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Research Article

# Effect of resisted sprint training and plyometric training on selected hematological variables among college Kabaddi players

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■ **ABSTRACT**

The purpose of the study is to find out effect of resisted sprint training and plyometric training on selected hematological variables among college Kabaddi players. To achieve these purpose, 30 men students were selected from Department of Physical Education, Annamalai university, Chidambaram as subjects. Their age group ranged from 18 to 25 years. They were divided into three equal groups of 10 subjects each and assigned to Experimental group-I, Experimental group-II and control group. In a week, the Experimental group-I underwent resisted sprint training, Experimental group-II underwent plyometric training and control group was not given any training. All the subjects underwent three areas of test namely, RBC count, WBC count and Hemoglobin. They assessed before and after the training period of eight weeks. The analysis of covariance was used to analyze the data. The study revealed that the above said criterion variables significantly improved due to the effect of resisted sprint training and plyometric training on selected hematological variables among college Kabaddi players.

■ **Key Words :** Sprint training, Plyometric training, RBC, WBC, Hemoglobin

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The word training has been a part of human language since ancient times. It denotes the process of preparation for some task. This process invariably extends to a number of days and even months and year. The basic training procedures will serve better when utilized with modification suited to individuals or a group dealt with. The training programme should look into improving the performance of the athletes and at the same time should prevent injury from taking place (Fox, 1984).

Training is a programme of exercise designed to improve the skills and to increase the energy capacity of an athlete for a particular event. Therefore, training is essential for the development of physical fitness components (William and Sperryn, 1976). It is the process of sports protection based on scientific and pedagogical principles for higher performance (Singh, 1991).

Training adaptation is the sum of transformations brought about by systematically repeated exercises. These structural and physiological and biochemical changes result from a specific demand that athletes place on their bodies by the activity they pursue depending on the volume, intensity and frequency of training. Physical training is beneficial as long as it forces the body to adapt to the stress of the effort (Bompa, 1999).

The resisted sprint training programmes have become highly structured training for athletic performance enhancement. It is an effective training method designed to elicit enhancements in motor fitness, physiological and biochemical parameters. It has vastly different training effects depending upon the intensity and duration of the work and rest period.

Plyometric training is a relatively new concept of training that applies the specific principles recording the present strength conditions of the muscle prior to explosive contraction. The effects of plyometric training in increasing vertical jumping ability has studied experimentally, but no

attempt has been made if they are more effective than the kinetic exercise.

The blood serves as a principal transport medium of the body carrying oxygen, nutrients, and chemical massages to the tissues and waste products and synthesized metabolites away. The circulatory system provides access to all cells of the body for materials ingested or prepared else where in the organism. Thus, blood plays many important role in coordinating the individuals cells into a whole complex organism. This is accomplished by the presence in the fluid of dispersed or dissolved nutrients, metabolites, electrolytes, hormones , substances to counteract infection and hemorrhage and by equilibria between the cell and the blood stream so that homeostasis with respect to temperature, oxidation , reduction potential and ionic concentration is maintained throughout the organism (Sajwan and Uppal, 1999).

The blood consists of the two parts a fluid part and a solid part of the corpuscles. The function of the blood as a whole, are of course, the sum total of those of its components –corpuscles, slats, proteins and other substances. The major function of RBC is to transports hemoglobin, which in turn carries oxygen from the lungs to the tissue, volume of blood and hemoglobin contents in the blood increased by training. The numbers of RBC is defiantly affected by exercise (Tamrakar, 2002).

Holmgren (1963) found in his study that intermittent long term training resulted in the major function of red blood cells, is to transport hemoglobin, which in turns carries oxygen from the lungs to the tissue. In some lower animals, hemoglobin circulates as free protein in the plasma, not enclosed in red blood cells, however, when it is free in the plasma of the human being, approximately 3 per cent of it leaks through the capillary membrane into the tissue spaces or through the glomerular membrane of kidney into bowman's capsule each time blood through the capillaries. Therefore, for hemoglobin to remain in the blood stream, it must exist in red blood cell there are approximately 4.5-5 million RBC' per micro-litre of blood.

