

Effect of resistance and aerobic training on selected physical and physiological variables among male football players

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Abstract

The purpose of the study was to investigate the effect of resistance and aerobic training on selected physical and physiological variables among male football players. For the present study, 45 male football players from Annamalai University, Chidambaram, Tamil Nadu State, India, were selected at random and their age ranged from 18 to 25 years. For the present study pre-test and post-test randomized group design which consists of experimental and control groups was used. The subjects were randomly assigned into three equal groups of fifteen subjects and named as Group-I, Group-II and Group-III. Group-I underwent resistance training, Group-II underwent aerobic training and Group-III acted as control and was not exposed to any specific training or conditioning. The selected physical and physiological variables were muscular strength and vital capacity. The standardized tests/equipments were used to collect relevant data namely pushups and peak flow meter. The data was collected before and after six weeks of training. The data was analysed by applying Analysis of Co-Variance (ANCOVA) technique to find out the effect of resistance and aerobic training programme. The Scheffe's post hoc was used to find the paired mean difference if any. The level of significance was fixed at 0.05 level of confidence. The findings of the present study strongly indicates that resistance and aerobic training of six weeks has significant impact on selected physical and physiological variables namely muscular strength and vital capacity of football players.

Keywords: Football, Resistance, Aerobic, Physical, and Physiological.

Introduction

Resistance training (RT) is an important tool for improving health and performance for one and all (Azeem, 2019). Resistance training, also known as strength or weight training has become one of the most popular forms of exercise for enhancing an individual's physical fitness as well as for conditioning purposes (Samuel, 2017). Resistance training is based on the principle that muscles of the body will work to overcome a resistance force when they are required to do so. When you do resistance training repeatedly and consistently, your muscles become stronger (Jayakumar, 2017). To

understand the value of resistance training, it is necessary to understand how the body works. The human body is more complex than any machine ever built, and it may be impossible to understand it completely. Over the past hundred years, research has unveiled some pretty cool stuff about the overall benefits of weight training, and we have understood why our bodies increase in size, strength, and power when using external loads for resistance (David, 2010).

Aerobic training implies that the training programme is designed to improve the oxygen transport system. It is imperative during soccer match -play and training sessions that there is a good supply of oxygen to the active muscles and that these tissues have the capability to use the oxygen that is provided by the circulatory system. Aerobic training therefore has central and peripheral aspects, an effect on the cardiac output and circulation of blood on one hand and an increased ability of the muscle to take up and utilize the oxygen that is offered.(Kumaravelu,2021) Aerobic exercise is a type of rhythmic movement activity which involves same group of muscles repeatedly for the entire duration of exercise or activity that uses the body's larger muscles groups, the legs and arms for a continuous period of time from 10 minutes to an hour and more (Sreedhar, 2007).

Vital capacity is the total volume of air that can be forcibly expired after a maximal inspiration. Vital capacity represents the total volume of air moved in one breath from inspiration to maximum expiration or vice versa (Heyward,2006).

Muscular Strength is the ability of neuromuscular system to overcome resistance with high speed of contractions, which the skeletal lever system accepts and expels at a high velocity (Kumaran,2018).

Methodology

Forty-five (45) male football players from Annamalai University, Chidambaram, Tamil Nadu State, India, were selected at random and their age ranged from 18 to 25 years. For the present study pre-test and post-test randomized group design which consists of experimental and control groups was used. The subjects were randomly assigned into three equal groups of fifteen subjects and named as Group-I, Group-II and Group-III. Group-I underwent resistance training, Group-II underwent aerobic training and Group-III acted as control and was not exposed to any specific training or conditioning. The selected physical and physiological variables namely muscular strength and vital capacity were chosen as variables. The standardized tests/equipments were used to collect relevant data namely pushups and peak flow meter. The data was collected before and after six weeks of training. The data was analysed by applying Analysis of Co-Variance(ANCOVA) technique to find out the effect of resistance and aerobic training programme. The Scheffe's post hoc was used to find the paired mean difference if any. The level of significance was fixed at 0.05 level of confidence.

Statistical Analysis

To find out the significant differences between the groups, Analysis of Covariance (ANCOVA) was applied. When the f-ratio of adjusted post-test mean was found to be significant, Scheffe's post hoc test was employed to find out paired mean differences. The level of significance was fixed at 0.05 level of confidence.

Analysis of Muscular Strength and Vital Capacity

The data collected from three groups on muscular strength and vital capacity was statistically analyzed by ANCOVA and the results are presented in table 1.

