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Effect of functional training and resistance training on reaction time and blocking among female volleyball players

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Abstract
The science of sports training is a recent to the field of sports science. The sports science discipline have improved at a very fast pace in the past few decades. The knowledge gained by these disciplines has to be understood by the coaches and trainers to apply it correctly to the training process. But majority of the coaches do not have sufficient scientific background and training to make full and effective use of the knowledge acquired by the sports science disciplines. This creates a gap between scientists and coaches. The science of training with its workers having sufficient background of science and sports are able to fill this gap and can become mediator between the scientists and the coaches. The Purpose of the Study Effect Of Functional Training and Resistance Training On Reaction Time and Blocking among Female Volleyball Players The study was formulated as a true random group design consisting of a pre-test and post-test. The subjects (N=60) were randomly assigned to three equal groups of twenty female volleyball players in each. The groups were assigned as experimental group I – (Functional Training), Experimental Group II (Resistance Training) and control group respectively. Pre-tests were conducted for all the 60 subjects on selected physical fitness and performance variables. After the experimental period of twelve weeks post-test were conducted and the scores were recorded. The post-tests were conducted on the above said dependent variables after a period of twelve weeks training on functional training and resistance training. The difference between initial and final scores of selected variables was the effect of respective experimental treatments. The statistical significance was determined using statistical application ANCOVA. In all cases 0.05 levels was fixed to test the significance.

Keywords: Reaction time and blocking, resistance & functional training, volleyball players

Introduction
The science of sports training is a recent to the field of sports science. The sports science discipline have improved at a very fast pace in the past few decades. The knowledge gained by these disciplines has to be understood by the coaches and trainers to apply it correctly to the training process. But majority of the coaches do not have sufficient scientific background and training to make full and effective use of the knowledge acquired by the sports science disciplines. This creates a gap between scientists and coaches. The science of training with its workers having sufficient background of science and sports are able to fill this gap and can become mediator between the scientists and the coaches.

Objective of the Study
The objective of this study was to assess the effect of functional training and resistance training on selected physical fitness and performance variables among female volleyball players. The investigator also interested to assess the levels of selected physical fitness and performance variables who undergo this training schedule. As an interventional programme, the investigator suggested two different packages of training, namely, functional training and resistance training for the benefit of female volleyball players. The initial and final scores on selected variables would prove the varied effect of experimental treatment and thus the objective of this study was to find out the effect of functional training and resistance training on selected physical fitness and performance variables among female volleyball players.

Selection of Subjects

The purpose of the study was to find out the effect of functional training and resistance training on selected physical fitness and performance variables among female volleyball players. To facilitate the study, 60female volleyball players from different Jr. colleges in Telangana state were randomly selected as subjects and their age were 16 - 18 years. They were assigned into three groups, namely, experimental group I, experimental group II and control group. Experimental group I served as functional training group, experimental group II served as resistance training group and the third group served as control group (CG). The requirement of the experiment procedures, testing as well as exercise schedule were explained to the subjects so as to get full co-operation of the effort required on their part and prior to the administration of the study. The investigator got individual consent from each subject.

Experimental Design

The study was formulated as a true random group design consisting of a pre-test and post-test. The subjects (N=60) were randomly assigned to three equal groups of twenty female volleyball players in each. The groups were assigned as experimental group I – (Functional Training), Experimental Group II (Resistance Training) and control group respectively. Pre-tests were conducted for all the 60 subjects on selected physical fitness and performance variables. After the experimental period of twelve weeks post-test were conducted and the scores were recorded. The post-tests were conducted on the above said dependent variables after a period of twelve weeks training on functional training and resistance training. The difference between initial and final scores of selected variables was the effect of respective experimental treatments. The statistical significance was determined using statistical application ANCOVA. In all cases 0.05 level was fixed to test the significance.

Results on Reaction Time

The statistical analysis comparing the initial and final means of Reaction time due to Functional training and Resistance training among female volleyball players is presented in Table-1.

Table 1: Ancova Results On Effect of Functional Training and Resistance Training Compared With Controls on Reaction Time

	Functional Training	Resistance Training	Control Group	Source of Variance	Sum of Squares	Df	Mean Squares	Obtained F
Pre-test Mean	0.279	0.264	0.281	Between	0.004	2	0.002	0.603
				Within	0.169	57	0.003	
Post-test Mean	0.253	0.242	0.286	Between	0.020	2	0.010	2.701
				Within	0.216	57	0.004	
Adjusted Post-test Mean	0.249	0.252	0.280	Between	0.012	2	0.006	3.863*
				Within	0.085	56	0.002	
Mean Diff	-0.026	-0.022	0.005					

Table F-ratio at 0.05 level of confidence for 2 and 57 (df) =3.16, 2 and 56 (df) =3.16.
*Significant

As shown in Table 1 the obtained pre-test means on Reaction time on Functional training group was 0.279, Resistance training group was 0.264 was and control group was 0.281. The obtained pre-test F-value was 0.603 and the required table F-value was 3.16, which proved that there was no significant difference among initial scores of the subjects. The obtained post-test means on Reaction time on Functional training group was 0.253, Resistance training group was 0.242 was and control group was 0.286. The obtained post-test F-value was 2.701 and the required table F-value was 3.16, which proved that there was no significant difference among post-test scores of the subjects.

