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PHYSIOLOGICAL PARAMETERS RESPONSE TO THE INFLUENCE OF PRANAYAMA PRACTICES AFTER ENDURANCE TRAINING ON FOOTBALL PLAYERS

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ABSTRACT

This study investigated the physiological parameters response to the influence of pranayama practices after endurance training on football players. To achieve the purpose of the study 30 inter-collegiate male football players were selected from affiliated colleges of Bharathiar University, Coimbatore. The subjects was randomly assigned to two equal groups (n=15). Group- I underwent pranayama practices after endurance training (PAETG) and group - II was acted as control group (CG). The pranayama practices after endurance training was given to the experimental group for 3 days per week (Monday, Wednesday and Friday) for the period of twelve weeks. The control group was not given any sort of training except their routine work. The physiological parameters of vital capacity (wet spirometer), resting pulse rate (radial pulse) and breath holding time (holding breath test for time) were measured. Before and after training period the data collected from the subjects was statistically analyzed with't' rest to find out significant improvement if any at 0.05 level of confidence. The result of the vital capacity, resting pulse rate and breath holding time speculated significant improvement due to influence of pranayama practices after endurance training with the limitations of (diet, climate, life style) status and previous training. The result of the present study coincide findings of the investigation done by different experts in the field of sports sciences. Influence of pranayama practices after endurance training significantly improved vital capacity, resting pulse rate and Breath holding time of inter-collegiate male football players.

KEY WORDS: *Pranayama practices after endurance training, Vital capacity, Resting pulse rate and Breath holding time.*

INTRODUCTION

ENDURANCE

Endurance, aerobic fitness, stamina is the ability to exercise continuously for extended periods without tiring. A person's aerobic fitness level is dependent upon the amount of oxygen which can be transported by the body to the working muscles via the lungs and blood system, and the efficiency of the muscles to use that oxygen. Endurance is a factor in a vigorous performance, methods of increasing it are of primary concern. Endurance is one of basic components of general athletic ability, and it is usually considered to be the most important component a physiological fitness. Some of the activities in which endurance is of prime importance are running. swimming, cycling, wrestling, basketball, soccer, rugby and kabaddi. in all of these activities, endurance training occupies an important place in preparation for performance. Endurance performance represents a complex interplay between several physiological factors, including maximal oxygen uptake (VO2max), aerobic endurance (AE) and the energy cost of running (**Prampero et al., 1986**). Endurance training consists, therefore in implementing exercise protocols that will enhance at least one of these determinants, in order to increase overall performance.

Pranayama

It is one among Ashtanga Yoga, which is a procedure of controlling mind by controlling the Vayu (air) in inspiration and expiration. It is not only having psychological benefits but it is having many physical benefits also (**SudShushanth et al.,2013**).Considering its benefits it was given utmost importance in ancient texts like Hathayoga Pradeepika, Bhavishyapurana, Atharvanaveda, Kausheetaki Upanishat, Sharangadhara Paddhati, Taittireeyopanishat, Manusmriti and Gheranda Samhita etc (**Panduranga et al.,2008**). There are three steps in the practice of Pranayama like Puraka, Kumbhaka (Bahyaor Shunyaka and bhyantara) and Rechaka. Further Pranayama is sub-divided into 8 types like Suryabhedana, Ujjayee, Sheetalee, Bhramaree, Bhastrikaa, Sheetkaaree, Moorchaa, Plaavinee(**Rao 2014**). All the types of Pranayama involves deep inspiration, with holding of air and deep expiration respectively which will show their influence on different physiological entities involved in respiration thereby significantly improve lung volumes and capacities (**Subbalakshmi et al., 2005, Keerthi et al., 2013, Dinesh et al., 2012**) In view of this, the present study was planned to study the effect of gender on the autonomic and electrocardiographic response to yoga type breathing. Physiology of respiration (**Sembulingam et al., 2012**) Breathing is the only autonomic function that can be consciously controlled and it is the key in bringing sympathetic and parasympathetic nervous system into harmony (**Shankarappa et al., 2012**). Air that is inspired through nose will pass via trachea, bronchi, bronchioles and finally end up in the alveoli, where the actual process of gaseous exchange of the lungs and blood takes place (external respiration) through respiratory membrane. Again at the level of tissues, exchange of gases takes place between blood and tissues (internal respiration).