Table 1

Analysis of Covariance on Muscular Strength and Vital Capacity of Experimental and Control groups

Dependent Variables	Testing Conditions	Resistance Training Group	Aerobic Training Group	Control Group	S O V	SS	DF	MS	'F' Ratio
Muscular Strength	Pre (M± SD)	20.06 1.62	20.13 1.59	20.20 1.56	B	0.13	2	0.06	0.02
					W	107.06	42	2.54	
	Post (M± SD)	26.80 1.47	24.20 1.47	20.33 1.49	B	317.64	2	158.82	72.40*
					W	92.13	42	2.19	
	Adjusted (M)	26.85	24.20	20.28	B	327.56	2	163.78	268.93*
					W	24.96	41	0.60	
Vital Capacity	Pre (M± SD)	3.04 0.37	3.08 0.31	3.10 0.29	B	0.02	2	0.01	0.12
					W	4.59	42	0.10	
	Post (M± SD)	3.30 0.51	3.57 0.28	3.12 0.30	B	1.56	2	0.78	5.32*
					W	6.14	42	0.14	
	Adjusted (M)	3.33	3.57	3.08	B	1.74	2	0.87	42.76*
					W	0.83	41	0.02	

*Significant, table value, 2 to 42 & 2 to 41 is 3.22 & 3.23

Table 1, shows that pre-test mean values on muscular strength of resistance training group(RTG), aerobic training group(ATG) and control group(CG) are 20.06, 20.13 and 20.20 respectively. The obtained 'F' ratio of 0.02 for pre-test score was lesser than the required table value of 3.22 for df 2 and 42 for significance at 0.05 level of confidence on muscular strength.

The post-test mean values on muscular strength of resistance training group(RTG), aerobic training group(ATG) and control group(CG) are 26.80, 24.20 and 20.33 respectively. The obtained 'F' ratio of 72.40 for post-test score was greater than the required table value of 3.22 for the df of 2 and 42 for significance at 0.05 level of confidence on muscular strength.

The adjusted post-test mean on muscular strength of resistance training group(RTG), aerobic training group(ATG) and control group(CG) are 26.85, 24.20 and 20.28 respectively. The obtained 'F' ratio of 268.93 for adjusted post-test score was greater than the required table value of 3.23 for df 2 and 41 for the significance at 0.05 level of confidence on muscular strength. It was concluded that the differences subsist among the adjusted post-test means of resistance training group, aerobic group and control group on muscular strength.

Table 1, shows that pre-test mean values on vital capacity of resistance training group(RTG), aerobic training group(ATG) and control group(CG) are 3.04, 3.08 and 3.10 respectively. The obtained 'F' ratio of 0.12 for pre-test score was lesser than the required table value of 3.22 for df 2 and 42 for significance at 0.05 level of confidence on vital capacity.

The post-test mean values on vital capacity of resistance training group(RTG), aerobic training group(ATG) and control group(CG) are 3.30, 3.57 and 3.12 respectively. The obtained 'F' ratio of 5.32 for post-test score was greater than the required table value of 3.22 for the df of 2 and 42 for significance at 0.05 level of confidence on vital capacity.

The adjusted post-test mean on vital capacity of resistance training group(RTG), aerobic training group(ATG) and control group(CG) are 3.33, 3.57 and 3.08 respectively. The obtained 'F' ratio of 42.76 for adjusted post-test score was greater than the required table value of 3.23 for df 2 and 41 for the significance at 0.05 level of confidence on vital capacity. It was concluded that the differences subsist among the adjusted post-test means of resistance training group, aerobic group and control group on vital capacity.

The 'F' value in the adjusted post-test means was found significant, hence Scheffe's test was applied to assess the paired mean of muscular strength and vital capacity difference and the results are presented in table 2

Table 2

Scheffe's test for the Differences between Adjusted Post-test Paired Means on Muscular Strength and Vital Capacity.

	Resistance Training Group	Aerobic Training Group	Control Group	M.D	C.I
Muscular Strength	26.85	24.20	-	2.65*	0.20
	26.85	-	20.28	6.57*	
	-	24.20	20.28	3.92*	
Vital Capacity	3.33	3.57	-	0.24*	0.02
	3.33	-	3.08	0.25*	
	-	3.57	3.08	0.49*	

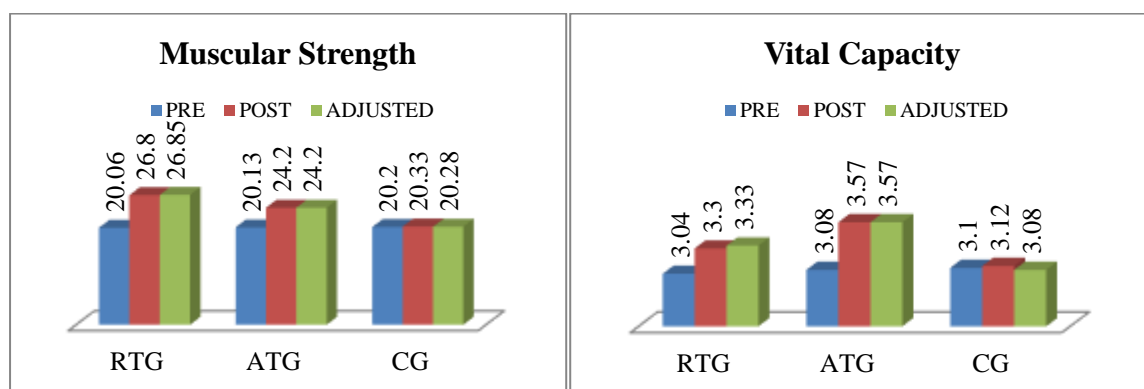
*Significant at 0.05 level of confidence

From the table 2 it is imperative that both resistance training and aerobic training groups differed significantly from control group on muscular strength. Therefore six weeks of resistance and aerobic training showed greater improvement on muscular strength.

