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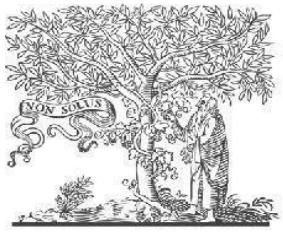

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Effect of Alternate High and Low Intensity Training and Progressive Training on Physical and Physiological Variables Among Boys

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Abstract
Physical fitness is a thing which one cannot afford to neglect. It is a major factor that determines the output of a person's life. Life will be miserable and unsuccessful without good health. The life without physical fitness is like "a ship without a radar." One who is physically fit enjoys robust health and has a fine physique and satisfactory levels of social and emotional adjustments. Fitness represents the capacity to live most vigorously and effectively with one's only resources.

Introduction
The sports activities are classified into several areas, such as performance sports, physical education, rehabilitation sports, fitness and leisure sports and adventure sports. Each area of sports caters to the requirements and demands of a particular section of the society. The area of performance sports has gained much more publicity and importance than the other areas.

The main components, which influence the physical performance of athletes, are strength, speed, agility, endurance, power, co-ordination, balance, flexibility and body control. As for as training in various track and field events and games speed, power, endurance and flexibility are considered as most important variables.
Sports' training is a conscious human activity. Also, it is a goal-oriented activity. Hence, sports training gives high weightage for studying the nature and genesis of sports performance in training and competition, similarly a large portion of sports training is devoted to the study of performance capacity which further comprises of physical condition, technique, coordinative abilities tactics, physique and psychic factors Haradayal Singh (1991).

The researcher proposed new methods of training "Alternate high and low intensity training." It is a method of training where the systematic conventional progressive training is mixed with periods of high and low intensity training. Here instead of increasing the load progressively (as in progressive training) period by period the load in the second period (easy period) is slightly reduced but in the third period (hard period) the load is on par with the load (in third week) in the progressive training group. Again in the fourth week the load is slightly reduced and so on. Importance of this method of training is the allocation of easy period (low intensity period) which helps the trainees physically and psychologically prepares them for the next phase

of training. Alternate high and low intensity training is more flexible to the athlete than the conventional progressive training.

The general principle of training that should be kept in mind when constructing a training program are (1) overload (2) consistency (3) specificity (4) progression (5) individuality (6) state of training (there should be separate training programs for beginners and well trained) (7) periodisation.

The speed, explosive power (Horizontal/Vertical), cardiovascular endurance, resting heart rate, resting respiratory rate and blood pressure (systolic/diastolic) are some of the most important criterion variables. These variables influence the athletic ability to achieve highest level of performance.

Normally progressive training enables to enhance required fitness components among athletes and alternate high and low intensity training gives athletes hard and easy period in training and there by more recovery period to accept heavy work load in the subsequent periods.

The primary purpose of the present study is to examine the effect of alternate high and low intensity training and progressive training on selected physical and physiological parameters among junior athletes and it also examine which training program will have better influence to develop the selected criterion variables.

Methodology

To achieve this purpose ninety students (N=90) were selected randomly as subjects from Ideal Junior & Degree Colleges, Kakinada, Andhra Pradesh India. Their age is between 16 and 18 years. The subjects were randomly divided into three groups and each group contained 30 subjects Group–I (n=30) underwent alternate high and low intensity training, group–II (n=30) and progressive training and group–III acted as control.

***Selection of variables*:** The available of techniques for the purpose of analysis, feasibility, reliability of the procedure and the outcome were extensively taken care of before finding the variables. After analyzing the various factors associated with the present study, the following most ideal variables were chosen to be tested during the study.

***Independent Variables*:** The researcher has made attempt to analyze the effects of two training methods. They are: (i) Alternate high and low intensity training and (ii) Progressive Training.

Criterion Variables: Each sports demands have specific qualities of physical and physiological systems for top class performance hence, the following criterion variables were selected.

***Physical variables*:** (a) Speed, (b) Explosive power (Vertical and Horizontal) and (c) Cardio vascular endurance

Physiological variables: (a) Resting heart rate, (b) Resting respiratory rate and (c) Blood pressure (Systolic and diastolic).

***Selection of Tests*:** The investigator has selected the standardized tests ideal for the chosen variables and most suitable for the chosen subjects for the purpose of the present study.