More research is required concerning the variation in different methods of sprint training and its effects. The applicability of this method of training to develop motor fitness and physiological and biochemical parameters is not yet completely known. Hence, there is a need to find out whether resisted sprint training is superior than plyometric training in improving the selected hematological variables parameters.

## ■ METHODOLOGY

**Selection of subjects :**

The prime purpose of this study was to explore the effect of resisted sprint training and plyometric training on selected hematological variables among college Kabaddi players. To achieve these purpose, 30 men students were selected from department of physical education, Annamalai University, Chidambaram as subjects. Their age group ranged from 18 to25 years. They were divided into three equal groups of 10 subjects each and assigned to Experimental group-I, Experimental group-II and control group. In a week, the Experimental group-I underwent resisted sprint training, Experimental group-II underwent plyometric training and control group was not given any special training. All the subjects underwent three areas of test namely, RBC count, WBC count and hemoglobin.

**Selection of variables and tests :**

The selected independent variables was resisted sprint training and plyometric training and the dependent variables were red blood cell count and white blood cell count and hemoglobin. All the subjects underwent three areas of test namely (RBC count) (WBC count) and Hemoglobin. Blood samples "were drawn from anti cubical vein before and after the training with assistance from qualified lab technician. The selected hematological variables were tested in the medical laboratory, Annamalai university medical college, Chidambaram.

**Training protocol :**

During the experimental period, group-I underwent resisted sprint training and group-II underwent plyometric training for eight weeks, 3 days per week alternative days. On every day of the training session, the exercises done were approximately 45 to 60 min, which included warming up and relaxation. Group-III acted as control who did not participated any special training programme.

**Experimental design and statistical technique :**

In the present study, random group design was used. the data were collected on selected hematological variables such as, (Rbc count) (wbc count) and hemoglobin at before and immediately after the 8 weeks of resisted sprint training and plyometric training as pre and post test. The selected variables for which data were collected from two groups prior to and after experimentation on selected hematological variables were statistically examined for significant difference, if any, by applying the analysis of covariance (ANCOVA) with the help of SPSS package. The level of significance was accepted at 0.05 level of confidence, which was considered to be appropriate.

## ■ OBSERVATIONS AND DISCUSSION

Table 1 shows the analyzed data on RBC count (red blood cell count). The pre-test, post-test and adjusted post test means of the RBC count were (4.63,4.56,4.55) (5.13,4.93,4.58) (5.09,4.95,4.60) for the experimental group I, II and control group, respectively.

The obtained 'F' ratio for pre-test 0.08 post-test 4.19 and

adjusted post-test 20.68. The obtained 'F' ratio of post and adjusted post-test were 4.19 and 20.68. The table value was 3.37 at 5 per cent level of significance for the degree of freedom (2, 27, 2 and 26).Therefore, it is proved that experimental group I has been better than the other two groups.

Table 2 shows the analyzed data on WBC count (white blood cell count). The pre-test, post-test and adjusted post test means of the WBC count were (9575,9650.00,9345) (10080,10135.00,9255.00) (10031.93,10017.16,9420.90) for the experimental group I, II and control group, respectively.

The obtained 'F' ratio for pre-test 0.34 post-test 3.39 and adjusted post-test 17.47. The obtained 'F' ratio of post and adjusted post test were 3.39 and 17.47. The table value was 3.37 at 5 per cent level of significance for the degree of freedom (2 , 27, 2 and 26).Therefore, it is proved that experimental group I has been better than the other two groups.

Table 3 shows the analyzed data on hemoglobin. The pre-test, post-test and adjusted post-test means of the hemoglobin were (11.84,11.88,11.99) (13.64,12.74,12.09) (13.69,12.76,12.02) for the experimental group I, II and control group, respectively.

The obtained 'F' ratio for pre-test0.06 post-test7.32 and adjusted post-test 46.79. The obtained 'F' ratio of post and adjusted post test were 7.32 and 46.79. The table value was 3.37 at 5 per cent level of significance for the degree of freedom (2, 27, 2 and 26). Therefore, it is proved that experimental group I has been better than the other two groups.

