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## Effect of resistance and circuit training packages on selected physiological parameters among hand ball players

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### Abstract

The study sought to investigate the effect of resistance and circuit training packages on selected physiological parameters among hand ball players. To achieve the purpose of the study (N=45) forty five men hand ball players were selected from Bharathidasan University, Tamilnadu, India as subjects. The age of the subjects ranged from 19 to 23 years. The selected subjects were divided into three equal groups (N=15). Group I underwent resistance training. Group II underwent circuit training. Group III acted as control group who did not undergo any specialized training program other than their daily routine. The physiological parameter such as heart rate, breathe holding time, blood pressure. Were selected as dependent variables and they were assessed by stop watch, digital monitor, and stop watch - beats respectively. The subjects were concerned with their particular training for a period of six weeks, three days per week. The collected data from three groups prior to and immediately after the training programme on selected criterion variables were statistically analyzed with analysis of covariance (ANCOVA). The level of confidence was fixed at 0.05 for all the cases to test the hypothesis. The result of the study reveals that the resistance training and circuit training groups achieved significant improvement on selected physiological parameters such as heart rate, breathe holding time, blood pressure of inter college men hand ball players.

**Keywords:** Resistance training, circuit training, physiological parameter, heart rate, breathe holding time and blood pressure

### Introduction

Resistance training involves a weight or moving against a force that is resistive through a range of motion. This resistive force can be in form of free weights, machine equipment and even one's own body weight. This resistive force can be in as a type of dumbbells, device equipment as well as one's weight that is own. A lot of the daily exercise sessions contain the utilization of free weights or machines which can be standard. The weight is in form of dumbbells and barbells and devices utilize different systems like cable-and-pulley system. Weight lifting generally speaking includes those exercises where you make use of weightseither in from of barbells, dumbbells, or weight devices. Resistance training include variations of weight training exercises, such as using dumbbells or barbells and also utilizing human anatomy that is very own for working out (Singh, et. al., 2011) [1]. The caloric cost of exercise can be increased to bring about improvements in more than one aspect of fitness by modifying the standard approach to resistance training. This approach, called circuit resistance training, (Heward) or Circuit resistance training, de-emphasizes the brief intervals of heavy-local muscle overload, providing for a more general conditioning to improve body composition, muscle strength and endurance, and cardiovascular fitness (Ballor, 1989) [2]. With this approach, a person lifts a weight between 40 and 55 percent of the 1- RM. The weight is then lifted as many times as possible for 30 seconds. After a 15-second rest, the participant moves to the next resistance exercise station and so on to complete the circuit. Between 8 and 15 exercise stations are usually used. (A modification that appears to result in similar energy expenditures during CRT is to employ exercise-torest ratios of 1:1 with either 15- or 30-second exercise periods).

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The circuit is repeated several times to allow for 30 to 50 minutes of continuous exercise. As strength increases, a new 1-RM is determined and the weight lifted is increased accordingly at each station (Ballor 1989) [2].

### Methodology

To achieve the purpose of the study (N=45) forty five men hand ball players were selected from Bharathidasan University, Tamilnadu, India as subjects. The age of the subjects ranged from 19 to 23 years. The selected subjects were divided into three equal groups (N=15). Group I underwent resistance training. Group II underwent circuit training. Group III acted as control group who did not

undergo any specialized training program other than their daily routine. The physiological parameter such as heart rate, breathe holding time, blood pressure. Were selected as dependent variables and they were assessed by stop watch, digital monitor, and stop watch - beats respectively. The subjects were concerned with their particular training for a period of six weeks, three days per week. The collected data from three groups prior to and immediately after the training programme on selected criterion variables were statistically analyzed with analysis of covariance (ANOVA). The level of confidence was fixed at 0.05 for all the cases to test the hypothesis.

