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## COMBINED EFFECT OF CROSS TRAINING AND INSTRUCTIONAL SKILL TRAINING ON SELECTED PHYSICAL FITNESS AND SKILL PERFORMANCE VARIABLES OF RURAL SCHOOL VOLLEYBALL PLAYERS

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**Abstract:-**This research aims to design a training program using cross- training and instructional skill training then to identify its effect on the selected physical abilities such as reaction speed, agility, and, flexibility among the rural volleyball players from Government Higher Secondary School Bujanganor in Tamil Nadu. The percentage of improvement for different measurements of both control and experimental groups were observed. Methods the researcher used the experimental method on a sample of 60 rural school volleyball players under 15-17 years old, four groups were used and was given 12 weeks of training except the control group. Most important tools of data collection were physical tests as pre and post measurements. Statistical work was done using arithmetic mean, standard deviation, T test, Ancova. Results training program using combined cross-training and instructional training led to development of all physical abilities such as reaction speed agility and flexibility within volleyball research sample. And clear improvement rates between experimental and control groups in all variables under consideration in favor of experimental group.

**Keywords:**Cross training, Instructional training, Pass, service and attack.

### INTRODUCTION

Cross-training has been widely used approach for structuring a training programme to improve competitive performance in a specific sport by training in a variety of sports (Tanaka 1994). Cross training is a tool underlies strength training, which helps players to reach pinnacle of their specialty sport competition. A strategy used by coaches to organize the training program and fitness activities, which are of greatest use of diverse activities and physical challenges in order to make their players continue to acquisition and achieve the requirements and objectives of overall fitness in a satisfactory and secure manner Loy et al (1992), Yacenda( 1994).

Cross training activities include both training with weights using few and large repetitions and ploy metric exercises like jump on box, which work to build body strength, development of muscle strength, legs muscles ability, and also includes activities of aerobic endurance including water running exercises and use of moving belt and fixed training cycle, as well as activities include anaerobic endurance including running exercises (Moran et al 1997).

Despite numerous anecdotal reports claiming benefits for cross-training, very few scientific studies have investigated this particular type of training. It appears that some transfer of training effects on maximum oxygen uptake (VO<sub>2</sub>max) exists from one mode to another. The nonspecific training effects seem to be more noticeable when running is performed as a cross-training mode. Swim training, however, may result in minimum transfer of training effects on VO<sub>2</sub>max. Cross-

Please cite this Article as :M.Moorthy<sup>1</sup> and C.Arumugam<sup>2</sup>, "COMBINED EFFECT OF CROSS TRAINING AND INSTRUCTIONAL SKILL TRAINING ON SELECTED PHYSICAL FITNESS AND SKILL PERFORMANCE VARIABLES OF RURAL SCHOOL VOLLEYBALL PLAYERS" : Academic Sports Scholar (Nov ; 2014)

training effects never exceed those induced by the sport-specific training mode. The principles of specificity of training tend to have greater significance, especially for highly trained athletes. For the general population, cross-training may be highly beneficial in terms of overall fitness. Similarly, cross-training may be an appropriate supplement during rehabilitation periods from physical injury and during periods of overtraining or psychological fatigue (Tanaka H. 1994)

Instructional skill training has been shown to improve an athlete's ability to reach their full potential, minimize injuries, and increase their ability and fitness. Many coaches believe instructional volleyball training molds the athlete by targeting areas for improvement more directly than group sessions or practices can, and is a recommended way to develop the athlete's ability and become a stronger player.(www.coachup.com/volleyball). It was hypothesized that there would be significant improvement exists due to the experimental groups, and especially the combined training group. The instructional training improved only spike jump and speed among the Australian Junior Volleyball players whom represented the World youth volleyball Championships and also induced meaningful improvements in all measurements of skill in volleyball and greater improvements in technical skill in these athletes (Gabbett -2008).

### **METHODOLOGY**

For the purpose of this study was to mark out the effect of chosen training programme on the physical fitness variables among rural school volleyball players. The subjects selected for this study were from Government Boys Higher Secondary School Bujanganor and were randomly selected as 60 numbers. The age group of the subjects was ranging from 14 to 16 years with standard deviation of + 0.52 and they divided into four equal groups and each group consists of twenty subjects. The physical fitness variables selected for this study was Reaction Speed, Agility and Flexibility and to assess the outcome the experiment standardized tests were used to collect the data. Cross Training and skill based training was formulated and implemented for twelve weeks.