The reason for obtaining a significant change in the concentration of red blood corpuscles, white blood corpuscles and hemoglobin, a result of general cardio-vascular fitness in the experimental groups might have resulted in release of more amount of fluid from the blood vessels leading a significant increase in red blood corpuscles concentration in every session of training. As it is general belief that red blood cells per unit volume of blood is increased by training practices. The present investigation also supports these earlier findings by Morehouse and miller, (Physiology of exercise) p.180. Krebs *et al.* (1983).

**Table 1 : Computation of analysis of covariance of RBC count (red blood cell count)**

| Test | Exp.gp.I | Exp. gp.II | Control gp. | Sum of variance | Sum of squares | D.f. | Mean square | F |
|---|---|---|---|---|---|---|---|---|
| Pre -test mean | 4.63 | 4.56 | 4.55 | Between | 0.04 | 2 | 0.019 | 0.08 |
| | | | | Within | 6.19 | 27 | 0.23 | |
| Post-test mean | 5.13 | 4.93 | 4.58 | Between | 1.55 | 2 | 0.77 | 4.19* |
| | | | | Within | 5.00 | 27 | 0.19 | |
| Adjusted mean | 5.09 | 4.95 | 4.60 | Between | 1.23 | 2 | 0.62 | 20.68* |
| | | | | Within | 0.775 | 26 | 0.03 | |

Significant at 0.05 level with 2 and 27 (df ) = 3.37

**Table 2 : Computation of analysis of covariance of WBC count (white blood cell count)**

| Test | Exp.gp.I | Exp.gp. II | Control gp. | Sum of variance | Sum of squares | D.f. | Mean square | F |
|---|---|---|---|---|---|---|---|---|
| Pre -test mean | 9575 | 9650.00 | 9345.00 | Between | 505166.67 | 2 | 252583.333 | 0.34 |
| | | | | Within | 20313500.00 | 27 | 752351.85 | |
| Post -test mean | 10080 | 10135.00 | 9255.00 | Between | 4860166.67 | 2 | 2430083.33 | 3.39* |
| | | | | Within | 19348500.00 | 27 | 716611.11 | |
| Adjusted mean | 10031.93 | 10017.16 | 9420.90 | Between | 2375234.66 | 2 | 1187617.33 | 17.47* |
| | | | | Within | 1767829.261 | 26 | 67993.43 | |

Significant at 0.05 level with 2 and 27 (df ) = 3.37

**Table 3 : Computation of analysis of covariance of hemoglobin**

| Test | Exp.gp.I | Exp.gp. II | Control gp. | Sum of variance | Sum of squares | D.f. | Mean square | F |
|---|---|---|---|---|---|---|---|---|
| Pre-test mean | 11.84 | 11.88 | 11.99 | Between | 0.12 | 2 | 0.060 | 0.06 |
| | | | | Within | 27.13 | 27 | 1.00 | |
| Post-test mean | 13.64 | 12.74 | 12.09 | Between | 12.12 | 2 | 6.06 | 7.32* |
| | | | | Within | 22.36 | 27 | 0.83 | |
| Adjusted mean | 13.69 | 12.76 | 12.02 | Between | 14.01 | 2 | 7.01 | 46.79* |
| | | | | Within | 3.893 | 26 | 0.15 | |

Significant at 0.05 level with 2 and 27 (df) = 3.37

The analysis of data clearly reveals that all the experimental groups obtained significant improvement in R.B.C, W.B.C and hemoglobin. The resisted sprint training group was higher than other groups. It was because of resistance exercise, an apparent increase in the concentration of red blood corpuscles was observed which is due to the mobilization of plasma from blood to tissue fluid. Besides this the resisted exercise makes a greater amount for oxygen supply thus, putting into circulation the red blood corpuscles stored in spleen and accessory spleen. Resisted exercise also increases the myoglobin pigment (store keeper of oxygen), which is helpful to supply more amount of oxygen.

**Conclusion :**

- There was a significant difference among resisted sprint training and plyometric training groups, which resisted sprint training and control groups, plyometric training and control groups on selected hematological variables.
- Significant improvements were noticed on selected hematological variables due to the effect of resisted sprint training and plyometric training among college Kabaddi players.

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