



Impact of Speed Training Permutation with Plyometric Training and Running ABC Training on Preferred Speed Parameters

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Abstract

The purpose of the study was to impact of speed training permutation with plyometric training and running ABC training on chosen speed parameters. To achieve the purpose of the study, forty five male students studying bachelor of education degree in the Nehru college of Education, Puducherry, in India were selected at random as subjects. The age, height and weight of the subjects ranged from 22 to 24 years, 162 to 173 centimeters and 56 to 67 kilograms respectively. The selected subjects were medically examined by a qualified physician and certified that they were medically and physically fit enough to undergo the exercise. The selected subjects (N=45) were classified into three equal groups of fifteen each (n=15) at random. Group-I undergone speed with plyometric training, Group-II undergone speed with running ABC training, and Group- III acted as control. The dependent parameters were speed, stride length, stride frequency and speed endurance. The selected variables for which data were collected from two groups prior to and after experimentation on selected speed parameters were statistically examined for significant difference, if any, by applying the analysis of covariance (ANCOVA) with the help of SPSS package. The level of significance was accepted at $P < 0.05$. The result of the study showed that speed training with plyometric training group and speed training with running ABC training group improved significantly on the selected dependent parameters when compared to control group.

Keywords: Plyometric Training, Running ABC, Speed, Stride Length, Stride Frequency, Speed Endurance.

Introduction

Modern sports and games embrace a huge world of activities - from the old ones like wrestling and running, to more recent ones like mountaineering and motor racing. Based on the variety, sports and games can broadly be classified into two types - 'indoor' and 'outdoor'. True, with the development of technology many of the exclusive outdoor games are being played indoors. Yet there are some games which are traditionally outdoor types. Physical fitness is defined as the state or condition of being physically sound and healthy, especially as the result of exercise and proper nutrition. It is, thus, a state of general well being, marked by physical health as well as mental stability. Physical fitness is not just about having a lean body; it is about having cardiovascular and overall muscular endurance, as well

as a strong immunity system, and most importantly, a satisfied and happy state of mind. The term "Training" is widely used in sports. But there is some disagreement among coaches and sports scientists regarding the meaning of this word. Some experts understand that sports training are basically doing physical exercises, the factors essentials are sports equipment and implements verbal instructions, means of recovery, means of assessment of performance capacity, nutrition, psychological means etc. Further advanced training of sports persons significantly supported by several sports performance in addition to physical and physiological characteristics, the social and psychic capacities of the sports persons also have to be improved.

The sports performance depends on several factors like constitution, condition, technique, tactics, coordination and personality. Sports training are done for improving sports performance. The sports performance as any other type of human performance is not the product of one single system (or) aspect of human personality. On the contrary it is the product of the total personality of the sports person. The personality of person has several dimensions. In order to improve sports performance the social and psychic capacities of the sports person also have to be improved in addition to

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the physical and physiological ones. In other words the total personality of sportsman has to be improved in order to improve his performance. Sports training therefore, directly and indirectly aims at improving the personality of the sports man.

Speed training produces global morphological and function changes in the organism. However, the adaptive changes of the central nervous system, physiological and bio-chemical, develop much more slowly than do the capacities for strength and endurance. These changes can be maintained only for very brief periods of time. Therefore, there is no specific mechanism that is solely responsible for speed, for strength or for endurance.

Every type of sporting activity uses the same functional systems. However, during the training process, these systems may acquire a specialization, depending upon the specific type of work required by the sports concerned. An increase in the capacity for work does not depend on the development of specific qualities, but on the body's specialization in a specific direction to speed, strength and endurance. This conclusion indicates that a change is needed in the theory and methodology of training, especially in regard to physical conditioning. (Verkhoshansky, 1996).

Plyometric exercise has been in practice for many years, (EDWIN RIMMER, 2000) to develop the explosive power of athletes. It is a type of training that develops the ability of muscles to produce force at high speeds (produce power) in dynamic movements; these movements involve a stretch of the muscle immediately followed by an explosive contraction of the muscle. This pattern of muscle contraction is known as the stretch-shorten cycle (SSC) (NORMAN 1979.). Plyometric exercises include vertical jumps, during which the athlete jumps as high as possible "on the spot," and bounds, during which the athlete leaps as high and as far as possible, thus moving the body in the horizontal and vertical planes. It is generally accepted that the more specific training exercises to a competitive movement, the greater the transfer of the training effect to performance (DELECLUSE, 1995). Athletes such as sprinters, who require power for moving in the horizontal plane, engage in bounding.

Plyometric exercises, whereas athletes such as high jumpers and volleyball players, who require power to be exerted in the vertical direction, train using vertical jumping exercises. Plyometric is a means of encouraging the muscle to achieve maximal force rapidly and therefore serving to increase explosive-reactive power through a range of motion and is a popular training approach (EICHER, 1994).