The hypothesis argued in this paper is that inter collegiate football players can significantly increase the physiological parameters of vital capacity, breath holding time and significantly reduce resting pulse rate and by combining normal technical and tactical sessions with a pranayama practices after endurance training program over a consecutive 12 weeks period. Therefore, the object of this study was to investigate the changes in the parameters produced during 12 weeks of pranayama practices after endurance training in 15 inter collegiate football players.

METHODS

Experimental Approach to the Problem

In order to address the hypothesis presented herein, we selected 30 inter-collegiate male football players from affiliated colleges of Bharathiar University, Coimbatore. The subjects were randomly assigned in to two equal groups namely, Pranayama Practices after Endurance Training group (PAETG) (n=15) and Control group (CG) (n=15). The respective training was given to the experimental group the 3 days per weeks (alternate days) for the training period of twelve weeks. The control group was not given any sort of training except their routine.

DESIGN

The evaluated physiological parameters were vital capacity was assessed by wet spirometer and the unit of measurement was in ml, resting pulse rate was assessed by radial pulse the unit of measurement was in numbers, breath holding time were assessed by breath holding test the unit of measurement was in seconds. The parameters were measured at baseline and after 12 weeks of pranayama practices after endurance training were examined.

Training programme

The training programme was lasted for 45 minutes for session in a day, 3 days in a week for a period of 12 weeks duration. This 45 minutes included 5 minutes warm up, endurance training for 20 minutes, 15 minutes pranayama practices and 5 minutes warm down. Every three weeks of training 5% of intensity of load was increased from 65% to 80% of work load. The volume of endurance training is prescribed based on the number of sets and repetitions. The equivalent in pranayama practices after endurance training is the length of the time each action in total 3 day per weeks (Monday, Wednesday and Friday).

STATISTICAL ANALYSIS

The collected data before and after training period of 12 weeks on the above said variables due to the effect of pranayama practices after endurance training was statistically analyzed with‘t’ test to find out the significant improvement between pre and post test. In all cases the criterion for statistical significance was set at 0.05 level of confidence. ($P < 0.05$)

Table - I

Computation Of ‘t’ Ratio On Selected Physiological Parameters Of Inter Collegiate Male Football Players On Experimental Group And Control Group

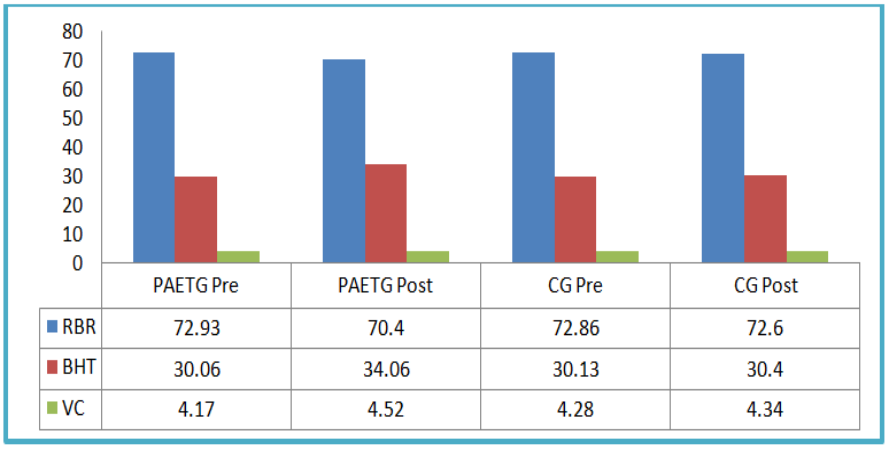
(Scores in numbers)

Group	Variables		Mean	N	Std. Deviation	Std. Error Mean	T ratio
Experimental Group	RPR	Pre test	72.93	15	0.96	0.24	7.23*
		Post test	70.40	15	1.45	0.37	
	BHT	Pre test	30.06	15	3.01	0.77	5.42*
		Post test	34.06	15	3.75	0.96	
	VC	Pre test	4.17	15	0.33	0.08	5.42*
		Post test	4.52	15	0.24	0.06	
Control group	RPR	Pre test	72.86	15	2.06	0.53	0.71
		Post test	72.60	15	2.47	0.63	
	BHT	Pre test	30.13	15	2.47	0.63	0.48
		Post test	30.40	15	2.82	0.72	
	VC	Pre test	4.28	15	0.23	0.06	2.01
		Post test	4.34	15	0.27	0.06	

*significant level 0.05 level degree of freedom (2.14,1 and 14)

Table I reveals the computation of mean, standard deviation and 't' ratio on selected physiological parameters namely vital capacity, resting pulse rate and breath holding Time of experimental group. The obtained 't' ratio on vital capacity, resting pulse rate and breath holding time were 7.23, 5.42 and 5.42 respectively. The required table value was 2.14 for the degrees of freedom 1and 14 at the 0.05 level of significance. Since the obtained 't' values were greater than the table value it was found to be statistically significant.

