

Effect of football coaching on total leukocyte count

■ VINAY PAWAR AND JAIPRAKASH BHUKAR

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■ ABSTRACT

The aim of the study was to examine the changes taking place in total leukocyte count (TLC) before and after regular participation of systematic football practice. For the purpose of this study, 30 male youth with mean age of 24.6 ± 1.76 from Pune city were selected as subjects. The subjects were further divided into two groups consisting of 15 subjects each as experimental and control groups, respectively. The experimental group consisted of 15 football players from Pune United Football Club, Pune. The control group included 15 subjects from Pune Engineering College. The blood sample of 30 subjects were collected in the beginning of the study and after the completion of 6 month regular training to find out the effect of regular football practice of total leukocyte count (TLC). Analysis of Co-variance (ANCOV) was used as statistical tool for comparison of mean difference between the experimental and control group which was analysed by SPSS 17 version. The results suggested that football coaching induced an increase of total leukocyte count by corticosteroid induced release of leukocytes from the bone marrow reserve, a pool of non-proliferating cells.

See end of the article for authors' affiliations

VINAY PAWAR

Bharati Vidyapeeth College of
Physical Education, PUNE (M.S.)
INDIA

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Blood is a specialized bodily fluid in man that function is to deliver the essential substances such as nutrients and oxygen to the cells and transport metabolic waste products away from those same cells. Blood is circulated around the body through blood vessels by the pumping action of the heart (Rogers, 2010). In man this process starts with lungs, arterial blood carries oxygen from inhaled air to the tissues of the body, and venous blood carries carbon dioxide, a waste product of metabolism produced by cells, from the tissues to the lungs to be exhaled. In blood, red blood cells and white blood cells are responsible for nourishing and cleansing the body. Since the cells are alive, they too need nourishment, vitamins and minerals to keep the blood healthy and to do their activities (Bain, 2006). The blood cells are also having a definite life cycle, just as all living organisms do. Approximately 55 per cent of blood is plasma, a straw-coloured clear liquid. The liquid plasma in the blood carries the solid cells and the platelets which help blood clot. Without blood platelets, an

individual would bleed to death (Dishman and Richard, 2004). Whenever, the human body loses a little bit of blood through a minor wound or any injury, the platelets cause the blood to clot so that the bleeding stops as quickly as possible. Because the process of new blood is always being made inside of your bones, the body can replace the lost blood immediately to meet the demand of the body (Schaller *et al.*, 2008). But sometime the human body loses a lot of blood through a major wound, that blood has to be replaced through a blood transfusion from other people.

The scientific name of white blood cell is leukocyte, which is among the one of several components that make up the blood that flows through the body (Daniels and Bromilow, 2010). White blood cells are generally known as the cells that do much of the work in keeping the body healthy, simply because they are playing a key factor role in the immune system of the body. Leukocytes are immune cells that make up approximately 1 per cent of whole blood of human. White

blood cell counts are usually expressed as the number of white cells per microlitre of blood, which is equal to one-millionth of a litre (Mitaishvili, 2010). A normal range of white blood cell count in the human blood is usually between 4,500 to 10,000 white cells per microlitre. White cells are formed in response to tissue trauma or damage, which may occur during enthusiastic exercise or the activity. This is the reason that white blood cell count may increase whenever an individual goes for exercising.

Dynamic exercise increases the leukocytes count in the blood, the mobile units of the body's defence system. As such there is an increase in neutrophils, lymphocytes and monocytes with a decrease in eosinophils and basophils. During brief exercise the leukocyte count rises rapidly mostly due to the mobilization of neutrophils and lymphocytes (Kjaer, 2003). Regular exercise increases resistance to infections such as the common cold. Moderate exercise stimulates the immune system and may be responsible for exercise related reduction in illness. A number of reports have shown that moderate exercise increases body defence against infection (LeMura, 2004).

On the basis of all the above mention informations and depth discussion with the experts of exercise physiologist, scholars had done a great effort to present gathered information in the form of a research topic.

