concerning the first group, the maintenance program included 95 training units, where muscular power trained for 38 training units and the same for speed and agility, while the aerobic endurance trained for 19 training units during the competitions period. The training week consisted of aerobic endurance training on Tuesday, training muscular power on Wednesday and Friday and speed and agility training on Saturday and Thursday of each week.

The program implemented with the assistance of the teams coaches under the supervision and implementation of the researcher. When designing the physical ability-maintaining program, the researcher took into account that the program should characterize with effectiveness and privacy [7, 8, 13-15].

The first experimental group implemented the training program for each of the muscular power, speed, agility and cardiovascular endurance, while the second experimental group only implemented the muscular power, where each of weights exercises and plyometrics exercises had used.

The researcher took into account that the suggested muscular power-training program with all of its variables fully unified between each of the two experimental groups. The muscular power-training program for both groups by using weights exercises included the basic exercises, which in turn included Power Snatch, Squat, Leg Press, Bench Press and Lat Pull down.

Moreover, the muscular power-training program for both groups using weights exercise included assistant exercises, which in turn included seated rowing and abdominals exercises.

The researcher also took into account that the program's exercises included exercises to prevent injuries of the rotator cuff muscles (Plyometrics Exercises); in addition, the muscular power program used the same exercises for both experimental groups. The basic and assistant exercises was performed in three sets, each set of three repetitions with an intensity ranging between 90-95% of the maximum weight that can be lifted once [5, 7, 8, 16].

The first group has implemented speed, agility and cardiovascular endurance program, in addition to the unified muscular power program. The speed program included short distance exercises represented in running 20, 30 and 50 meters with an intensity of 90-95% of the best time achieved by the player for three repetitions for each distance. Moreover, the first group implemented the suggested agility program that included exercises of changing directions and the rebound running with an intensity of 90-95% of the best time achieved by the player, for three repetitions for each exercise. The first group trained for just one day per week on the cardiovascular endurance by running for the longest

distance in a time of 12 minutes for one time while the heart rate ranges between 150-170 beats per minute [4, 5, 16].

RESULTS AND DISCUSSION

Table 1 illustrates that there are statistical significant indications of the physical variables between the pre and post-measurements of the first group in favor of the post-measurements, except for the vertical jump of stability test. Moreover, the changing rates of the research variables in the first group ranged between 1.7% for the 20 meters running test and 9% for both vertical jump of stability and chest press tests.

Table 2 illustrates that there are no statistical significant indications between the pre and post-measurements of the second group in the physical variables, except for both the running 20 meters and Barrow agility tests. Moreover, the changing rates of the research variables in the second group ranged between 0.07% for the leg press test and 2.02% for the chest press test.

Table 3 illustrates that there are no statistical significant indications between both the post-measurements of the two groups in the physical variables, except for the vertical jump from stability test.

Table 1: Differences indication and the changing rate between pre-and post-measurements of the first group in the physical variables

Variables	Pre-measurement		Pre-measurement		T	changing rate %
	Mean	Deviation	Mean	Deviation		
vertical jump	42.83	7.15	45	3.95	1.35	9
running 20 m.	3.26	0.13	3.21	0.13	2.67	1.7
Barrow test	20.51	1.08	19.76	0.85	5.97	2.7
Cooper test	2.82	0.28	2.97	0.29	3.18	1.9
half-squat	54.75	6.44	57.91	3.34	2.56	5.8
power snatch	40	5.22	42.08	2.57	2.15	5.2
leg press	114.58	13.04	120.83	8.21	3.19	5.4
chest press	41.66	8.61	45.41	6.20	3.44	9

The indexed "T" value at the freedom degree of 22 and significant level of 0.05= 2.074

Table 2: Differences indication and the changing rate between pre-and post-measurements of the second group in the physical variables

Variables	Pre-measurement		Pre-measurement		T	changing rate %
	Mean	Deviation	Mean	Deviation		
vertical jump	41.5	4.14	42.30	3.77	1.6	2.01
running 20 m.	3.27	0.13	3.20	0.15	2.08	0.61
Barrow test	20.53	1.1	20.49	1.08	2.15	0.14
Cooper test	2.9	0.2	2.90	0.20	1	0.29
half-squat	54.9	5.19	55.50	3.50	0.9	1.06
power snatch	39.9	4.5	40.30	3.68	1	1.04
leg press	113.3	11.5	114.16	10.60	1.48	0.07
chest press	41.25	8	42.08	6.89	1.48	2.02

The indexed "T" value at the freedom degree of 22 and significant level of 0.05= 2.074

Table 3: Differences indication between both the post-measurements of the two groups

