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CHANGES IN PHYSICAL FITNESS VARIABLES FOR VOLLEYBALL PLAYERS DUE TO ISOLATED AND COMBINED EFFECT OF GAME SPECIFIC DRILLS AND SPECIFIC FITNESS TRAINING

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ABSTRACT

The purpose of the study is to find out the changes in physical fitness variables due to isolated and combined effect of game specific drills and game specific training. To solve the problem 60 women volleyball players were selected from various colleges affiliated to Annamalai university Tamil Nadu. The age of the subjects ranged between 18 and 25. They all were healthful and normal. The range of subjects within the study become delimited to 4 groups, viz., Experimental group-I (specific fitness training group), Experimental group-II (Game specific drill training group), Experimental group-III combined group (specific fitness and drill training group) and control group. The criterion variables selected for the study was leg explosive power and muscular endurance and they were measured by the standard test such as vertical jump and sit-ups respectively. After the initial measurement the specially designed training programme named as volleyball specific fitness training programme and volleyball game specific drill training and combined training was to given to the subjects of each experimental groups. Each experimental session was of 45 minutes duration with including warm up and warm down for five days in a week for 12 weeks in the morning sessions only. The data were collected on selected fitness variables namely explosive power and muscular endurance which were assessed by vertical jump and bent knee sit ups respectively before and after twelve weeks of training. The data was analyzed by using analysis of covariance (ANCOVA). The level of significance was fixed at 0.05. The findings of the present study have strongly indicated that that package of specific fitness training and specific drill training and combined training shows significant changes among volleyball players.

Keywords: Specific Fitness, Game Specific Drills, Explosive Power, Muscular Endurance.

I. INTRODUCTION

Volleyball is the most widely spread ball game in the world, it is complex, random and open game format in many points of views. Even though there are a lot of different styles in volleyball world, that some methods are more efficient than the others, because the best players have quite similar tendencies in every skill. Modern volleyball at the highest level is still rather similar from team to team, because inefficient techniques, mechanics, movements and tactics have slowly gone away. On individual level, requirements of modern volleyball consist psychological aspects like inner motivational and maintaining the focus during the game, which is difficult because there are a lot of breaks and successful and unsuccessful rallies in every volleyball match. Inner motivated player can push himself easier to the limits of his capacity during the game. Reading the game is the most important skill in volleyball and it can be trained with game-like training sessions (Liukkonen etc. 2006). Motor learning is the key for learning volleyball skills and to fulfil this need game-like specific training is the most important part to learn volleyball skills (Berry & Abernethy 2003). The most important part of volleyball training is to get better at volleyball skills. Physical training sessions should be implemented to training plans to prevent injuries, increase the vertical jump ability, increase the velocity of an arm-swing and power produced by body to hit and to serve ball harder and to make moving on a court more efficient. Still physical training sessions should be supportive to main goal which is getting better at volleyball skills so it is better to improve above-mentioned physical elements in a way not to make players too tired, which means short sessions, high intensity safely (submaximal weights) and low volume (to prevent delayed-onset-muscle-

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soreness). Thus, the aim of physical training should be to prevent injuries and to make players stronger and faster (McGown 2001).

Sports-specific training is an approach that improves performance in a specific sport by developing the necessary skills and athletic characteristics. Sports-specific practices focus on the exact needs of the sport and address each player's unique needs and weaknesses. Sports-specific training focuses on enhancing the skills and abilities required for a particular sport. By targeting the specific muscle groups and movement patterns used in the sport, athletes can improve their performance in key areas such as speed, agility, power, and endurance. For example, a basketball player looking to improve their vertical jump and explosiveness can incorporate exercises like plyometrics and weighted jump squats into their training routine. These exercises mimic the movements used during a jump shot or a rebound, helping to increase vertical leap and overall power. By tailoring training to the specific needs of the sport, athletes can see significant improvements in their performance, giving them a competitive edge on the field or court. the primary benefits of sports-specific training are its ability to reduce the risk of injury. By focusing on the specific movements and demands of the sport, athletes can strengthen the muscles and joints involved, improving stability and overall body control. For example, a runner looking to prevent knee injuries can incorporate exercises that target the muscles around the knee joint, such as lunges and single-leg squats. Strengthening these muscles helps to stabilize the knee and reduce the risk of common running-related injuries. In addition to strengthening specific muscle groups, sports-specific training also emphasizes balance, flexibility, and coordination, further reducing the risk of injury. It helps athletes develop better body awareness and control, reducing the likelihood of accidents or fall-related injuries. sports-specific training takes it a step further by directly improving sport-specific skills. By performing drills and exercises that mimic the movements and patterns of the sport, athletes can enhance their technical skills and proficiency. By focusing on the specific skills required in their sport, athletes can fine-tune their abilities and improve their overall performance. Sports-specific training is tailored to each individual's specific needs and goals.