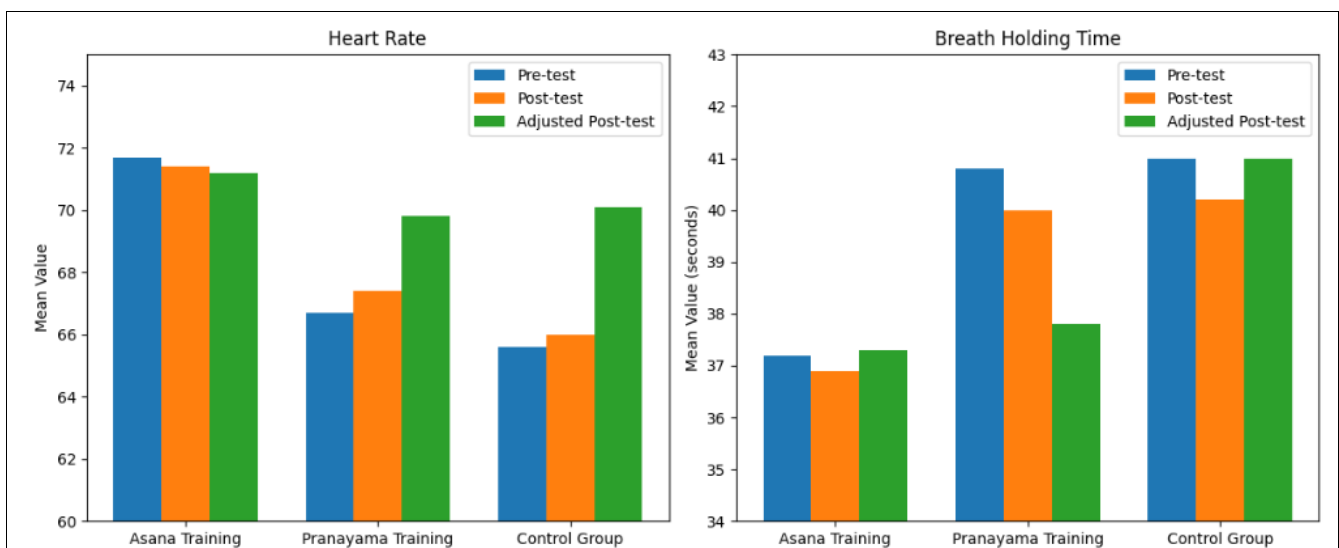
**Table 1:** Computation of Analysis of Covariance of Means of Resistance Training and Circuit Training and Control Group on Heart Rate, Breathe Holding Time and Blood Pressure. (In Seconds and Mints).

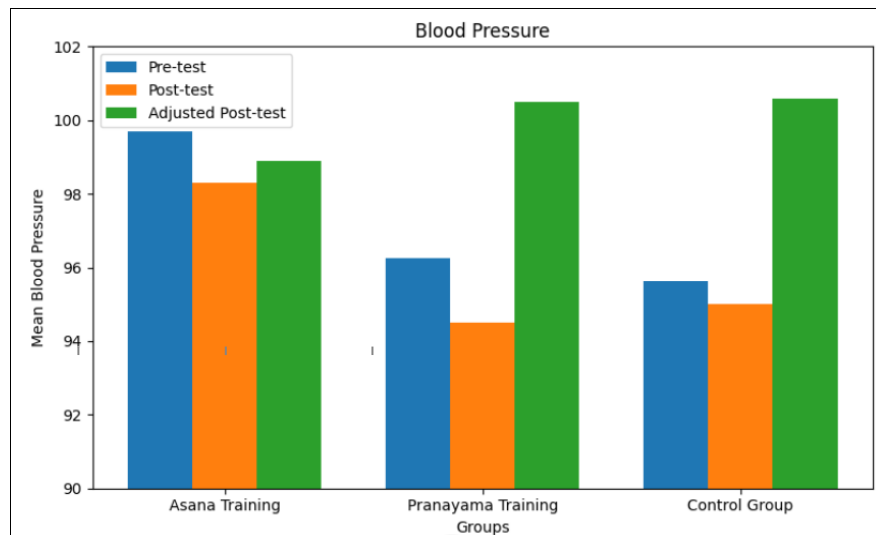
Variable	Test	RTG	CTG	CG	Source of Variance	Sum of Squares	df	Mean Square	F-ratio
Heart Rate	Pre-test	71.70	71.60	71.25	Between	2.23	2	1.12	0.03
					Within	2506.75	57	43.98	
	Post-test	66.70	67.45	69.85	Between	108.30	2	54.15	1.70
					Within	1815.70	57	31.85	
	Adjusted Post-test	66.56	67.39	70.05	Between	133.29	2	66.65	10.75*
					Within	347.33	56	6.20	
Breath Holding Time	Pre-test	37.20	36.90	37.25	Between	1.43	2	0.72	0.02
					Within	1926.75	57	33.80	
	Post-test	40.75	40.00	37.75	Between	97.50	2	48.75	1.94
					Within	1435.50	57	25.18	
	Adjusted Post-test	40.69	40.15	37.66	Between	104.96	2	52.48	6.36*