Taking into consideration of the pre-test means and post-test means adjusted post-test means were determined and analysis of covariance was done and the obtained F-value 3.863 was greater than the required value of 3.16 and hence it was accepted that there was significant differences among the treated groups. Since significant differences were recorded, the results were subjected to post-hoc analysis using Scheffe's Confidence Interval test. The results were presented in Table-2.

Table 2: Multiple Comparisons of Paired Adjusted Means and Scheffe's Confidence Interval Test Results on Reaction time

MEANS				Required C.I.
Functional training Group	Resistance training Group	Control Group	Mean Difference	
0.249	0.252		0.003	0.031
0.249		0.280	0.031*	0.031
	0.252	0.280	0.028	0.031

***** Significant

The post-hoc analysis of obtained ordered adjusted means proved that there was significant differences existed between Functional training group and control group (MD: 0.031). There was no significant difference between Resistance training group and control group (MD: 0.028). There was no significant difference between treatment groups, namely, Functional training group and Resistance training group (MD: 0.003). The ordered adjusted means were presented through bar diagram for better understanding of the results of this study in Figure-2.

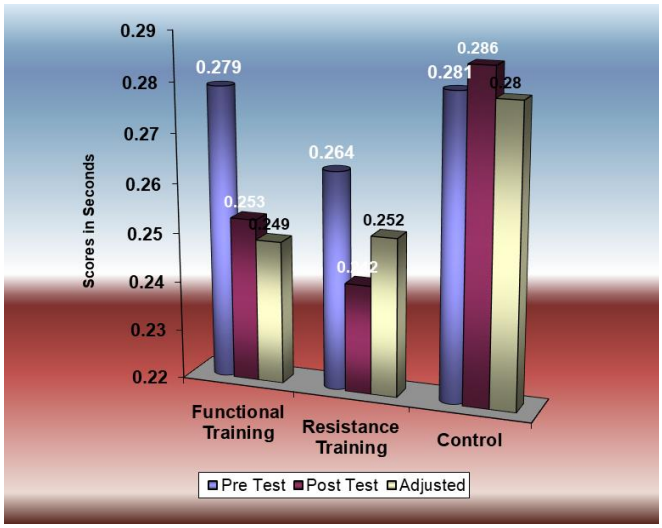

Fig 1: Bar Diagram Showing Pre-Test, Post-Test And Ordered Adjusted Means On Reaction Time

Discussions on Findings on Reaction Tim

In order to find out the effect of Functional training and Resistance training on Reaction time, the obtained pre- and post-test means were subjected to ANCOVA and post-hoc analysis through Scheffe's confidence interval test.The effect of Functional training and Resistance training on Reaction time is presented in Table-4. The analysis of covariance proved that there was significant difference between the experimental group and control group as the obtained F-value 3.863 was greater than the required table F-value to be significant at 0.05 level.

Since significant F-value was obtained, the results were further subjected to post-hoc analysis and the results presented in Table-2 proved that there was significant difference between Functional training group and control group (MD: 0.031). There was no significant difference between Resistance training group and control group (MD: -0.028). Comparing between the treatments groups, it was found that there was no significant difference between Functional training and Resistance training group among female volleyball players. Thus, it was found that functional training was significantly better than control group in improving Reaction time of the female volleyball players.

Results on Blocking

The statistical analysis comparing the initial and final means of Blocking' due to Functional training and Resistance training among female volleyball players is presented in Table-3.

Table 3: Ancova Results on Effect of Functional Training And Resistance Training Compared With Controls On Blocking'

	Functional Training	Resistance Training	Control Group	Source of Variance	Sum of Squares	Df	Mean Squares	Obtained F
Pre-test Mean	7.20	7.15	7.45	Between	1.03	2	0.52	0.72
				Within	40.70	57	0.71	
Post-test Mean	8.95	8.10	7.70	Between	16.30	2	8.15	10.33*
				Within	44.95	57	0.79	
Adjusted Post-test Mean	9.01	8.20	7.54	Between	21.18	2	10.589	38.17*
				Within	15.536	56	0.277	
Mean Diff	1.75	0.95	0.25					

Table F-ratio at 0.05 level of confidence for 2 and 57 (df) =3.16, 2 and 56 (df) =3.16.
*Significant

As shown in Table-3 they obtained pre-test means on Blocking' on Functional training group was 7.20, Resistance training group was 7.15 was and control group was 7.45. The obtained pre-test F-value was 0.72 and the required table F-value was 3.16, which proved that there was no significant difference among initial scores of the subjects.

