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Effect of Treadmill and Resistance Training on Selected Motor Fitness Variables among Hockey Players

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KEYWORDS

Treadmill Training, Resistance Training, Motor Fitness Variables, Coordination, Balance, Explosive Power and Cardiorespiratory Endurance..

ABSTRACT

The study sought to investigate the effect of treadmill and resistance training on selected motor fitness variables among hockey players. To achieve the purpose of the study (N=45) forty five field hockey players were selected from Bharathidasan University, Tamilnadu, India as subjects. The age of the subjects ranged from 19 to 25 years. The selected subjects were divided into three equal groups (N=15). Group I underwent treadmill training. Group II underwent resistance training. Group III acted as control group who did not undergo any specialized training program other than their daily routine. The motor fitness variables such as coordination, balance, explosive power and cardiorespiratory endurance. Were selected as dependent variables and they were assessed by hand-eye coordination, stork balance test, standing broad jumps, cooper 12 min run/walk respectively. The subjects were concerned with their particular training for a period of twelve 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 treadmill training and resistance training groups achieved significant improvement on selected motor fitness variables such as coordination, balance, explosive power, cardiorespiratory endurance of college field hockey players...

1. INTRODUCTION

Hockey

Hockey is a game which calls for strenuous, continuous, thrilling action and therefore attracts the youth all over the World. The skills involved are simple, natural and yet are highly stimulating and satisfying to any child. These skills are dribbling, pushing, flicking, scooping, tackling and dodging the opponent. Hockey is rated as one of the most popular team games in the world. With the involvement of Dhayan Chand, and Dung from India, this sport is getting a dimensional popularity in India, Asian countries and in other European countries as well (Ansari, 2020). Hockey is a game of strength, speed and skill. It is the most difficult to master, costliest to equip, fastest to watch and most dangerous to play. It requires a combination of power, endurance and flexibility applied within a confined space (Bieniec & Grabara, 2025). It is a game of control of both emotions and flying objects. It is a sport that requires a high level of physical fitness that includes muscular and cardiorespiratory endurance, speed, strength, power, coordination, flexibility and balance.

Treadmills Training

Treadmills are great for beginning as well as experienced runners. One can program a treadmill for hill and speed work, and it offers a cushioned surface that minimizes impact on joints. Weather factors like excessive heat, wind and cold don't affect treadmill workouts. Choosing the correct combination of speed, time and incline will get a beginner onto a solid base for one of the best forms of cardiovascular conditioning (Wang, et. al., 2023). The incline feature allows for variation and helps prevent boredom during exercise sessions. The treadmill running helps to improve the physical fitness. The energy cost of running on a treadmill higher while running than walking two hand kettle ball exercise and grade tread millrunning had similar effects on improving blood pressure and cardiorespiratory endurance (Luna, et. al., 2020). proved that kettle ball and treadmill running improves rate of perceived exertion among triathletes. Aquatic treadmill running was running is

as effective as treadmill running on the floor for aerobic conditioning, resting heart rate, and breathing frequency in fit individuals (Bishnoi, et. al., 2022)..,...

Resistance Training

Resistance training (also known as strength training or weight training) is to increase muscle strength, anaerobic endurance, and resistance to building skeletal muscle tissue length. Resistance training is founded on the principle that the body's muscles will work to overcome any reaction that must be overcome. When you do resistance training in a timely and consistent manner, your muscle tissue becomes more powerful. The advantages of well-designed resistance training program your heart and lung health, flexibility and balance (Azeem and Hamdan, 2019)**.** Resistance training is incorporated into the game to help players perform better. Resistance Training is a method of improving muscular strength by gradually increasing the ability to resist force through the use of free weights, machines, or by using the person's own body weight (Jesus Rajkumar, 2022)**.** Strength training sessions are designed to impose increasingly greater resistance, which in turn stimulates development of muscle strength to meet the added demand (Yumnam & Kumar, 2025)**.** Any exercise that works muscles against external resistance in the hopes of building strength is referred to as resistance training. Stamina or endurance. External resistance can be dumbbells, restraint exercises, and exercise with a machine, restraint belt, bricks, water bottles, your own body weight, or anything else that tightens muscles (Raj & GF, 2024)**.**

OBJECTIVES

This study was designed to investigate the effect of treadmill and resistance training on selected motor fitness variables among hockey players.