### **EXPERIMENTAL DESIGN**

Randomly selected rural school rural volleyball players (N=60) were assigned into four groups. As per the experimental design Group I acted as experimental group which underwent cross training (CT), group II underwent instructional skill training (IST), group III underwent combined cross training and instructional skill training (CTIST) and group IV did not participated in any special training and were strictly under control (CG). Prior to experimental treatment all the subjects were measured of their physical fitness such as reaction speed, agility and flexibility. The subjects underwent respective experimental treatments for a period of 12 weeks. After the experimental period, post measurements were taken for the selected variables. The difference between the initial and final scores was considered as the effect of respective treatments. To test the statistical significance of the data collected were subjected to statistical analysis using ANCOVA to test the significance. In all cases 0.05 level was fixed to test the hypothesis of this study. The statistical analysis comparing the initial and final means of Reaction Speed Time due to cross training, instructional skill training, combined cross training and instructional skill training and control groups of school volleyball players is presented in Table I

**Table I**  
**COMPUTATION OF ANALYSIS OF COVARIANCE DUE TO CROSS TRAINING, INSTRUCTIONAL SKILL TRAINING AND COMBINED TRAINING ON REACTION SPEED TIME**

	Cross training Group	Instructional skill training Group	Com-bined Group	Control Group	SOV	Sum of Squares	df	Mean Squares	Obtained F
Pre Test Mean	0.279	0.233	0.264	0.281	B	0.030	3	0.010	1.366
Std Dev	0.055	0.056	0.057	0.050	W	0.227	56	0.003	
Post Test Mean	0.253	0.209	0.242	0.281	B	0.060	3	0.020	5.930*
Std Dev	0.046	0.046	0.057	0.050	W	0.256	56	0.003	
Adjusted Post Test Mean	0.240	0.236	0.243	0.271	B	0.015	3	0.005	4.139*
					W	0.089	55	0.001	

Required table value 0.05 level (df3 &55) 2.77, \* Significant at 0.05 level of confidence

Taking into consideration of the pre test means and post test means, adjusted post test means for analysis of covariance. The obtained F value was greater than the required value of 2.77 and hence it was accepted that there was significant differences existed in reaction speed among the rural high school volleyball players. Since significant improvements were recorded, Schaffe’s post hoc test was used to find out the paired mean difference among the groups and the results were presented in Table II

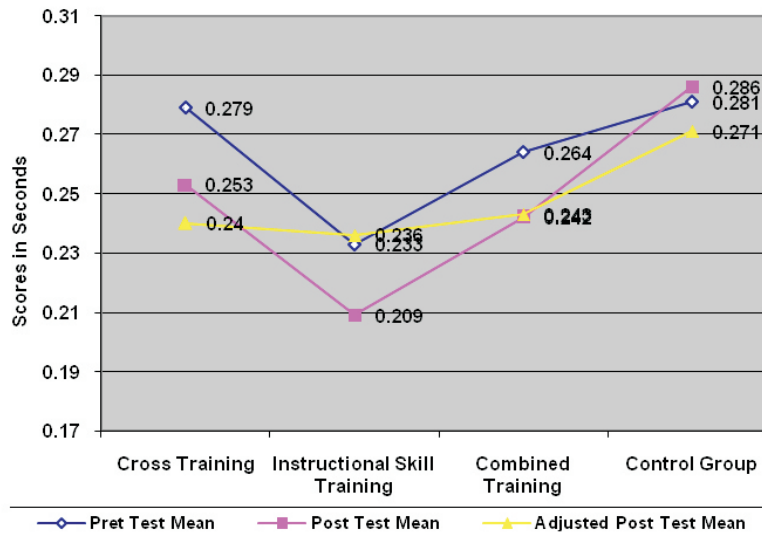
**Table II**  
**Multiple Comparisons between Cross training, Instructional skill training, Combined Training and Control Groups and Scheffe’s Post Hoc Analysis on Reaction Speed Time**

Cross training Group	Instructional skill training Group	Com-bined Group	Control Group	Mean difference	C.I
0.240	0.236			0.004	0.029
0.240		0.243		0.002	0.029
0.240			0.271	0.031*	0.029
	0.236	0.243		0.006	0.029
	0.236		0.271	0.035*	0.029
		0.243	0.271	0.029*	0.029

\* Significant at 0.05 level.

From the above table it is clear that combined training group had significant improvement in reaction speed among the rural school volleyball players when compared to other two groups. Cross training and instructional skill training had also improved the reaction capacity among the rural volleyball players. The pre test, post test and ordered adjusted means were presented through line graph for better understanding of the results of this study in Figure 1.