\*Significant at 0.05 level of confidence. (Table value with df 2 and 57 and 2 and 57 were 2.96)

The pre, post-test and adjusted post-test mean values of Heart Rate on Resistance Training Group (RTG), Circuit Training Group (PTG) and Control Group (CG) were 71.70, 71.60, 71.25., 66.70, 67.45, 69.85 and 66.56, 67.39, 70.05 respectively. The obtained F value of adjusted post-test were 10.75 was greater than the table value of 2.96. Hence it was proved that there were significant improvements on Heart Rate of inter college men handball players. The pre, post-test and adjusted post-test mean values of Breath Holding Time on Resistance Training Group (RTG), Circuit Training Group (PTG) and Control Group (CG) were 37.20, 36.90, 37.25., 40.75, 40.00, 37.75 and 40.69, 40.15, 37.66 respectively. The

obtained F value of post-test and adjusted post-test were 6.36 was greater than the table value of 1.94. Hence it was proved that there were significant improvements on Breathe Holding Time of inter college men handball players. The pre, post-test and adjusted post-test mean values of Blood Pressure on Resistance Training Group (RTG), Circuit Training Group (PTG) and Control Group (CG) were 99.70, 98.30, 98.90., 96.25, 94.50, 100.50 and 95.64, 95.06, 100.56 respectively. The obtained F value of post-test and adjusted post-test were 95.26 was greater than the table value of 7.20. Hence it was proved that there were significant improvements on Blood Pressure of inter college men handball players.





**Fig 1:** Pre, Post and Adjusted Post Test Means of Resistance Training and Circuit Training and Control Group on Heart Rate, Breathe Holding Time and Blood Pressure.

### Discussion of Findings

The result of the study indicates that the experimental group namely as resistance training and circuit training had significantly improved in the selected dependent variables namely as Heart Rate, Breathe Holding Time, Blood Pressure. It is also found that the improvement caused by resistance training and circuit training was better when compared to control group (Thiruvangadam, S., & Mohanakrishnan, R. (2023) <sup>[3]</sup>.

### Conclusion

The experimental group's namely as resistance training and circuit training had achieved significant improvement on selected the physiological variables such as Heart Rate, Breathe Holding Time, Blood Pressure when compared to control group. It was concluded that resistance training as better improvement when comparing to the circuit training groups on selected the physiological variables such as Heart Rate, Breathe Holding Time and Blood Pressure. It was concluded that college level player should practice both resistance training and circuit training for positive enhancement of playing.

### References

1. Singh P, Hemang S, Jani S, John V, Singh P. Effects of upper body resistance training on pulmonary functions in sedentary male smokers. *Lung India*. 2011;28(3):169-173.
2. Ballor DL, Becque MD, Katch VL. Energy output during hydraulic resistance circuit exercise for males and females. *Journal of Strength and Conditioning Research*. 1989;3(1):7-12.
3. Thiruvangadam S, Mohanakrishnan R. Merged impact of yogic practice and interval training on flexibility and resting heart rate of middle-aged armed reserve police men in Cuddalore District. *Korean Journal of Physiology and Pharmacology*. 2023;27(2):33-36.
4. Bompa TO, Buzzichelli C. Periodization: theory and methodology of training. 6th ed. Champaign (IL): Human Kinetics; 2019. p. 1-412.
5. Fleck SJ, Kraemer WJ. Designing resistance training programs. 4th ed. Champaign (IL): Human Kinetics; 2014. p. 1-360.