From the table 2 it is imperative that both resistance training and aerobic training groups differed significantly from control group on vital capacity. Therefore six weeks of resistance and aerobic training showed greater improvement on vital capacity. The changes in muscular strength and vital capacity are presented in figure 1.

Figure 1

The Pre, Post and Adjusted Post Test Means of Experimental and Control Groups on Muscular Strength and Vital Capacity



Discussion and findings

The findings of the present study strongly indicates that resistance and aerobic training of six weeks have shown significant improvement in selected physical and physiological variables namely muscular strength and vital capacity of male football players. The results of this investigation are also supported by the following studies of Paul (2014), Patel (2017), Tomar (2018), Kumaran(2018), Karuppasamy (2018), Azeem(2019), Kudakasseril(2019), Yokesh(2020), Parthiban (2020), Ramesh(2020) and Chotemiya (2020).

Conclusions

The following are the main findings of the study:

- I) The resistance training had achieved better significant improvement than aerobic training in muscular strength of the football players.
- II) The aerobic training had achieved better significant improvement than resistance training in vital capacity of the football players.

References

- Azeem, K., & Mohammed, M. H. H. (2019). The Effect of Resistance Training on the Selected Physical and Physiological Variables of the Male Students. *International Journal of Pharmaceutical Research & Allied Sciences*, 8(2), 198-205.
- Chotemiya, M. M., Vairavasundaram, C., & Jany, M. S. H. (2020). Isolated and Combined effect of Aqua and Resistance training on selected Physiological variables among men Basketball players. *Xi'an University of Architecture and Technology*, 12(7), 743-754.
- David Sandler. (2010). Fundamental Weight Training. *Human Kinetics*, United States.
- Heyward VH. *Advanced Fitness Assessment and Exercise Prescription*, (Champaign, Illinois: Human Kinetics Publishers, 2006, 224.
- Jayakumar, S., & Lakshmanan, C. (2019). Effect of resistance training on selected physical fitness variables among inter collegiate men kabaddi players. *International Journal of Physiology, Nutrition and Physical Education* 2019;4(2):607-609.
- Karuppasamy, G. (2018). Effect of plyometric training and circuit training on selected physical and physiological variables among male Volleyball players. *International Journal of Yoga, Physiotherapy and Physical Education*, 3(4), 26-32.

Kumaran, G., & Sheikh, J. A. (2018). Effect of aerobic cross training and aerobic training on vital capacity and strength endurance among male students. *International Journal of Yogic, Human Movement and Sports Sciences*, 3(1), 756-759.

Kumaravelu, P. General and specific aerobic training influences on selected performance variables among university men football players. *Journal of Xi'an Shiyou University, Natural Sciences Edition*, ISSN:1673-064X, 17(5):202-205.

MK, S. S., & Kudakasseril, B. L. (2019). Effect of aerobics yoga and resistance training on strength and vital capacity of sports school students. *International Journal of Physical Education, Sports and Health* ISSN:2394-1685;6(5):219-221.

Parthiban, I. J., & Ramesh, (2020) K. A. The effect of land and aquatic plyometric training on vital capacity among college men. *Athletes. Gedrag & Organisatie Review*-ISSN:0921-5077, 33(2):127-133.

Patel Amit, D., & Joshi Makarand, S. (2017). The effect of resistance training and circuit training on vital capacity among college male basketball players. *International Research Journal of Sport Glimpses*, ISSN:2278-5027, 3(2):1-3.

Paul, P. A. D., & Sultana, D. (2014). Effect of 12 weeks free weights and resistance training on muscular strength on junior level basket ball players. *International Journal of Fitness, Health, Physical Education & Iron Games*, 1(1).

Ramesh, R., & Muralirajan, K(2020). Combined effect of yogic practices and aerobic exercises on VO_2 max and vital capacity of rural tribal school boys in Rangareddy district in Telangana State. *Journal of Xi'an University of Architecture & Technology*, ISSN NO.1006-7930, 12(7): 447-457.

Samuel, E. J. Effect of Resistance Training on Selected Fitness Variables among Football Players. *Pre-Exercise Nutrition: Carbohydrates and Fluid Requirement for Training and Competition*, 130.

Sreedhar K. *Sports Training Methods*. Sowmi Publications, South Car Street, Chidambaram, 2007, 130- 137.

Tomar, A. (2018). Effect of weight training and circuit training on selected strength and physiological variables of swimmers in Delhi district. *International Journal of Physiology, Nutrition and Physical Education*, ISSN:2456-0057;3(1):1802-1804.

Yokesh, T.(2020) Effect of yogic practices on vital capacity among university level players. *Journal of Xi'an University of Architecture & Technology*, ISSN NO.1006-7930, Volume XI(Issue, XII):Page No.311-314.