

## **Influence of Barbell Training on Selected Hematological Variables among Engineering College Kabaddi Players**

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### **Abstract**

The purpose of the current study was to investigate the influence of barbell training on selected hematological variables among engineering college kabaddi players. For the purpose of the study, thirty men kabaddi players studying bachelor's degree in the different engineering colleges, affiliated to Anna University, Chennai were selected as subject and they were divided into two equal groups of fifteen subjects each at random namely barbell training group and control group. The age of the selected subjects were ranged from 18 to 22 years. Group I underwent barbell training for three days per week for eight weeks and Group II acted as control they did not undergo any special training programme apart from their regular activity. The following dependent variables were selected for this study namely Hemoglobin and Red blood corpuscles. The data were collected on selected dependent variables at prior and immediately after the experimental period as pretest and posttest respectively. The data were analyzed by applying dependent 't' test and analysis of covariance (ANCOVA) was used to find out the significant difference among the groups, if any separately for each dependent variable. Since, two groups were compared, whenever the obtained 'F' ratio for adjusted posttest was found to be significant. The 0.05 level of confidence was fixed to test the level of significance which was considered as an appropriate. The result of the study showed that barbell training group has significantly differed on selected dependent variables namely Hemoglobin and Red blood corpuscles when compared to control group.

**KEYWORDS:** Barbell training, Hemoglobin and Red blood corpuscles.

## **INTRODUCTION**

### **Barbell Training**

Free weights present a number of different testing conditions compared with weight machines. Freeweight require greater motor coordination than do machines, primarily because the individual must control free weights through all spatial dimensions, whereas machines generally involve control through only one plane of movement (**Fleck S J and Kraemer W J, 1996**). This attribute can be an advantage or a disadvantage, depending on the motor function (e.g., frail elderly, those with neuromuscular disease, people with arthritis, and soon) may require machine-based testing initially until sufficient improvement in physical function occurs. Another more practical reason for using free weights is their low cost and availability.

Blood volume decreased significantly during bed rest (from 5.0 to 4.7 L in the five subjects, i.e., a 7% reduction). The decrease in plasma volume was slightly more pronounced than in the red cell mass. During training, the plasma volume and red cell

mass increased again, in most subjects above the control values. Endurance training increases both the blood volume and the total hemoglobin (Hb) so that the Hb concentration usually is maintained constant. Plasma volume increases after a few days of training, whereas the expansion of erythrocyte volume takes longer. Cross-sectional studies show that there is a close relationship between VO<sub>2</sub>max on one hand and blood volume and total amount of Hb on the other (**Harrison M H,1985**).

**Langford GA et al., (2007)** The findings of this study showed that all three training groups significantly improved in strength during short – time training on the machine (MB), Barbell (BB) and leg bench press (LB) These data tend evidence that improved strength after training on the MB, BB and LB equally transfers to strength gains on any of the four model of testing. These results should be considered when including similar exercises varying in stability into the training program to improve strength.

#### **Limitation**

1. The previous experience of the subjects in the field of sports and games which may influence the training was not considered.
2. Food habits were not taken into consideration.
3. The weather condition such as atmosphere temperature and humidity during test period were also not considered

#### **Delimitation**

1. Selected hematological variables such as Hemoglobin and Red blood corpuscles were measured.
2. Intercollegiate level 30 men kabaddi players were selected as subjects.
3. Age group the subjects ranged from 18 to 22 years.

#### **METHODOLOGY**

To achieve the purpose, thirty men kabaddi players studying bachelor's degree in the different engineering colleges, affiliated to Anna University, Chennai were selected as subject and they were divided into two equal groups of fifteen subjects each at random namely barbell training group and control group. The age of the selected subjects were ranged from 18 to 22 years. Group I underwent barbell training for three days per week for eight weeks and group II acted as control they did not undergo any special training programme apart from their regular activity. The following dependent variables were selected for this study namely Hemoglobin and Red blood corpuscles. The experimental design selected for this study was pre and posttest randomized design. The data were collected from each subject before and after the training period and statistically analyzed by using dependent 't' test and analysis of covariance (ANCOVA).

**TABLE I**  
**DESCRIPTION OF TRAINING SCHEDULE FOR BARBELL GROUP**

Week	1-2 Week			3-4 Week			5-6 Week			7-8 Week		
	Load	Set	Reps	Weight	Set	Reps	Weight	Set	Reps	Weight	Set	Reps
Clean	3	6-8	30	3	6-8	35	3	6-8	40	3	6-8	45
Snatch	3	6-8	30	3	6-8	35	3	6-8	40	3	6-8	45
Bench Press	3	6-8	30	3	6-8	35	3	6-8	40	3	6-8	45
Step up	3	6-8	30	3	6-8	35	3	6-8	40	3	6-8	45

**TABLE II**  
**TESTS SELECTION**

Variable	Tests/ Equipment	Unit of measurement
Hemoglobin	Blood Sampling Analysis	Gram percentage
Red blood corpuscles	Blood Sampling Analysis	Millions per cubic millilitre