METHODOLOGY

To achieve the purpose of the study (N=45) forty five field hockey players were selected from Bharathidasan University, Tamilnadu, India as subjects. The age of the subjects ranged from 19 to 25 years. The selected subjects were divided into three equal groups (N=15). Group I underwent treadmill training. Group II underwent resistance training. Group III acted as control group who did not undergo any specialized training program other than their daily routine. The motor fitness variables such as coordination, balance, explosive power and cardiorespiratory endurance. Were selected as dependent variables and they were assessed by hand – eye coordination, stork balance test, standing broad jumps and cooper 12 min run/walk respectively. The subjects were concerned with their particular training for a period of twelve 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.

RESULT AND DISCUSSION

Table 1: Computation of Analysis of Covariance of Means of Treadmill Training, Resistance Training and Control Groups on Coordination, Balance, Explosive Power and Cardio respiratory Endurance.

Variable	Test Type	TTG Mean	RTG Mean	CG Mean	Source	df	SS	MS	F-Ratio
Coordination	Pre	10.81	10.57	10.74	BG	2	0.61	0.31	1.45
					WG	42	12.00	0.21	
	Post	10.51	10.54	10.75	BG	2	0.74	0.37	**3.68***
					WG	42	12.51	0.22	
	Adjusted	10.42	10.66	10.73	BG	2	1.03	0.52	**8.04***
					WG	41	3.60	0.06	
Balance	Pre	35.57	35.57	35.67	BG	2	65.12	65.12	1.38
					WG	42	18.84	0.88	
	Post	38.89	35.87	35.67	BG	2	65.12	65.12	**78.84***
					WG	42	18.84	0.88	

	Adjusted	39.94	39.90	34.62	BG	2	65.12	65.12	**4.32***
					WG	41	18.84	0.88	
Explosive Power	Pre	2.32	2.32	2.32	BG	2	106.71	53.36	2.08
					WG	42	1085.87	19.05	
	Post	2.80	2.53	2.53	BG	2	196.84	98.42	**3.91***
					WG	42	1433.47	25.14	
	Adjusted	2.80	2.53	2.53	BG	2	11.87	5.94	**6.99***
					WG	41	47.37	0.85	
Cardio Respiratory Endurance	Pre	2405.60	2488.00	2432.40	BG	2	88328.00	44164.00	0.61
					WG	42	518687.0	72039.89	
	Post	2533.20	2660.52	2452.44	BG	2	550248.7	75124.36	**4.70***
					WG	42	421583.4	58553.31	
	Adjusted	2564.89	2620.47	2460.80	BG	2	327003.1	163501.5	**40.83***
					WG	41	284302.4	4004.26	

***Significant at 0.05 level of confidence. Table value required for significant at 0.05 level of confidence were 3.16 respectively.**

The pre, post-test and adjusted post-test mean values of coordination on Treadmill Training Group (TTG), Resistance Training Group (RTG) and Control Group (CG) were 10.81,10.51, 10.42: 10.57, 10.54, 10.66 and 10.74, 10.75, 10.73 respectively.

The pre, post-test and adjusted post-test mean values of balance on Treadmill Training Group (TTG), Resistance Training Group (RTG) and Control Group (CG) were 35.57, 38.89, 39.94: 35.57, 35.87, 39.90 and 35.67, 35.67, 34.62 respectively.

The pre, post-test and adjusted post-test mean values of explosive power on Treadmill Training Group (TTG), Resistance Training Group (RTG) and Control Group (CG) were 2.32, 2.80, 2.80: 2.32, 2.53, 2.53 and 2.32, 2.53, 2.53 respectively.

The pre, post-test and adjusted post-test mean values of cardiorespiratory endurance on Treadmill Training Group (TTG), Resistance Training Group (RTG) and Control Group (CG) was 2405.60, 2533.20, 2564: 2488.00, 2660.52, 2620.47 and 2432.40, 2452.44, 2460.80 respectively. The obtained f ratio values of coordination, balance, explosive power and cardio respiratory endurance of adjusted post-test were 8.04, 4.32, 6.99 and 40.83. The obtained F values of adjusted post-test were greater than the table value of 3.16. Hence it was proved that there were significant improvements on coordination, balance, explosive power, cardiorespiratory endurance of college field hockey players.

