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Effects of plyometric exercise and circuit training on physical fitness selected variably speed and agility of tennis players

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Abstract

The aim of the research is to study the Effects of Plyometric Exercise and Circuit Training on Physical Fitness Selected Variably Speed and Agility of Tennis Players. Total 45 students from Tennis Players Jaipur Rajasthan. were selected as the subject. These students were divided into three groups i.e. 15 students in Plyometric Exercise group, 15 students in Circuit training group and 15 students in control group. Speed and Agility were tested by 50 Yard Dash Test and Shuttle Run Test, respectively twice i.e. before and after the particular six weeks training. ANCOVA was applied at 0.05 level of significance to test the hypothesis. It was observed from the result of the study that both the experimental groups improved significantly in Speed, Agility, due to the particular Plyometric Exercise and Circuit training.

Keywords: Plyometric exercise and circuit training, speed and agility

Introduction

Today, modern world is a world of competition. In every phase of life people have to face one or other kind of competition. In this competitive world sports and games occupy a unique position. It is the area of friendly rivalry. Top class international sports meets are considered to be the international ambassadors for world supermodel in various sports and games.

Games and sports have been part of human life almost since the time immemorial. Be if a necessary for his survival i.e. hunting for food, shelter and safety from wild animals or other enemies or as a pursuit of pleasure. The games and sports have been indispensable to mankind and have become part of his culture. The games and sports are a great unifying force and have tremendous effect on the national and international integration people used sports.

Today, life mostly depends upon science and technology. In such circumstance people need more exercise to keep the body and mind fit to execute the activity efficiently.

Sport training is a physical, technical, moral and intellectual participation of an athlete with the help of physical exercises. It is a planned process for the participation of athlete and players to achieve top level performance (Hardayal singh, 1984). Training is much like constructing a multi-storey building. One needs materials for the building such as aerobic, anaerobic running, comprehensive conditioning, flexibility, etc. Several kinds of materials like training intensities and modalities should be utilized in an on-going process to complete the goal of finished buildings or competitively fit athlete. Depending on the progress in the construction plan, the relative mix of all these materials will vary. As a training season develops, compressive conditioning work for strength of endurance will gradually form a transition into an emphasis on power with a substitution of intensity of volume in determining the total load.

The purpose of the training programme is to produce metabolic, physiological and psychological adaptation that allows the sportsperson to achieve top level performance (Hardayal singh, 1983). When the training increases the demand for aerobic energy, the number and size of muscle mitochondria will increase so that in these chemical factories where aerobic metabolism takes place becomes larger and more numerous. These will help athletes to provide more energy from aerobic metabolism. There are three steps of adaptation: the first involves creating the need for more aerobic energy. Training must be sufficient in both duration and intensity to accomplish. The second step is to provide nutrients to build and

repair mitochondrial tissues. Third is that the athlete must be given enough rest to regain the energy as super compensation. There are different types of training by which one can attain the required development. Each training has its own specific effect.

Plyometrics refers to exercises that enable a muscle to reach maximal strength in as short a time as possible. Such exercise usually involve some form of jumping, but other modes of exercise exist. The elements ply and metric come from Latin roots for ‘increase’ and ‘measure’, ‘respectively; the combination thus means “measurable increase”. Plyometric exercise utilize the force of gravity (e.g., you step off a box) to store energy in the muscles (potential energy). This energy is then utilized immediately in an opposite reaction (e.g., you immediately jump up, up on landing), so the natural elastic properties of the muscle will produce kinetic energy.

The ability to rapidly apply force (reactive force) is the major goal of plyometric training. Plyometrics are used to apply an overload to the muscles with speed-strength as goal. Plyometrics should not be considered an end in themselves, but part of an overall program (Stretching, running, strength training, nutrition, etc.) After the athlete has begun a proper strength and conditioning program, plyometrics are used to develop speed strength.

Circuit training is an efficient and challenging form of conditioning. It works well for developing strength, endurance (both aerobic and anaerobic), flexibility and coordination. Its versatility has made it popular with the general Public right through to elite athletes. For sports men and women, it can be used during the closed season and early pre-season to help develop a solid base of fitness and prepare the body for more stressful subsequent training. Circuit training is an effective organizational form of doing physical exercises for improving all physical fitness components. Before and after training, the initial and final tests were conducted for the variables such as speed, agility, power, co-ordination, static balance and dynamic balance for the experimental and control groups. Circuit training is an exercise program that develops overall fitness. Performed

regularly, circuit training will simultaneously improve muscular strength, endurance, cardiovascular fitness, and flexibility. Circuit training was invented in 1953 as an efficient way for coaches to train many athletes in a limited amount of time with limited equipment. The exerciser moved through a series of weight training or calisthenics arranged consecutively. It was a fast-paced workout of 15 to 45 seconds per station with little (15 to 30 seconds) or no rest between stations. Today, this is known as “circuit weight training”.

