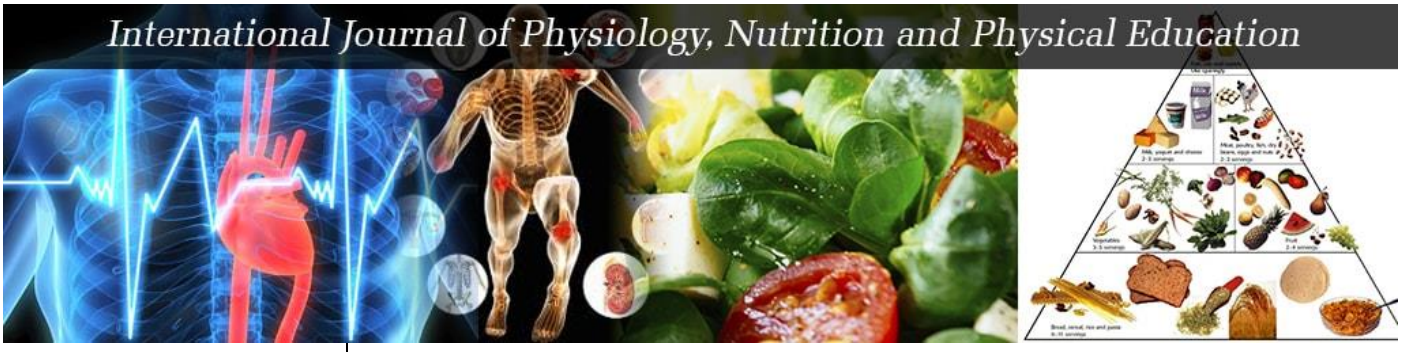

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Effects of strength training on selected physiological variables among basketball players

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Abstract
Introduction: The current study is on how 12 weeks of strength training impacts several physiological features in elite basketball players. The New Public School, Sec-18, and Sri Guru Harkrishan Model School, Sec-38, both in Union Territory Chandigarh, each had twenty basketball players recruited at random. Students' ages varied from 16 to 19. Each team contained 10 participants, and they were distributed equally between the strength training and control groups.
Method: This research used a completely random group design. The Strength training group's workouts were planned for 1.5 hours twice a week (on Tuesdays and Fridays). The control group was not allowed to take part in any of the training programmes beyond the normal, everyday practice they were already engaged in. Pulse rate at rest, systolic blood pressure, diastolic blood pressure, respiratory rate at rest, and peak expiratory flow rate were the physiological variables used for the research.
Results: The 't' test was calculated using SPSS with a significance threshold of 0.05 to examine the mean difference between the pre- and post-tests. Measures of cardiovascular health, including heart rate, blood pressure, and respiratory rate at rest, showed statistically significant improvement between the pre- and post-test periods.
Conclusion: It has been concluded that strength training has a positive effect on the physiological variables. Physiological variables in the control group showed no significant change between the pre- and post-test. Therefore, athletes should make this exercise a regular component of their schedules.

Keywords: Strength, heart rate, blood pressure, respiratory rate and basketball players

Introduction
Strength is perhaps the foremost crucial motor talent in sports, since all actions in sports is mainly generated by muscle shortening. Consequently, it could not be erroneous to argue that strength is a part and parcel of all-motor abilities, technical skills and plan of actions. The development of strength has virtually been the main component to improve performance in sports. It is the utilizable strength that is the main component, the strength which can be employed via the body to make it faster, quicker, and to alter the direction of the body movement, put a bigger amount energy into a cricket bat or racket head, or make the draw on an oar faster and longer. Weight training and other sorts of resistance workouts (using devices other than barbells and weight plates) are relevant ways of building different forms of strength. The intensity, density, length and repetitions needs to be adjusted in a manner that workouts contribute to increase of various kinds of strength. For resistance workouts, movements may be conducted against one's own body weight, weight of the partner, and even weight jackets, wrist and ankle collars can be utilized to add resistance. Medicine ball exercises, rubber cables exercise and several sorts of partner exercises may be conducted to develop strength (Uppal, 2013) [5].
The sequential arrangement of strength training exercises is crucial because of two reasons. First, the bigger muscle group should be worked before the smaller ones, since overloading the major muscles is difficult as the smaller muscle groups activate more rapidly. Secondly, no two physical workouts should train the same set of muscles consecutively, because the muscles will have a very little recuperation period. Beginning of weights may be based on the percentage of either the athlete's body weight or his or her optimum performance in each activity. Strength training focuses either the body growth (Hypertrophy) or the strength; it relies on the weight and number of repetitions of exercises (Bowerman and Freeman, 1991) [1].