**Figure 1**  
**LINE GRAPH SHOWING PRE, POST AND ADJUSTED MEANS ON REACTION SPEED**



**Table III**  
**COMPUTATION OF ANALYSIS OF COVARIANCE DUE TO CROSS TRAINING, INSTRUCTIONAL SKILL TRAINING AND COMBINED TRAINING ON FLEXIBILITY**

	Cross training Group	Instructional skill training Group	Com-bined Group	Control Group	SOV	Sum of Squares	df	Mean Squares	Obtained F
Pre Test Mean	12.55	12.95	13.05	13.10	B	3.74	3	1.25	0.22
Std Dev	1.88	2.09	2.21	3.21	W	438.65	56	5.77	
Post Test Mean	13.75	14.35	14.80	13.10	B	17.44	3	5.81	1.15
Std Dev	1.68	2.06	2.21	3.21	W	384.05	56	5.05	
Adjusted Post Test Mean	14.08	14.32	14.68	13.48	B	15.13	3	5.04	14.25*
					W	26.55	55	0.35	

Required table value 0.05 level (df3 &55) 2.77, \* Significant at 0.05 level of confidence

As shown in Table III, the pre test mean on Flexibility of cross training group instructional skill training group combined group consisting of cross training and instructional skill trainings training and control group found to be insignificant. The post test means, adjusted post test means revealed that there existed significant improvement and Schaffe's post hoc test was used to find out the paired mean difference among the groups and the results were presented in Table IV

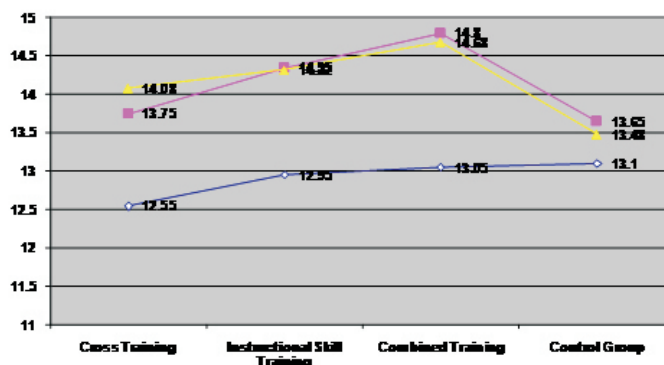
**Table IV**  
**Multiple Comparisons between and Scheffe's Post Hoc Analysis on Flexibility**

Cross training Group	Instructional skill training Group	Com-bined Group	Control Group	Mean difference	C.I
14.08	14.32			0.24	0.54
14.08		14.68		0.60*	0.54
14.08			13.48	0.60*	0.54
	14.32	14.68		0.36	0.54
	14.32		13.48	0.84*	0.54
		14.68	13.48	1.20*	0.54

\* Significant at 0.05 level.

Multiple mean comparisons shows that there found to be better improvement in flexibility among the rural school volleyball players, due to combined training when compared to other two training groups, and the instructional skill training group and cross training group were also improved on Flexibility. The results were presented through line graph for better understanding of the results of this study in Figure 2.

**Figure 2**  
**LINE GRAPH SHOWING PRE, POST AND ADJUSTED MEANS ON FLEXIBILITY**



**Table V**  
**COMPUTATION OF ANALYSIS OF COVARIANCE DUE TO CROSS TRAINING, INSTRUCTIONAL SKILL TRAINING AND COMBINED TRAINING ON AGILITY**

	Cross training Group	Instructional skill training Group	Com-bined Group	Control Group	SOV	Sum of Squares	df	Mean Squares	Obtained F
Pre Test Mean	17.85	17.87	17.66	17.95	B	0.90	3	0.30	1.60
Std Dev	0.44	0.46	0.39	0.45	W	14.35	56	0.19	
Post Test Mean	17.22	17.24	16.97	17.95	B	9.92	3	3.31	23.61*
Std Dev	0.30	0.46	0.39	0.45	W	10.65	56	0.14	
Adjusted Post Test Mean	17.21	17.23	17.03	17.87	B	7.73	3	2.58	23.00*
					W	8.40	55	0.11	

Taking into consideration of the pre test means and post test means, adjusted post test means for analysis of covariance. The obtained F value was greater than the required value of 2.77 and hence it was accepted that there was significant differences existed in agility among the rural high school volleyball players. Since significant improvements were recorded, Schaffe's post hoc test was used to find out the paired mean difference among the groups and the results were presented in Table IV. Since significant improvements were recorded, the results were subjected to post hoc analysis using Scheffe's Confidence Interval test. The results were presented in Table IV