Sports-specific training considers the unique demands of each sport and the specific requirements of each athlete, ensuring that the training program is customized to their needs.

This individualized approach allows athletes to focus on areas that need improvement, making their training more efficient and effective. sports-specific training is not just for professional athletes. Regardless of your current fitness level or skill level, sports-specific training can benefit athletes of all levels. Sports-specific training focuses on tailoring workouts to meet the unique demands of a particular sport. Unlike general fitness routines, these training programmes are designed to enhance the skills and physical attributes needed for an athlete to excel in their chosen sport. This approach involves understanding the sport's specific movements, energy systems, and physical requirements, and then developing a training plan that improves performance in those areas. General fitness training aims to improve overall health and physical fitness. It usually includes a mix of cardiovascular exercise, strength training, flexibility work, and general conditioning. While this is beneficial for overall well-being, it doesn't address the specific demands of a particular sport. In contrast, sports-specific training zeroes in on the particular needs of an athlete. For instance, a sprinter's training will differ vastly from that of a long-distance runner. While both require cardiovascular conditioning, the former needs more focus on explosive power and speed, while the latter needs endurance and stamina.

II. METHODOLOGY

The purpose of the study is to find out the changes in physical fitness variables due to isolated and combined effect of game specific drills and game specific training. To solve the problem 60 women volleyball players were selected from various colleges affiliated to Annamalai university Tamil Nadu. The age of the subjects ranged between 18 and 25. They all were healthful and normal. The range of subjects within the study become delimited to 4 groups, viz., Experimental group-I (specific fitness training group), Experimental group-II (specific drill training group), Experimental group-III combined group (specific fitness and drill training group) and control group. The criterion skill variables decided on for the study was leg explosive power and muscular endurance and they were measured by the standard test such as vertical jump and sit-ups respectively.

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III. TRAINING PROCEDURE

After the initial measurement the specially designed training programme named as volleyball specific fitness training programme and volleyball game specific drill training and combined training was to given to the subjects of each experimental groups. Each experimental session was of 45 minutes duration with including warm up and warm down for five days in a week for 12 weeks in the morning sessions only. The package of volleyball specific drill and specific fitness training were as follows: SAQ training exercise such as ladder drill, shuttle runs, foot matrix, short sprints, plyometric metrics such as hurdle jumps, box jumps weight training exercise such as arm curl leg curls bench press shoulder curls knee extension exercise set with sideways walk, set to box, blocker movement setting drill**,** setter concentration drill, blind blocking drill, middle blocking drill, jousting blocking drill, side-to-side blocking drill, middle attack drill, block and hit drill, hitter versus hitter, six-on-six drill, court drills passing with partners by jogging in between, bump pass, make a turn and pass, pass to self, do a forward roll, pass to self again, then bump to a partner, passing the ball with moving in a circle, pass-moving to left and pass, then move to the right then pass, outside in hitting, four way step close, multiple area deep hitting, power and vision hitting, make a pass to the setter and attack the ball, continuous attack in all the three positions etc.(Dunphy et al.,2000).

IV. STATISTICAL PROCEDURE

The data were collected on selected performance fitness variables namely explosive power and muscular endurance which were assessed by vertical jump and bent knee sit ups respectively before and after twelve weeks of training. The data was analyzed by using analysis of covariance (ANCOVA). The level of significance was fixed at 0.05.

V. ANALYSIS OF THE DATA

The analysis of covariance on physical fitness variables of the pre and post test scores of control group with specific fitness and specific drill training and combined training groups have been analyzed and presented in Table I and IV.