Methods and procedure

This study is an example of analytic research that takes an experimental approach. This research used an experimental design with randomly assigned groups. Twenty (20) basketball players from Union Territory Chandigarh's The New Public School, Sec-18, and Sri Guru Harkrishan Model School, Sec-38, were used as the study's sample. The pupils' ages ranged from 16 to 19. A total of 20 players were split evenly between the Strength Training Group and the Control Group. The Strength training group's training programme was set for 1.5 hours, or between 4:00 and 5:30 PM, twice weekly (on Tuesdays and Fridays). Members of the control group were barred from taking part in anything other than their regular practice. The study's conclusion followed the data's transformation into statistical analysis. Initial (pre-test) and final (post-12-weeks of training) measurements were obtained for all variables (post-test).

The study's chosen physiological variables were assessed in beats per minute (BPM), millimeters of mercury (mmHg), breaths per minute (bpm), and litres (LEF). The 't' test was calculated in SPSS at a significance level of 0.05 to examine the difference in mean scores between the pre- and post-tests.

Data Analysis and Results

For the variables, the statistical analysis between the pre-test and post-test of experimental group and control group regarding resting pulse rate, systolic blood pressure, diastolic blood pressure, resting respiratory rate and peak expiratory flow rate among basketball players has been given in table 1 and 2. There were significant differences between the pre-test and post-test results.

Table 1: Comparison of pre-test and post test of Strength training group with regard to selected physiological variables among basketball players (Experimental Group)

Variables	Test Condition	N	Mean	Std. Deviation	Mean Difference	t-value	p-value
Resting Pulse Rate (Beats/Minute)	Pre-test	10	74.7	5.6	4.8	10.854	0.0001**
	Post-test	10	69.9	6.2			
Systolic Blood Pressure (mmhg)	Pre-test	10	120.3	4.9	5.6	5.650	0.0001**
	Post-test	10	114.7	3.4			
Diastolic Blood Pressure (mmhg)	Pre-test	10	81.3	5.7	5.4	15.885	0.0001**
	Post-test	10	75.9	5.5			
Resting Respiratory Rate (Breath/Minute)	Pre-test	10	19.5	2.1	3.7	10.091	0.0001**
	Post-test	10	15.8	1.0			
Peak Expiratory Flow Rate (Liters)	Pre-test	10	409.0	50.9	143.0	12.379	0.0001**
	Post-test	10	552.0	45.4			

The pre-test and post-test changes in physiological variables for the basketball players who participated in the strength training programme are shown in Table 1. When looking at table 1, it can be seen that the strength training group portrayed the mean score of 74.7 and SD 5.6 for the pre-test, while the mean score dropped to 69.9 and SD 6.2 for the post-test. This can be seen on the variable resting pulse rate pre-test and post-test. With a p-value of 0.0001 (less than 0.001), the t-value of 10.854 for the pre-test and post-test was statistically very significant. This pertains to the resting pulse rate.

It has been shown that the mean systolic blood pressure and SD values with reference to the pre-test were 120.3 and 4.9 as contrasted to these values post-test, which had attained the mean 114.7 and standard deviation 3.4 for the strength training group on the basketball player. Basketball players' pre-test and post-test systolic blood pressure was significantly different, as shown by a t-value of 5.650 and a p-value of 0.0001, respectively.

The pre-test diastolic blood pressure had reached a mean of 81.3 with a standard deviation of 5.7. while the results of the post-test showed a mean of 75.9 and a standard deviation of 5.5. It was determined that the t-value of 15.885 for the pre-test and post-test of diastolic blood pressure was statistically significant, with a p-value of 0.0001 (0.001).

In the case of the pre-test, the mean score and standard deviation of the strength training group were 19.5 and 2.1 respectively. In the case of the post-test, the mean score and standard deviation of the strength training group were 15.8 and 1.0 respectively. The findings of the paired sample t-test (t-10.091, p-value 0.0001(0.001)) indicate that the pre-test and post-test resting respiratory rates of basketball players were significantly distinct.

The difference in peak expiratory flow rate between the pre-test mean of 409.0 with a standard deviation of 50.9 and the post-test mean of 552.0 with a standard deviation of 45.4 was statistically significant with a t-value of 12.379 and a p-value of 0.0001 (0.001), according to the results of a paired sample 't' test.