■ METHODOLOGY

For the purpose of this study 30 male youth with mean age of 24.6 ± 1.76 from Pune city were selected as subjects. The subjects were further divided into two groups consisting of 15 subjects each as experimental and control group, respectively. The experimental group consisted of 15 football players from Pune United Football Club, Pune. The control group included 15 subjects from pune Engineering College. They were briefed about the cause of the study. The subjects were voluntarily stood by to participate in the study. The experimental groups engaged themselves in systematic and regular football training for the period of 6 month. The practice

session conducted twice in day for the six days in a week. Whereas, the control group was not participated in any physical activity/ exercise programme but they were active in their daily life routine. The blood sample of Total Leukocyte Count (TLC) on experimental and control group subjects were collected in the beginning of the study and after the complication of 6 month regular training. The blood sample was taken by a professional pathologist under the control condition. The randomised group pre-post design was used as a statistical design for this study. Analysis of Co-variance (ANCOV) was used as statistical tool for the comparison of mean difference between the experimental and control groups and analysed by SPSS 17 version. Following objectives were formulated for this study.

- To find out the effect of 6 month systematic football training on total leukocyte count in experimental group participants.
- To uncover the changes in total leukocyte count in control group partakers.
- To compare the experimental group and control group participants on total leukocyte count after the gap of 6 month.

■ OBSERVATIONS AND DISCUSSION

Analysis of co-variance (ANCOV) was used as statistical procedure for the comparison of mean difference between the experimental and control group on total leukocyte count which is presented in Table 1.

Table 1 depicts that the pre-test mean of experimental group was 6.34 and control group was 6.03 respectively. The table also shows that prèt-test value of F ratio was 4.60 which was statistically significant ($p < 0.05$). The post-test mean of experimental and control group were 7.79 and 6.72 in that order. The F value of post test mean was 12.2, being statistically significant ($p < 0.05$). The adjusted post-test mean value was 7.40 for experimental group and 6.82 for control group, respectively. F value of post-test mean was 6.90 being statistically significant ($p < 0.05$).

Post-hoc was applied to find out the significant

Table 1 : Analysis of co-variance on total leukocyte count of experimental and control groups

Mean	Experimental group	Control group	Sum of square	d.f	Mean sum of square	F-ratio
Pre-test	6.34	6.03	A	0.7	1	0.70
			W	4.28	28	0.15
Post-test	7.49	6.72	A	4.4	1	4.40
			W	10.07	28	0.35
Adjusted post-test	7.40	6.82	A	2.23	1	2.23
			W	8.63	27	0.31

Table 2 : Post-HOC mean difference comparison on total leukocyte count of experimental and control groups

Experimental group	Control group	Mean difference	Critical difference
7.40	6.82	0.58*	0.34

difference between experimental and control groups on total leukocyte count on adjusted post-test mean value which is presented in Table 2.

Table 2 reveals that mean difference of experimental and control groups was 0.58 which was statistically significant as the mean value was higher than critical difference 0.34 required to be significant at 0.05.

Therefore, it is to be predicted that regular football training brought increase in total leukocyte count in experimental group participants after 6 month of football training in comparison to the control group participants.

In human body normally, 7-8% of weight is from blood. In adults, this amounts goes up to 4.5-6 quarts of blood. This essential function of blood is to carry out the critical functions of transporting oxygen and nutrients to the cells and getting rid of carbon dioxide, ammonia, and other waste products from the human body. Apart from this, blood also plays a crucial role in human immune system and in maintaining a relatively constant body temperature. Four of the most important contents of blood are red cells, white cells, platelets, and plasma

White cells or leukocytes count in blood, stay alive in variable numbers and types but make up a very small part of blood's volume normally *i.e.* only about 1% in healthy people. Leukocytes are not only limited to blood in the body. But they occur elsewhere in the body as well, most markedly in the spleen, liver, and lymph glands. Most are produced in the bone marrow from the same kind of stem cells that produce red blood cells. Others are produced in the thymus gland, which is at the base of the neck. Some white cells (called

lymphocytes) are the first responders for our immune system.

Authors' affiliations:

JAIPRAKASH BHUKAR, Lakshmbai National University of Physical Education, GWALIOR (M.P.) INDIA

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