Table –1: Analysis of Covariance of Experimental Groups and Control Groups on Explosive Power

	Control Group	Specific fitness training	Specific drill training	Combined group	S oV	Sum of Squares	df	Mean squares	'F' ratio
Pretest Mean	51.66	54.26	54.80	54.53	B	40.33	3	13.44	1.24
SD	3.0	3.5	2.95	2.94	W	606.40	56	10.82	
Posttest Mean	51.66	54.26	54.80	54.53	B	94.58	3	31.52	3.19*
SD	3.08	3.53	2.95	2.94	W	552.40	56	9.86	
Adjusted Posttest Mean	51.07	55.13	54.04	55.01	B	156.14	3	52.05	23.76*
					W	120.44	55	2.19	

*Significant at 0.05 level of confidence. The table values required for significance at 0.05 level of confidence for 3 and 56 (df)=2.77, 3 and 55(df)=2.78 respectively.

The above table shows that the pretest means of control group with specific fitness and specific drill training and combined training groups 51.66, 54.26, 54.80 and 54.53 respectively. The obtained F value of 1.24 was less than the required table value 2.77. This proved that there was no significant mean difference between the groups at pretest period. The posttest means of the variable explosive power among control group, specific fitness and specific drill training and combined training groups 51.66, 54.26, 54.80 and 54.53 respectively. The obtained F value of 3.19 was greater than the required table value of 2.77. This proved that there was a significant mean difference among the groups after the twelve weeks training. The adjusted posttest means of the control group, specific fitness and specific drill training and combined training groups were 51.07, 55.13, 54.04 and 55.01 respectively. The obtained F value of 23.76 was greater than the required table value of

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2.77. This proved that there was a significant mean difference among the three groups. Since the obtained F ratio of the adjusted posttest means was found to be significant, Scheffe's post hoc test was applied. The obtained paired mean differences among the training and control group, between the training groups and the confidence interval required for significance are presented in table-4.

Table 2: Scheffe's Confidence Interval Test Scores and the Mean Differences between the Groups on Explosive Power

Means of				Paired Mean Difference	Confidence interval
Control Group	Specific fitness training	Specific drill training	Combined group		
51.07	55.13			4.06*	1.56
51.07		54.04		2.97*	1.56
51.07			55.01	3.94*	1.56
	55.13	54.04		1.09	1.56
	55.13		55.01	0.12	1.56
		54.04	55.01	0.97	1.56

*Significant at 0.05 level

The paired mean difference obtained for control group with specific fitness, specific drills and combined training group was 4.06, 2.97 and 3.94 respectively. All the paired mean differences were higher than the confidence interval value of 1.56 which resulted in a significant improvement than the control group. The paired mean difference between specific fitness training and specific drill training group and combined training group was 1.09 and 0.12 was lower than the confidence interval value which resulted no significant improvement. The paired mean differences between specific drill training group and combined training group was 0.97 was lower than the confidence interval value which resulted no significant improvement. The results of the study showed that all the three trainings had resulted in a significant improvement in explosive power as compared with control group.

Table –3: Analysis of Covariance of Experimental Groups and Control Groups On Muscular Endurance

	Control Group	Specific fitness training	Specific drill training	Combined group	S oV	Sum of Squares	df	Mean squares	'F' ratio
Pretest Mean	33.06	33.93	34.00	34.66	B	19.38	3	6.41	1.03
SD	2.84	2.65	1.85	2.55	W	351.2	56	6.27	
Posttest Mean	32.00	39.26	37.33	39.66	B	560.13	3	186.71	41.23*
SD	2.53	2.18	1.44	2.19	W	253.60	56	4.52	
Adjusted Posttest Mean	32.66	39.25	37.26	39.07	B	406.32	3	135.44	199.57*
					W	37.32	55	.679	

*Significant at 0.05 level of confidence. The table values required for significance at 0.05 level of confidence for 3 and 56 (df)=2.77, 3 and 55(df)=2.78 respectively.

The above table shows that the pretest means of control group with specific fitness and specific drill training and combined training groups 33.06, 33.93.34.0 and 34.66 respectively. The obtained F value of 1.03 was less than the required table value 2.77. This proved that there was no significant mean difference between the groups at pretest period. The posttest means of the variable muscular endurance among control group, specific

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fitness and specific drill training and combined training groups 32.0, 39.26, 37.33 and 39.66 respectively. The obtained F value of 41.23 was greater than the required table value of 2.77. This proved that there was a significant mean difference among the groups after the twelve weeks training. The adjusted posttest means of the control group, specific fitness and specific drill training and combined training groups were 32.66, 39.25,37.26 and 39.07 respectively. The obtained F value of 199.57 was greater than the required table value of 2.77. This proved that there was a significant mean difference among the three groups. Since the obtained F ratio of the adjusted posttest means was found to be significant, Scheffe's post hoc test was applied. The obtained paired mean differences among the training and control group, between the training groups and the confidence interval required for significance are presented in table-4.