The obtained post-test means on Blocking' on Functional training group was 8.95, Resistance training group was 8.10 was and control group was 7.70. The obtained post-test F-value was 10.33 and the required table F-value was 3.16, which proved that there was significant difference among post-test scores of the subjects.

Taking into consideration of the pre-test means and post-test means adjusted post-test means were determined and analysis of covariance was done and the obtained F-value 38.17 was greater than the required value of 3.16 and hence it was accepted that there was significant differences among the treated groups. Since significant differences were recorded, the results were subjected to post-hoc analysis using Scheffe's Confidence Interval test. The results were presented in Table-4.

Table 4: Multiple Comparisons of Paired Adjusted Means and Scheffe's Confidence Interval Test Results on Blocking'

MEANS				Required C.I.
Functional training Group	Resistance training Group	Control Group	Mean Difference	
9.01	8.20		0.81*	0.42
9.01		7.54	1.46*	0.42
	8.20	7.54	0.66*	0.42

***** Significant

The post-hoc analysis of obtained ordered adjusted means proved that there was significant differences existed between Functional training group and control group (MD: 1.46). There was significant difference between Resistance training group and control group (MD: 0.66). There was significant difference between treatment groups, namely, Functional training group and Resistance training group. (MD: 0.81). The ordered adjusted means were presented through bar diagram for better understanding of the results of this study in Figure-2.

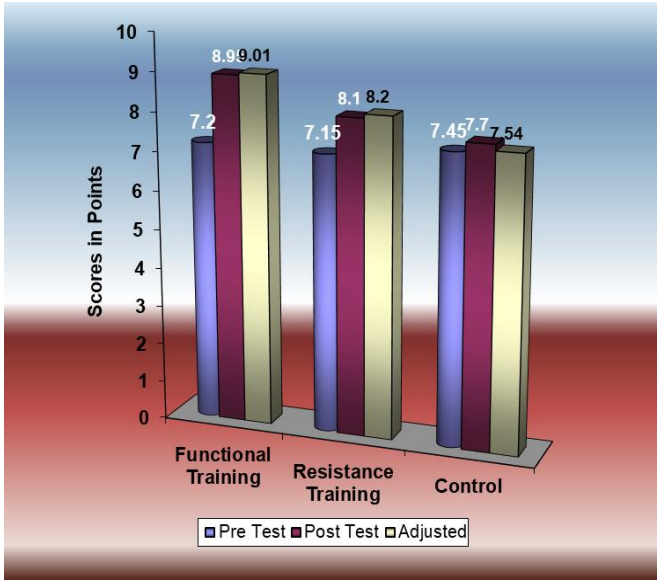

Fig 2: Bar Diagram Showing Pre-Test, Post-Test And Ordered Adjusted Means On Blocking'

Discussions on Findings on Blocking

In order to find out the effect of Functional training and Resistance training on Blocking' the obtained pre and post-test means were subjected to ANCOVA and post-hoc analysis through Scheffe's confidence interval test.

The effect of Functional training and Resistance training on Blocking' is presented in Table-4. The analysis of covariance proved that there was significant difference between the experimental group and control group as the obtained F-value 38.17 was greater than the required table F-value to be significant at 0.05 level. Since significant F-value was obtained, the results were further subjected to post-hoc analysis and the results presented in Table 4 proved that there was significant difference between Functional training group and control group (MD: 1.46) and Resistance training group and control group (MD: 0.66). Comparing between the treatments groups, it was found that there was significant difference between Functional training and Resistance training group among female volleyball players.

Thus, it was found that functional training was significantly better than resistance training and control group in improving Blocking' performance of the female volleyball players.

Discussions on Findings

This research is aimed at comparing the effect of functional training and resistance training on selected physical fitness and performance variables of female volleyball players. For this purpose, the following were hypothesised.

I. It was hypothesized that functional training would significantly improve the selected reaction time among female volleyball players compared to control group.
II. It was hypothesized that functional training would significantly improve the selected performance variables, blocking among female volleyball players compared to control group.

Conclusions

1. It was concluded that 12 weeks functional training and 12 weeks resistance training significantly improved reaction time of female volleyball players compared to control group. It was also found that though functional training showed superiority than resistance training on physical fitness variable, reaction time the difference was not significant as such there was no significant difference between the experimental protocols of this study in altering of female volleyball players.
2. It was concluded that 12 weeks functional training and 12 weeks resistance training significantly improved performance variable, blocking among female volleyball players compared to control group. It was also found that functional training was significantly better than functional training in improving blocking ability than resistances training of female volleyball players.

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