Table – I

Sl. No.	Name of the variable	Unit of Measures	Test/equipment
	Physical variables		
1	Speed	Seconds	50 metre dash
2	Explosive power (Horizontal) Explosive power (Vertical)	Metre Centimetre	Standing broad Jump Vertical jump
3	Cardio Vascular endurance	Metre	Cooper's 12 minutes run/walk
	Physiological variables		
4	Resting heart rate	Beat per minute	Automatic Blood Pressure monitor
5	Resting respiratory rate	Number per minute	Manual method
6	Blood Pressure i) Systolic blood pressure ii) Diastolic blood pressure	 mm. Hg mm. Hg	 Automatic Blood Pressure monitor

During training period the experimental groups namely alternate high and low intensity training group and progressive training group underwent their respective training program 5 days/week/12 weeks in

addition to their regular physical activities. Every training session workout lasted for about 45 to 60 minutes including worm-up and limbering down exercises. Control group did not participate in any specific training however they performed regular physical activities.

There are two ways to express the load, one is expressed as the maximal number of times a given load can be lifted correctly without rest between lifts. The loads are characterized by 2RM, 6 RM, 12 RM, etc. Berger (1962). Another way of expression the load is as a percentage of the 1 RM Handsen (1967). Mc. Donagh and Davis (1984) has established the relationship between these two methods of describing the training load empirically within the range of 1-12 RM.

The intensity variations in 12 weeks of training for alternate high and low intensity training and progressive groups are given below:

Table - II

Weeks	Percentage of intensity	
	Alternate high and low intensity group**	Progressive group*
1 – 2	80	80
3 – 4	85	83
5 – 6	80	86
7 – 8	90	89
9 – 10	85	92
11 – 12	95	95

*** Load increase – 3%**
**** Load Increase/decrease – 5%**
Recovery – Partial recovery

Test Administration: The following tests were administered for selected physical and physiological parameters. (i) Speed (50 metre dash), (ii) Explosive power (Standing broad jump), (iii) Cardiovascular endurance (Cooper's 12 minutes' walk/run), (iv) Resisting heart rate, (v) Resisting respiratory rate, (vi) Blood pressure (systolic and diastolic).

Analysis of Data and Results of The Study

The collected data pertaining to the study has been analysed and the results are presented hereunder:

Speed: The results concluded that alternate high and low intensity training has improved speed when compared to control group. Further, the results indicate insignificant difference between training groups and progressive training and control group on speed.

Explosive Power (Horizontal and Vertical): The progressive training and alternate high and low intensity training are effective methods to increase explosive power.

Cardio Vascular Endurance: From the results it has been concluded that both the alternate high and low intensity training and progressive training has increased cardiovascular endurance as compared to control group. Further, it indicates that insignificant difference between training groups. The present investigation involves 12 weeks of alternate high and low intensity training and progressive training. This training would cause the above mentioned changes in cardiovascular endurance.

Resting Heart Rate: From the results it has been concluded that both the high and low intensity training and progressive training has reduced resting heart rate when compared with control group. Further, the results indicate insignificant difference between training groups on resting heart rate. Hence, the researcher concluded that alternate high and low intensity training and progressive training are effective methods to reduce resting heart rate.

Resting Respiratory Rate: The results showed that alternate high and low intensity training is an effective method to reduce resting respiratory rate.

Blood pressure (systolic and diastolic): The results of the study revealed that alternate high and low intensity training has significantly reduced systolic blood pressure (SBP). But the reduction takes place by progressive training is not remarkably documented and the training

effect also fails to have significant difference on systolic blood pressure.

From the results of the study the following conclusions were drawn.

- Speed is significantly increased by alternate high and low intensity training. Further the improvement in speed is not in favour of progressive training.
- There is no difference between alternate high and low intensity training and progressive training on speed.
- Explosive power (Horizontal/Vertical) is remarkably documented in favour progressive training and alternate high and low intensity training.
- There is no significant difference between alternate high and low intensity groups and progressive training on explosive power (Horizontal and Vertical).
- Cardiovascular endurance has increased by progressive training and alternate high and low intensity training. But the significant difference does not exist between training groups.
- Resting heart rate (RHR) is significantly reduced by alternate high and low intensity training and progressive training.
- There is no difference between training groups on RHR.
- Resting respiratory rate (R3) is reduced only by alternate high and low intensity training whereas progressive training failed to reduce R3.
- There is no significant difference between alternate high and low intensity training and progressive training on R3.
- Systolic blood pressure (SBP) and diastolic blood pressure (DBP) is reduced only by the alternate high and low intensity training whereas progressive training has not influenced at significant level on systolic blood pressure and diastolic blood pressure.
- There is no difference between training groups on systolic blood pressure and diastolic blood pressure.

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