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## Effect of combined training programmes on explosive power of secondary level hockey players

**Kiran GN and Dr. R Srinivasa**

### Abstract

Hockey is one of the world's most and attractive ball game. Present days, this game is being played by implementing new strategies and techniques during training schedules. Hockey is a sport of speed and power. Power is a measure of work performed per unit time. Medicine balls are weighted balls that can be used to develop power. Medicine ball exercises can be built-in in a circuit or interval training forms. Circuit training and interval training are the methods for achieving better explosive power. The purpose of the study was to evaluate the effectiveness of combined circuit and interval training on explosive power of secondary school hockey players. To achieve this purpose, sixty secondary school Hockey players in the age group of 14-16 years were selected as subjects. he selected subjects were divided into four equal groups, in which, Group-I: Circuit Training Group (CTG) (n=15) underwent resistance and plyometric training in the form of circuit; Group-II: Interval Training Group (ITG) (n=15) underwent aerobic and anaerobic training in the form of interval; Group-III: Combined Circuit and Interval Training Group (CCITG) (n=15) underwent combined training both in the form of circuit & interval form and Group-IV: Control Group (CG) (n=15) acted as control which did not participate any training but allowed to take part in their regular Hockey training and playing game. The training programme was carried out for this study was five days per week for twelve weeks. Prior to and after the training period the subjects were tested for explosive power of hand. This was assessed by administering Sitting Medicine Ball Throw measured in meters. The statistical tool used for the present study ANCOVA along with Scheffe's Post Hoc Analysis. After applying ANCOVA, it was found that there was significant improvement in the hand explosive power for Circuit Training Group, Interval Training Group and Combined Circuit and Interval Training Group (CCITG) when compared with control group. Based on the results it was concluded that the CCITG experimental group was significantly improved the hand explosive power of secondary school Hockey players when compared with Circuit Training Group (CTG) and Interval Training Group (ITG).

**Keywords:** Combined Training Programmes, explosive power, Hockey

### Introduction

Hockey is one of the world's most and attractive ball game. Present days, this game is being played by implementing new strategies and techniques during training schedules. Hockey is a sport of speed and power. Power is a measure of work performed per unit time. Medicine balls are weighted balls that can be used to develop power. Medicine ball exercises can be built-in in a circuit or interval training forms. Circuit training and interval training are the methods for achieving better explosive power. Both Circuit and Interval trainings are most popular form of fitness sessions used by various sports teams. These training will improve both aerobic fitness, thus this is very useful conditioning method. Hockey game requires high level of motor fitness to excel at different levels of competitions. The power plays an important role in improving the fitness level of players. The purpose of the study was to evaluate the effectiveness of combined circuit and interval training on explosive power of secondary school hockey players. In the game of hockey, a player must play vigorously to hit the ball, dribble the ball fast and frequently and change direction abruptly during the play. Speed, Strength, Endurance, Power are necessary motor components for good hockey performance. Higher level of performance of a hockey player may be dependent upon the motor abilities.

### Objective of the Study

The objective of the study was to determine the effect of combined circuit and interval training on hand explosive power of secondary school Hockey players.

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**Hypothesis of the Study**

It is hypothesized that there would be a significant difference in the hand explosive power of experimental group by practicing combined circuit and interval training.

**Methodology**

The purpose of the study was to investigate the effect of combined circuit and interval training on power among secondary school Hockey players. For this purpose, sixty secondary school Hockey players in the age group of 14-16 years were selected as subjects. he selected subjects were divided into four equal groups, in which, Group-I: Circuit Training Group (CTG) (n=15) underwent resistance and plyometric training in the form of circuit; Group-II: Interval Training Group (ITG) (n=15) underwent aerobic and anaerobic training in the form of interval; Group-III: Combined Circuit and Interval Training Group (CCITG)

(n=15) underwent combined training both in the form of circuit & interval form and Group-IV: Control Group (CG) (n=15) acted as control which did not participate any training but allowed to take part in their regular Hockey training and playing game. The training programme was carried out for this study was 3 alternate days per week for twelve weeks. Prior to and after the training period the subjects were tested for power. This was assessed by administering Sitting Medicine Ball Throw measured in meters. The data was analyzed by applying Analysis of Co-Variance (ANCOVA). The level of significance was set at 0.05.

**Analysis of Data**

The findings pertaining to analysis of covariance between experimental groups and control group on Hand Explosive Power among school Hockey players for pre-posttest respectively.

**Table 1:** Ancova For The Pre-Test And Post-Test Data On Hand Explosive Power (In Meters) Of Circuit Training Group (Ctg), Interval Training Group (Itg), Combined Circuit And Interval Training Group (Ccitg) And Control Group (Cg).