Further the table reveals the computation of mean, standard deviation and 't' ratio on selected physiological parameters, namely vital capacity, resting pulse rate and breath holding time of control group. The obtained 't' ratio on vital capacity, resting pulse rate and breath holding time were 0.71, 0.48 and 2.01 respectively. The required table value was 2.14 for the degrees of freedom 1 and 14 at the 0.05 level of significance. Since the obtained 't' values were lesser than the table value it was found to be statistically not significant.



	PAETG Pre	PAETG Post	CG Pre	CG Post
RBR	72.93	70.4	72.86	72.6
BHT	30.06	34.06	30.13	30.4
VC	4.17	4.52	4.28	4.34

Figure - I

Bar diagram showing the mean value on selected physiological parameters of inter collegiate male football players on experimental and control group

(Scores in numbers)

DISCUSSION AND FINDINGS

The present study experimented the impact of twelve weeks pranayama practices after endurance training on the selected physiological parameters of the inter collegiate male football players. The results of this study indicated that pranayama practices after endurance training is more efficient to bring out desirable changes over the vital capacity, resting pulse rate and breath holding time of the inter - colligate male football players. The finding of the present study had similarity with the findings of the investigators referred in this study. Raja et al., (2013) evaluated aerobics exercise on training cessation helped to increase Resting heart rate and breath hold timing .The forced vital capacity decreases due to the training cessation on aerobics exercises of high fat intake young men in Chennai. Andrew et al., (2000) Endurance exercise training results in numerous adaptations to the neuromuscular, metabolic, cardiovascular, respiratory and endocrine systems. These adaptations are reflected in improvements in the key parameters of aerobic fitness, namely the VO2max, exercise economy, the lactate/ventilator threshold and the CP which will influence the oxygen uptake kinetics. Dawans et al., (2014) a 12-week endurance exercise program significantly reduced the reactivity to a psychosocial stressor in terms of cortisol, heart rate (HR), and heart rate variability (HRV). Sivaraman et

al., (2014) There was a significant decrease on resting pulse rate between aerobic training group and control group. Selvaganesh(2015) demonstrated that, aerobic training has significant impact on cardio respiratory endurance, flexibility, vital capacity and resting pulse rate. Muralikrishna et al., (2014) High intensity aerobic training positively influences the cardiopulmonary (vital capacity) variable of middle-aged obese men. Shankarappa et al., (2012) Pranayama training causes an increase in the voluntary breath holding time. Pradnya et al., (2013) It also improves cardiac efficiency as indicated by significant decrease in pulse rate & highly significant increase in 40 mmHg endurance time. Keerthi et al., (2013) the Pranayama procedures the only respiratory parameter that will reduce is the rate of respiration and all the other parameters including volumes and capacities will increase depending on the regularity of practice. Pushparajan et al., (2015) investigation indicates that twelve weeks of power yoga practice and significantly reduce the resting pulse rate and significantly can increase the vital capacity among middle aged men. Rahul et al., (2015) conclude that pranayama exercises have positive effect on the selected physiological variables resting pulse rate, maximum breath holding.

From of result of the present study, it is speculated that the improvement in the vital capacity of the subjects may be due to the improvement in breath holding time are reduction in resting plus rate, further, the planned programme pranayama practices after endurance training might have influenced the resting plus rate and breath holding time of the subjects involved in this study.

CONCLUSIONS

1. It was concluded that 12 weeks twelve weeks pranayama practices after endurance training significantly improved the vital capacity, resting pulse rate and breath holding of the inter collegiate male football players.
2. Pranayama practice after endurance training is one among the most appropriate means to bring about the desirable changes over physiological variables of football players. Hence, suggested that coaches and the experts deal with football players to incorporate pranayama practices after endurance training as a component in their training programme.

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