Table 4: Scheffe's confidence interval test scores and the Mean differences between the groups on Muscular Endurance

Means of				Paired Mean Difference	Confidence interval
Control Group	Specific fitness training	Specific drill training	Combined group		
32.66	39.25			6.59*	0.86
32.66		37.26		4.6*	0.86
32.66			39.07	6.41*	0.86
	39.25	37.26		1.99*	0.86
	39.25		39.07	0.18	0.86
		37.26	39.07	1.81*	0.86

*Significant at 0.05 level

The paired mean difference obtained for control group with specific fitness, specific drills and combined training group was 6.59, 4.6 and 6.41 respectively. All the paired mean differences were higher than the confidence interval value of 0.86 which resulted in a significant improvement than the control group. The paired mean difference between specific fitness training and specific drill training group and combined training group was 1.99 higher than the confidence interval value of 0.86 which resulted in a significant improvement and 0.18 is lower than the confidence interval value which resulted no significant improvement. The paired mean differences between specific drill training group and combined training group was 1.81 is lower than the confidence interval value which resulted significant improvement. The results of the study showed that all the three trainings had resulted in a significant improvement in muscular endurance as compared with control group. Among the three training groups, specific fitness training had a higher significant change than the other training groups.

VI. DISCUSSION

Specificity of training essentially means that the training should be both metabolically and mechanically specific to the demands of the sport. The principle of specificity states that the adaptations that occur to the human body are exposed to exercise stress are specific to the type of applied stress. The game of volleyball is a game of power. For peak performance in volleyball, the muscles which are the source of power must be strong. Power may be defined as the ability to release maximum force in the fastest possible time as in jumping and throwing activities. It is important for a volleyball player to have explosive power in legs because he has to jump hundreds of times during the match or tournament for executing spiking skill or blocking skill. Thus, a good vertical jump during the spike and block depends on strength, speed and technique. Hakkinen et al [1993] have suggested 4-5 weekly sessions for playing drills and competitive games and 2-3 weekly sessions for physical conditioning for strength and explosive strength training for volleyball players to improve their vertical jumping ability significantly as well as spike and block jumps during competitive season. Lawrence Grey, Kumar et al [2002] have emphasized the importance of plyometric exercises, weight and sprint training in volleyball players. They have found huge improvements in speed, agility and power, thus increasing the vertical

leap for volleyball. Mac Colloway [2005] has stressed that most important type of training needed for a volleyball player was power and core strength. He has stated that power involves the simultaneous reaction of the hips, knees and ankles while the abdominals and low back are used for the support. He has suggested hang deans, push press\jerks, power shrugs along with plyometrics (jumps, hops, bounds etc.) for development of power. Muscular endurance is the ability to repeat a series of muscle contractions without fatigue. Volleyball has been described as Interval sport with both anaerobic as well as aerobic component. In long matches or tournament play, the players have to bend, jump and move thousands of times which need good muscular endurance. Steven, et al [2000] lower body muscular endurance has been assessed by number of sit-ups [Bent knees] executed correctly. It is one of the required qualities for excelling in volleyball. Dennison J.D. et al [2001] have stressed equal importance of both isotonic as well as isometric exercise programmes in improving muscular endurance. Thus, muscular endurance can be improved by proper weight training, isotonic exercise and isometric exercises. The findings of the present study have strongly indicated the influence of the above findings hence the package of specific fitness training and specific drill training and combined training shows significant changes among volleyball players.

VII. CONCLUSION

Based on the results of the study,

1. It was concluded that explosive power and muscular endurance showed significant improvement among the volleyball players due to specific fitness training, game specific drill training and combined training compared to control group.
2. Among the three groups specific fitness training groups showed better improvement followed by combined group and specific drill training group.
3. So, from the conclusion it is recommended that volleyball coaches should use the combination of game specific drill and specific fitness training to train the volleyball players.

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