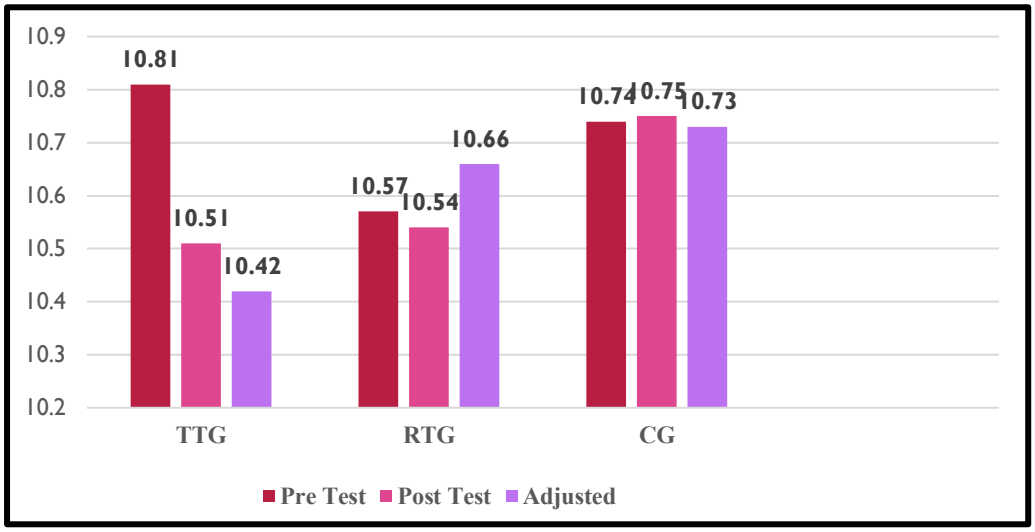

Figure 1. Pre, Post and Adjusted Post Test Means of Treadmill Training, Resistance Training and Control Groups on Coordination

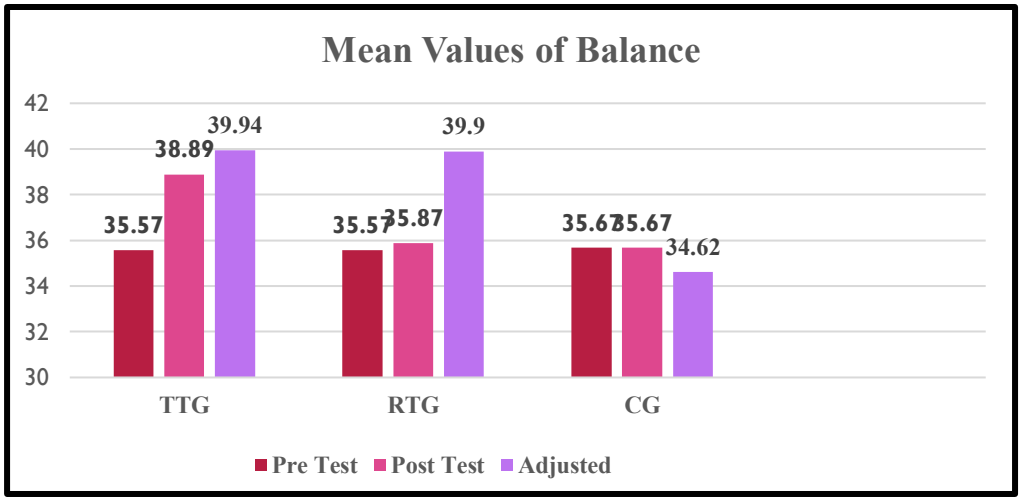

Figure 2. Pre, Post and Adjusted Post Test Means of Treadmill Training, Resistance Training and Control Groups on Balance