Objectives of research

1. To study effects Plyometric Exercise and Circuit training on Speed.
2. To study effects Plyometric Exercise and Circuit training on Agility.

Criterion measures

Criterion Measures for selected measuring standards given below:

No.	Test	Measuring standards
1	Speed	50 Yard Dash
2	Agility	Shuttle Run

Method and material

Total 45 students from Gyandhara School, Sadra were selected as the subject. These students were divided into three groups i.e. 15 students in Plyometric Exercise group, 15 students in Circuit training group and 15 students in control group. Speed, Agility, were tested by 50 Yard Dash Test, Shuttle Run Test, respectively twice i.e. before and after the particular six weeks training.

Statistical analysis

ANCOVA was applied at 0.05 level of significance.

Result of the study

The result of the study is presented in following tables.

Table 1: Means and ANCOVA of Speed Test for Plyometric Exercise, Circuit training and Control Group

Test	Group			ANCOVA Table			
	Plyometric Exercise	Circuit training	Control	Sum of Square	Degree of Freedom	Mean Sum of Square	'F'
Pretest Mean	7.582	7.707	7.541	0.224	2	0.112	0.873
				5.399	42	0.128	
Posttest Mean	7.286	7.221	7.54	0.851	2	0.425	3.245*
				5.508	42	0.131	
Adjusted Mean	7.305	7.155	7.586	1.387	2	0.693	9.306*
				3.057	41	0.074	

* Sig. Level at 0.05 (2,42) (2,41) = 3.150

It is observed from table – 1 that the means of Plyometric Exercise Group; Pre-test is 7.582, post-test mean is 7.286 and adjusted mean is 7.305. Circuit training Group; Pre-test is 7.707, post-test mean is 7.221 and adjusted mean is 7.155. Control Group; Pre-test is 7.541, post-test mean is 7.54 and

adjusted mean is 7.586. The calculated ‘F’ value of pre-test means of all the groups is not significant, calculated ‘F’ value of post-test means of all the groups is significant and calculated ‘F’ value of adjusted means of all the groups is significant.

Table 2: Means and LSD of Speed Test for Plyometric Exercise, Circuit training and Control Group

Mean			MD	CD
Plyometric Exercise	Circuit training	Control		
7.305	7.155		0.149	0.201
7.305		7.586	0.281*	
	7.155	7.586	0.430*	

*Sig. Level at 0.05

It is observed from table – 2 that the adjusted means of Plyometric Exercise Group, Circuit training Group and Control Group are 0.149, 0.281 and 0.430 respectively and the CD is 0.201. Mean difference among these groups shows

significant difference among Plyometric Exercise and Circuit training Groups, Plyometric Exercise and Control Group, Circuit training and Control Group.

Table 3: Means and ANCOVA of Agility for Plyometric Exercise, Circuit training and Control Group

Test	Group			ANCOVA table			
	Plyometric Exercise	Circuit training	Control	Sum of Square	Degree of Freedom	Mean Sum of Square	'F'
Pretest Mean	11.724	11.992	11.718	0.738	2	0.369	0.920
				16.841	42	0.400	
Posttest Mean	11.044	7.221	11.696	175.302	2	87.651	270.634*
				13.602	42	0.323	
Adjusted Mean	11.049	7.209	11.701	169.401	2	84.700	256.550*
				13.536	41	0.330	

* Sig. Level at 0.05 (2,42) (2,41) = 3.150

It is observed from table – 3 that the means of Plyometric Exercise Group; Pre-test is 11.724, post-test mean is 11.044 and adjusted mean is 11.049. Circuit training Group; Pre-test is 11.992, post-test mean is 7.221 and adjusted mean is 7.209. Control Group; Pre-test is 11.718, post-test mean is 11.696

and adjusted mean is 11.701. The calculated 'F' value of pre-test means of all the groups is not significant, calculated 'F' value of post-test means of all the groups is significant and calculated 'F' value of adjusted means of all the groups is significant.

Table 4: Means and LSD of Agility for Plyometric Exercise, Circuit training and Control Group

Mean			MD	(CD)
Plyometric Exercise	Circuit training	Control		
11.049	7.209		3.839*	0.423
11.049		11.701	0.652*	
	7.209	11.701	4.491*	

* Sig. Level at 0.05

It is observed from table – 4 that the adjusted means of Plyometric Exercise Group, Circuit training Group and Control Group are 3.839, 0.652 and 4.491 respectively and the CD is 0.423. Mean difference among these groups shows significant difference among Plyometric Exercise and Circuit training Groups, Plyometric Exercise and Control Group, Circuit training and Control Group.

Conclusion

It was observed from the result of the study that both the experimental groups improved significantly in Speed and Agility, due to the particular of Plyometric Exercise and Circuit training.

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