Variables	First experimental group		Second experimental group		T
	Mean	Deviation	Mean	Deviation	
vertical jump	41.5	4.14	42.3	3.77	1.6
running 20 meters	3.27	0.13	3.2	0.15	2.08
Barrow test	20.5	1.1	20.49	1.08	2.15
Cooper test	2.9	0.2	2.9	0.25	1
half-squat	54.9	5.19	55.5	3.5	0.9
power snatch	39.9	4.52	40.3	3.68	1
leg press	113.3	11.55	114.1	10.6	1.48
chest press	41.25	8.01	42.08	6.89	1.48

The indexed "T" value at the freedom degree of 22 and significant level of 0.05= 2.074

DISCUSSION

The results of Tables 1 and 2 illustrated the existence of a changing rate in the physical abilities of the first and second groups in favor of the pre-measurements, which indicates that there is no decrease in the physical abilities level during the competitions period. Thus, both training programs of the first and second groups have led to maintaining the specific physical abilities of the volleyball juniors during the competitions period.

The researcher returns this tiny change of the specific physical abilities level of the volleyball juniors, which emerged from the statistical analysis is only a natural result of the load intensity during the many matches performed in the competitions period.

Volleyball requires high performance of the specific physical abilities level represented in the high jump to the maximum distance, changing directions, reaction speed and endurance during smashing, blocking, serving, preparing and defending, that indicates the occurrence of significant growth in the specific physical abilities level. Moreover, repeating the performance of the offensive and defensive skills during the competitions may lead to such simple growth in the rates of change between pre-and post-measurements in favor of the post-measurements, which indicate that both proposed maintaining programs have led to maintaining the specific physical abilities level during the competitions period. These results are consistent with the views of many scientists that maintaining the level achieved during the preparation period, as well as promoting it are the main training goal for training the specific physical abilities during the competitions period [5, 16].

Table 3 illustrates that there are no statistical significances between both pre-measurements of the two experimental groups in the physical variables, but the vertical jump from stability. The researcher returns this result to the positive impact of training speed, agility and cardiovascular endurance to improve

muscular power in general and vertical jump in particular, where the vertical jump is of the most technical skills related to the offensive and defensive volleyball technical skills.

According to many scientists, the physical abilities have a dual effect on each other as speed and agility affected by not training the muscular strength, where speed tends to be the first physical ability affected by stopping training as breaking down proteins and the degeneration of the motor units lead to the lack of muscular contraction ability. The nervous system affected by stopping training than strength training, which would negatively influence the speed, because of the motor unit itself is the first thing affected by periods of stopping training, thus the lack of nerve impulses in the muscle fibers leads to its contraction and relaxation in a very rapid rate. The strength and frequency of pulses can influence by the decrease in the total number of the new recruited motor units during the consecutive contractions.

Because of the obvious lack in movement, which training aimed to, the lack of power becomes more obvious and the body ceases to function in the recruitment of a number of new motor units, which in turn lead to the lack of muscular strength, which must produced. That decline in the number of motor units leads to the lack of the total strength outcome required in performance to implement each of the technical skills in a right manner, in addition to the negative impact on speed performance, as the muscle tension depends on strength, provoke speed and explosive speed rate [1, 4, 12, 14].

The researcher also suggests that this result gives an important indicator of the success of both training programs to maintain the physical abilities level of the volleyball juniors during the competitions period and differences between them were not very significant. This gives freedom for the coaches in using one of the two methods according to its commensurate with the training time, circumstances and the available facilities to each team than the other.

CONCLUSION

The researcher concluded that each of the two training programs have led to maintaining the specific physical abilities level of the volleyball juniors during the competitions period, moreover the training program of the first group surpassed the training program of the second group in all the specific physical abilities of the volleyball juniors during the competitions period. The highest growth rate was in favor of the first group in both tests of the vertical jump from stability and chest press by 9%, while the second group had the lowest growth rate in the squat test by 0.07%.

The researcher also concluded that there were no gross significant differences between both training methods in maintaining the physical abilities during the season of competitions; in addition to using one of the two training methods gives coaches the freedom to select what ever commensurate with the training time, circumstances and available facilities to each team than the other.

Recommendations: In the limits of the procedures and the results reached by the researcher, the researcher recommends using the first suggested training program to maintain the specific physical abilities level during the competitions period of the volleyball juniors.

Moreover, the researcher recommends using one of the suggested programs to maintain the physical abilities level during the period of competitions according to what ever commensurate with the training time, circumstances and available facilities to each team as an integral systematic and standardized part of the physical preparation program and the annual general training program for the volleyball players. As well as conducting similar researches on different technical levels and different age stages, sexuality and activities.

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