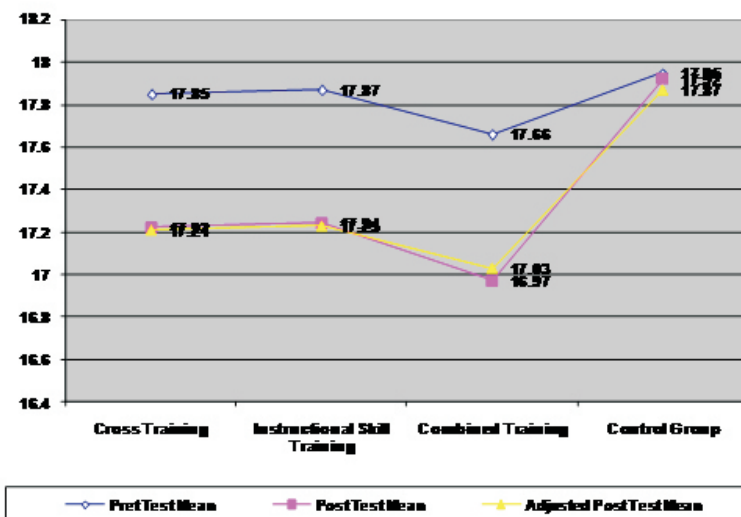
**Table VI**  
**Multiple Comparisons and Scheffe's Post Hoc Analysis on Agility**

Cross training Group	Instructional skill training Group	Com-bined Group	Control Group	Mean difference	C.I
17.21	17.23			0.01	0.30
17.21		17.03		0.18	0.30
17.21			17.87	0.65*	0.30
	17.23	17.03		0.19	0.30
	17.23		17.87	0.64*	0.30
		17.03	17.87	0.84*	0.30

\* Significant at 0.05 level.

Multiple mean comparisons shows that there found to be better improvement in agility among the rural school volleyball players, due to combined training when compared to other two training groups, and the instructional skill training group and cross training group were also improved on agility. The results were presented through line graph for better understanding of the results of this study in Figure 3.

**Figure 3**  
**LINE GRAPH SHOWING PRE, POST AND ADJUSTED MEANS ON AGILITY**



## DISCUSSION

Instructional lessons are a great way to get an athlete ready for their school or club teams and in fighting shape for matches and scrimmages. By focusing on specific skills and techniques, instructional volleyball coaching grooms players to evolve their skills to be prepared to play at the next level. Most players are looking for a confidant in the sport to provide motivation, push them when they lose focus, and instruct training drills to help them develop more technical skills. An athlete is driven towards success when there is a person available to turn to with questions or direction with their position or game.

Experts now say that the cross training is a much better approach and all sorts of professional athletes, from ball players to golfers, tennis players to swimmers, and other sports too make cross training part of their regimes and cross training is also making its way into the average person's fitness routine, with more and more benefits. The cross training takes into consideration the fact that many muscles in different parts of the body contribute to a single activity. So to get the most out of any activity, and to do it safely, one must pay attention to all the muscles in his body that are involved, not just the ones directly related to that activity.

Researches on instructional training for improving physical fitness and skills in junior elite volleyball players found that skill-based conditioning games induced improvements in vertical jump, spike jump, speed, agility, upper-body muscular power, and estimated maximal aerobic power, whereas technical instruction improved only spike jump and speed while instructional training induced meaningful improvements in all measurements of skill, whereas improvements in technical skill after skill-based conditioning games were uncommon and typically small. Hence, the benefits of cross training, instructional training and combined effect of cross training and instructional training on physical fitness variables, reaction speed time, agility, and, flexibility were explored and hence, an attempt was made in this study. Thus, the findings of this study that the combined effect of cross training and instructional skill training significantly altered selected physical variables were in agreement with these previous studies.

## CONCLUSIONS

Combined effect of cross training and instructional skill training significantly improved physical fitness variable, such as, reaction speed time, agility and explosive power of rural school volleyball players. It was also found that there was no significant difference among treatment groups on reaction speed time.

Combined effect of cross training and instructional skill training and isolated cross training and instructional skill training significantly improved skill performance variable, such as, pass, service and attack of rural school volleyball players. It was also found that there combined group was significantly better than isolated cross training groups in improving skill performance pass of the rural school volleyball players.

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