### RESULTS AND DISCUSSIONS

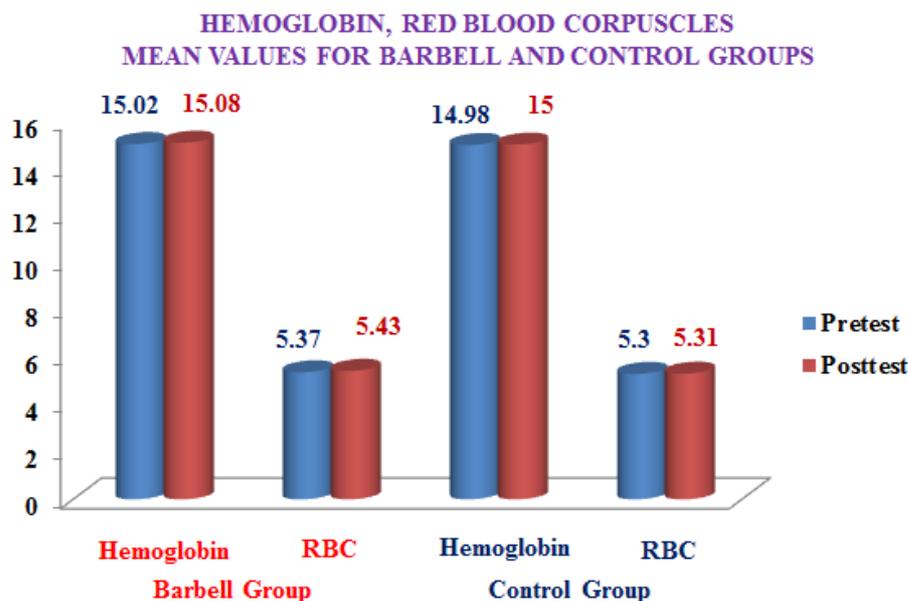
The data pertaining to the variables in this study were examined by using dependent 't' test to find out the significant improvement and analysis of covariance (ANCOVA) for each variables separately in order to determine the difference and tested at 0.05 level of significance. The analysis of dependent 't' test on data obtained for Hemoglobin and Red blood corpuscles of the pretest and posttest means of experimental and control group have been analyzed and presented in Table III.

**TABLE III**  
**MEAN AND DEPENDENT 'T' TEST OF EXPERIMENTAL AND CONTROL GROUPS ON SELECTED HEMATOLOGICAL VARIABLES**

Variables	Mean	Barbell	Control Group
Hemoglobin	Pre Test	15.02	14.98
	Post Test	15.08	15.00
	't' test	3.63*	1.38
Red blood corpuscles	Pre Test	5.37	5.30
	Post Test	5.43	5.31
	't' test	3.57*	1.00

\*Significant at 0.05 level of confidence (14) is 2.145

The obtained 't' ratio value on Hemoglobin and Red blood corpuscles of experimental group was higher than the table value, it was understood that the barbell training had made significant improvement on Hemoglobin and Red blood corpuscles. However, the control group has not made significant changes as the obtained 't' value is less than the table value, because it was not subjected to any specific training. The analysis of covariance on the data obtained on Hemoglobin and Red blood corpuscles due to the influence of barbell training and control groups have been analyzed and presented in Table IV.



**FIGURE SHOWING THE MEAN VALUES OF HEMOGLOBIN, RED BLOOD CORPUSCLES FOR BARBELL AND CONTROL GROUPS AMONG ENGINEERING COLLEGE KABADDI PLAYERS**

**TABLE IV  
ANALYSIS OF COVARIANCE OF EXPERIMENTAL AND CONTROL GROUPS ON HEMATOLOGICAL VARIABLES**

Variables	Adjusted Post Test Means		Source of variance	SS	df	Mean squares	F ratio
	Barbell training	Control Group					
Hemoglobin	15.23	15.27	Between	0.012	1	0.012	4.287*
			Within	0.082	27	0.003	
Red blood corpuscles	5.56	5.43	Between	0.026	1	0.026	7.484*
			Within	0.092	27	0.003	

\*Significant Table F-ratio at 0.05 level of confidence for 1 and 27 (df) =4.210

Table IV showed that the obtained ‘F’ ratio value of 4.287 and 7.484 which were higher than the table value of 4.210 with df 1 and 27 required to be significant at 0.05 level. Since the obtained value of ‘F’ ratio was higher than the table value, it indicated that there was significant difference among the adjusted posttest means of barbell training and control group on Hemoglobin and Red blood corpuscles.

The barbell training showed the significant difference than control group on Hemoglobin and Red blood corpuscles.

## CONCLUSIONS

- The result of the study showed that barbell training group has significantly differed on selected dependent variables namely Hemoglobin and Red blood corpuscles when compared to control group.
- There was no significant difference among the hemoglobin and red blood corpuscles on control group.

## REFERENCES

- Fleck S J and Kraemer, W J (1996)**“Strength and power training: physiological mechanisms of adaptation”. *Exercise and Sport Science. Rev.* 24:363- 397.
- Harrison, M.H. (1985)** “Effects on thermal stress and exercise on blood volume in humans”*Physiology Rev.* 65:149-209.
- Langford GA, McCurdy KW, Ernest JM, Doscher MW, Walters SD. (2007)** “Specificity of machine, barbell, and water-filled log bench press resistance training on measures of strength”. *J Strength Cond Res.*(4):1061- 6.