Table 2: Comparison of pre-test and post-test of control group with regard to selected physiological variables among basketball players

Variables	Test Condition	N	Mean	Std. Deviation	Mean Difference	t-value	p-value
Resting Pulse Rate (Beats/Minute)	Pre-test	10	73.1	6.6	0.7	1.769	0.111^{NS}
	Post-test	10	72.4	6.5			
Systolic Blood Pressure (mmhg)	Pre-test	10	120.0	2.8	0.9	0.797	0.446^{NS}
	Post-test	10	119.1	3.9			
Diastolic Blood Pressure (mmhg)	Pre-test	10	77.5	3.3	0.6	1.203	0.260^{NS}
	Post-test	10	78.1	3.6			
Resting Respiratory Rate (Breath/Minute)	Pre-test	10	19.4	1.2	0.3	0.580	0.576^{NS}
	Post-test	10	19.7	1.8			
Peak Expiratory Flow Rate (Liters)	Pre-test	10	445.0	49.7	3.0	0.818	0.434^{NS}
	Post-test	10	448.0	50.1			

Table 2, displays the descriptive statistics and paired t-ratio of Pre-test and post-test in control group for physiological variables such resting pulse rate, systolic blood pressure, diastolic blood pressure, resting respiratory rate and peak expiratory flow rate among basketball players. It is demonstrated that mean and SD values with reference to pre-test of Control group on the basketball players resting pulse rate were 73.1 and 6.6 as contrasted to these values post group had got the mean 72.4, standard deviation 6.5. The 't'-value 1.769 for pre-test and post-test on the basketball players resting pulse rate was with p-value 0.111 which was non-significant.

In control group pre-test and post-test systolic blood pressure of basketball players, shows mean score of 120.0 and SD 2.8 for pre-test and mean score 119.1 and SD 3.9 for post-test. The estimated t-value 0.797 for pre-test and post-test was determined to be statistically non-significant with p-value 0.446 (>0.05).

Diastolic blood pressure in pre-test had secured mean 77.5, standard deviation 3.3. However post-test secured mean 78.1, standard deviation 3.6. The t-value 1.203 for pre-test and post-test of diastolic blood pressure was determined to be statistically non-significant p-value 0.260 (>0.05).

In instance of pre-test mean resting respiratory rate was 19.4, standard deviation 1.2 while mean and standard deviation in post-test were 19.7, 1.8 respectively. The resultant t-value 0.580 for pre-test and post-test was statistically non-significant as the p-value was 0.576 (>0.05).

A paired sample 't' test for control group mean difference with respect to peak expiratory flow rate between the pre-test mean 445.0, standard deviation 49.7 and the post group mean 448.0, standard deviation 50.1 which were statistically non-significant with t-value 0.818 and p-value 0.434 (>0.05).

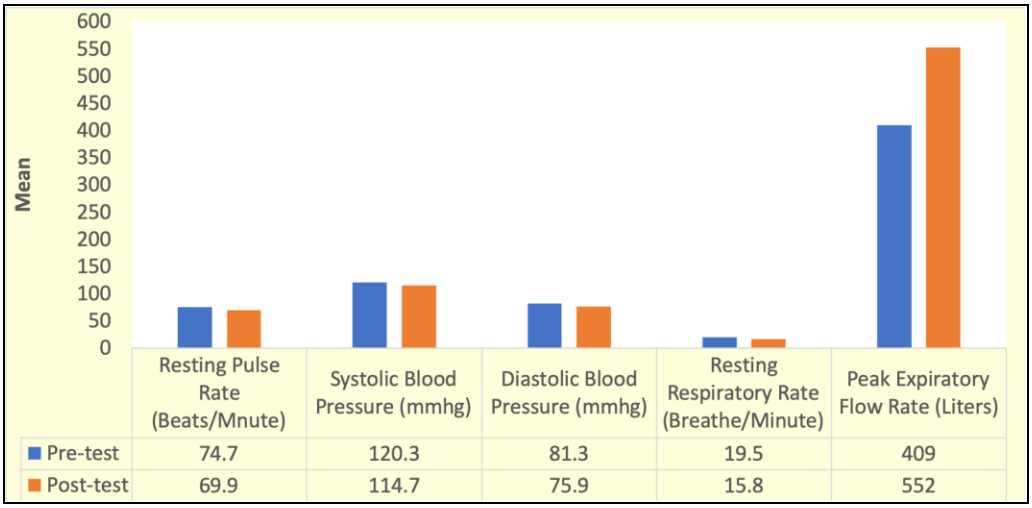

Fig 1: The Graphical Representation of Mean Score of Pre-Test and Post-Test Measurements for Experimental Group