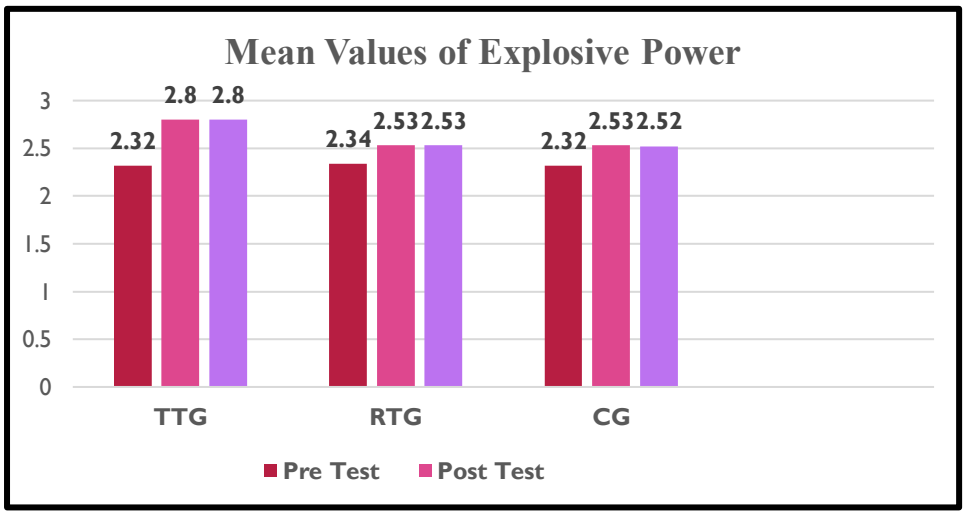

Figure 3. Pre, Post and Adjusted Post Test Means of Treadmill Training, Resistance Training and Control Groups on Explosive Power

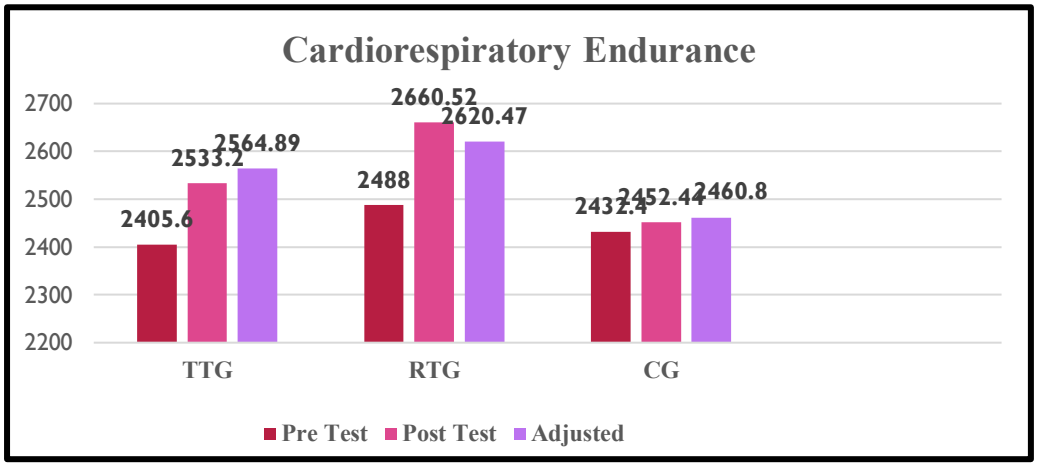

Figure 4. Pre, Post and Adjusted Post Test Means of Treadmill Training, Resistance Training and Control Groups on Cardiorespiratory Endurance

DISCUSSION ON FINDINGS

The results of the study indicates that the experimental group namely as treadmill training and resistance training had significantly improved in the selected dependent variables coordination, balance, explosive power and cardiorespiratory endurance improvement caused by treadmill training and resistance training. The results of the studies are in line with the studies of (Azeem & Hamdan, 2019).

CONCLUSION

The experimental groups namely as treadmill training and resistance training had achieved significant improvement on selected the motor fitness variables such as coordination, balance, explosive power and cardiorespiratory endurance when compared to control group.

It was concluded that resistance training shown better improvement when comparing to the treadmill training groups on selected the motor fitness variables.

It was concluded that college level player should practice both treadmill training and resistance training for positive enhancement of playing.

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