Running has long been accepted as an essential training component for the competitive athlete in almost every sport. Running is a skill that most of us learn at an early age. Because no two persons are anatomically exactly the same, each person will have a slightly different running style or form. However, there are certain things that all runners more efficient and reduce

the possibility of injuries (Prentice, 1994). Form running drills are used to help ingrain neuromuscular movement patterns and increase leg turnover (Baechle, 1994). Form running drills are not necessarily specific to running in that most drills exhibit leg movements that are not exactly run-like. However, if done correctly and quickly, the form drills can help increase speed or the very least, increase footwork (Sandler, 2005). An elite runner's running technique is shaped by a number of physical characteristics such as flexibility, power, neuro-muscular function, body composition and so forth, running technique contributes to the competitive edge of a short distance runner. Efficient running biomechanics help to keep injuries at bay and ensure that the runner's neuromuscular potential is fully exploited. It also helps to save the energy, which in turn results in better racing (Skop and Stuhel, 2004).

Methodology

Selection of Subjects

The purpose of the study was to impact of speed training permutation with plyometric training and running ABC training on chosen speed parameters. To achieve the purpose of the study, forty five male students studying bachelor of Education degree in the Nehru college of Education, Puducherry in India were selected at random as subjects. The age, height and weight of the subjects ranged from 22 to 24 years, 162 to 173 centimeters and 56 to 67 kilograms respectively. The selected subjects were medically examined by a qualified physician and certified that they were medically and physically fit enough to undergo the exercise. The selected subjects (N=45) were classified into three equal groups of fifteen each (n=15) at random. Group-I undergone speed with plyometric training, Group-II undergone speed with running ABC training, and Group- III acted as control. The dependent parameters were speed, stride length, stride frequency and speed endurance.

Training Protocol

The training programme were scheduled for one session a day, each session lasted between 45 minutes and an hour, approximately excluding warming up and relaxation in morning session. During the training period, the experimental groups underwent their respective training programme three days per week (*alternate days*) for twelve weeks in addition to their regular programme of the course of study as per their curriculum. The programme lasted for twelve weeks with three training units per week.

Statistical Analysis

These criterion variables were assessed using standard tests and procedures, before and after the exercises. The selected variables for which data were collected from two groups prior to and after experimentation on selected Speed parameters were statistically examined for significant difference, if any, by applying the analysis of covariance (ANCOVA) with the

help of SPSS package. The level of significance was accepted at $P < 0.05$.

Results

Table 1. Adjusted Post Test Mean on Speed, Stride Length, Stride Frequency and Speed Endurance of Experimental and Control Groups

Variables	Speed with plyometric Training Group	Speed with running ABC Training Group	Control Group	Source of variance	Sum of Squares	df	Mean squares	Obtained 'F' ratio
Speed	6.27	6.66	6.97	Between	3.10	2	1.54	19.05*
				Within	3.33	41	0.19	
Stride Length	1.79	1.66	1.58	Between	0.98	2	0.48	5.43*
				Within	3.58	41	0.08	
Stride Frequency	4.03	4.21	3.96	Between	0.32	2	0.16	16.00*
				Within	0.23	41	0.01	
Speed Endurance	17.791	17.046	18.523	Between	16.040	2	8.020	67.966*
				Within	4.832	41	0.11	

*Significant at 0.05 level of confidence.

The required table value for significance at 0.05 level of confidence with degrees of freedom 2 and 41 is 3.23. The result of this study shows that there is a significant difference existing between experimental and control groups, since the obtained F ratio on adjusted post test means are 19.05, 5.43, 16.00, and 67.96 on

dependent variables are greater than the required table value of 3.23 for given degrees of freedom at 0.05 level of confidence. Since, the adjusted post test F ratio value is found to be significant, Scheffe's post hoc test was applied to find out the paired mean difference.

Table II. Scheffe's Post Hoc Test for Paired Mean Difference on Speed, Stride Length, Stride Frequency and Speed Endurance

Variables	Adjusted post test			Mean Differences	C I
	SWPT Group-I	SWRBC Group-II	Control Group		
Speed	6.27	6.66	---	0.39*	0.27
	6.27	---	6.97	0.70*	0.27
	---	6.66	6.97	0.31*	0.27
Stride Length	1.79	1.66	---	0.13*	0.06
	1.79	---	1.58	0.21*	0.06
	---	1.66	1.58	0.08	0.06
Stride Frequency	4.03	4.21	---	0.18*	0.03
	4.03	---	3.96	0.07*	0.03
	---	4.21	3.96	0.25*	0.03
Speed Endurance	17.719	17.046	---	0.673*	0.319
	17.719	---	18.523	0.804*	0.319
	---	17.046	18.523	1.477*	0.319

*Significant at 0.05 level.

Table-II shows that both training groups are significantly contributing to the improvement of selected speed parameters, however speed with plyometric training group has better impact on speed and stride length than that of group-II and speed with running ABC training group has better impact on stride frequency and speed endurance than that of group-I.

Discussion on Findings

Speed training produces global morphological and function changes in the organism. Plyometric exercise has been in practice for many years. It is a type of training that develops the ability of muscles to produce force at high speeds (produce power) in dynamic. Form running drills are used to help ingrain neuromuscular movement patterns and increase leg turnover (Baechle, 1994). The present study revealed a significant difference between speed with plyometric training group and control group, speed with running ABC training group and control group on speed, stride length stride frequency and speed endurance. The observation has been confirmed in recent studies also (Luebbbers P E. et al, (2002).

Conclusion

It was concluded from the result of the study that the speed parameters can be developed by both speed with plyometric and speed with running ABC training, however speed with plyometric training group have better improvement in speed and stride length. However speed with running ABC training group have better improvement in stride frequency and speed endurance.

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