According to the findings of the research conducted on basketball players and their physiological variables, such as resting pulse rate, systolic blood pressure, diastolic blood pressure, resting respiratory rate, and peak expiratory flow rate, the experimental group, which was called the Strength training group, had significantly improved after the 12 weeks of training, whereas the control group did not show any significant difference between their pre-test and post-test results. The findings are consistent with those of an earlier study that was carried out by Mohammad *et al*., (2012) [4]. That study revealed the effects of a six-week strength training programme that were evaluated on thirty young male athletes between the ages of 15 and 17, and the findings showed a significant increase in static and dynamic balance in the experimental group (P = 0.001). The research conducted by Guigan *et al*. (2012) [2] attempted, among other things, to determine the significance of strength training for athletes. Similar findings were found in the research conducted by Kumar (2015) [3], which found that strength training led to substantial changes in the physical and physiological variables as well as the skill performance factors of college males who played football.

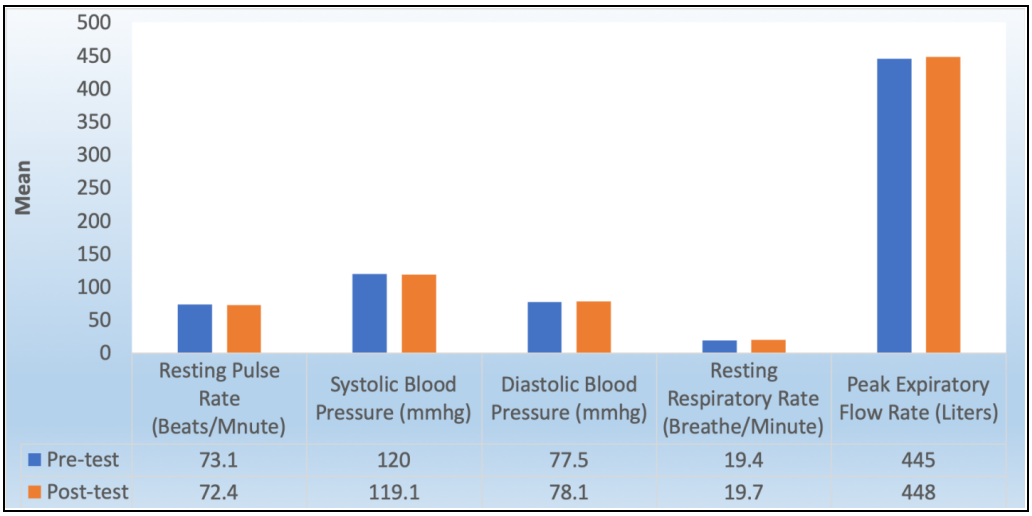

Fig 2: The Graphical representation of Mean Score of Pre-Test and Post-Test Measurements for Control Group

Conclusion

A strength training programme is an essential component of an athlete's overall training regimen, since it not only improves an athlete's performance but also influences their physiological factors. In addition, several studies have shown its use for sportspeople, particularly sportsmen and players. The purpose of this research was to investigate the effects of a strength training programme on athletes in order to determine the effects that this programme has on physiological factors such as the respiratory rate, the systolic blood pressure, and other factors. Participants in the research were selected based on their ability on the basketball court. It was discovered that strength training had a discernible and substantial influence on the physiological variables that were selected for the investigation. The majority of the variables demonstrated a statistically significant change between the pre-test and the post-test findings. Therefore, it is reasonable to deduce that strength training has a visible influence on the different physiological parameters of players, since this impact can be shown to have a positive effect on the players. It is efficient kinds of training that may help athletes enhance their levels of physiological variables.

References

1. Bowerman WJ, Freeman WH. High Performance Training for Track and Field. Champaign U.S.A: Leisure press; c1991.
2. Guigan MR Mc, Wright GA, Fleck SA. Strength Training for Athletes: Does it really help Sports Performance. International Journal of Sports Physiology and Performance. 2012;7(1):2-5.
3. Kumar PS. Effects of Isolated and Combined SAQ and Strength Trainings on Selected Physical, Physiological Blood Lipids and Skill Performance Variables of Intercollegiate Men Football Players. Unpublished Ph.D. Thesis, Bharathiar University, Coimbatore; c2015.
4. Mohammadi V, Alizadeh M, Gaieni A. The Effects of Six Weeks Strength Exercises on Static and Dynamic Balance of Young Male Athletes. Procedia - Social and Behavioral Sciences. 2012;31:247-250.
5. Uppal AK. Science of Sports Training. Delhi: Friends publications; c2013.