Tests		CG	CTG	ITG	CCITG	SV	df	Sum of square	Means square	'F' ratio
	Pre-test	Mean	3.210	3.196	3.217	3.203	B	3	0.004	
S.D.		0.457	0.318	0.372	0.207	W	56	6.898	0.123	
Post-test	Mean	3.219	3.636	3.586	3.632	B	3	1.815	0.605	4.32 <sup>**</sup>
	S.D.	0.462	0.340	0.384	0.286	W	56	7.846	0.140	
Adjusted Post-test	Mean	3.216	3.647	3.576	3.636	B	3	1.879	0.626	45.35 <sup>**</sup>
						W	55	0.760	0.014	

Note: SV: Source of Variance; B-Between Groups; W- Within Groups; S.D.- Standard Deviation

Table value at 0.05(df-3, 56) =2.76; at 0.01(df-3, 56) =4.13

\*\*Significant at 0.01 level; \*Significant at 0.05 level; <sup>NS</sup> Not Significant

As shown in Table-1, the pre-test mean values of Hand Explosive Power of Control Group, Circuit Training Group; Interval Training Group and Combined Circuit & Interval Training are 3.210, 3.196, 3.217 and 3.203 respectively. The obtained 'F' ratio of 0.01 for pre-test mean is less than the table value 2.76 for df 3 and 56 required for significance at 0.05 level. The post-test means value of Hand Explosive Power of Control Group, Circuit Training Group; Interval Training Group and Combined Circuit & Interval Training are

3.219, 3.636, 3.586 and 3.632 respectively. The obtained 'F' ratio of 4.32 on post-test mean is greater than the table value 4.13 for df 3 and 56 required for significance at 0.01 level. The same table also indicated that there was a significant difference in adjusted mean of Hand Explosive Power of secondary school Hockey players. The obtained 'F' ratio of 45.35 on adjusted post-test means is greater than the table value 4.13 for df 3 and 55 required for significance at 0.01 level.

**Table 2:** Scheffe's Test for the differences between the adjusted post-test paired means of Hand Explosive Power in Meters

Adjusted post-test mean				Mean Difference (MD)	Critical Difference (CD)
CG	CTG	ITG	CCITG		
3.216	3.647			0.431*	0.085
3.216		3.576		0.360*	
3.216			3.636	0.420*	
	3.647	3.576		0.071	
	3.647		3.636	0.011	
		3.576	3.636	0.060	

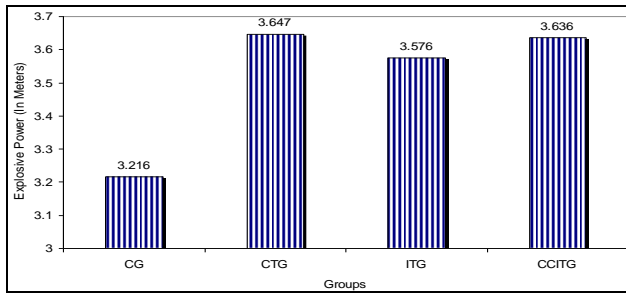
\*Significant at 0.05 of confidence.

The table-2 shows that the adjusted post-test means difference on Hand Explosive Power between Circuit Training Group & Control Group; Interval Training & Control Group; and Combined Circuit & Interval Training and Control Group are 0.431, 0.360 and 0.420 which are higher than the critical difference of 0.085 at 0.05 level of confidence and the obtained adjusted post-test mean difference on Hand Explosive Power between Circuit Training Group & Interval Training Group; Circuit Training Group & Combined Circuit & Interval Training Group; Interval Training Group and Combined Circuit & Interval Training Group are 0.071, 0.011 and 0.060 are less than the critical difference of 0.085 at 0.05

level of confidence.

It may be concluded from the results that there was significant difference on Hand Explosive Power between Circuit Training Group and Control Group; Interval Training & Control Group; Combined Circuit & Interval Training and Control Group; Circuit Training group & combined circuit and interval training. The circuit training had better Hand Explosive Power than combined training and interval training respectively.

The comparison of pre, post and adjusted post-test mean values on Hand Explosive Power among various experimental and control groups are graphically depicted in Fig.1.



**Fig 1:** Bar diagram of Pre, Post and Adjusted Post-test Means on Hand Explosive Power among various groups.

### Discussions on findings

The finding of the study shows that there was a significant difference in the Hand Explosive Power of experimental group by practicing interval training, circuit training and combined circuit and interval training. The power results between pre and post (12 weeks) tests have been found significantly higher in experimental groups when comparison to control group. This is possible because due to practice of regular circuit and interval training which may also bring sudden explode in power. The findings of the present study have strongly indicates that circuit training, interval training and combined circuit and interval training of twelve weeks have significant effect on power. Hence the hypothesis earlier set that circuit training programme would have been significant effect on power in light of the same the hypothesis was accepted. Sudhakar and Paul (2014) and Kumarasan and Saravanan (2015) found similar results.

### Conclusion

On the basis of findings and within the limitations of the study the following conclusions were drawn:

1. The circuit training, interval training and combined circuit & interval training had positive impact on power among secondary school Hockey players.
2. The circuit training showed better improvement on power among secondary school Hockey players than combined circuit & interval training and circuit training.

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