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Effect of stretching, plyometric exercises, aerobic dancing, weight training in combinations on the skill related physical fitness of young men

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Abstract

Introduction: Physical fitness is a specialized concept and the meaning of the term is highly volatile and it is difficult to delineate the meaning as there are different streams denoted to the concept of fitness. Different experts in the field of physical education and sports sciences identified different components for physical fitness. Some other qualities which underlie motor performance, but are not essential for basic physical fitness are included in motor fitness. The skill related physical fitness may be required in different combinations by different sporting persons, according to the sport they are participating. The purpose of the study was to analyse the effects of four months of training, incorporating the selected exercise modalities viz stretching, Aerobic dancing, Weight training and Plyometric power exercises in several combinations on the Skill Related Physical Fitness components among young men of 20 to 24 years and who were never exposed to any kind of regular physical conditioning earlier.

Methodology: Six experimental groups and one control group, each group consisted of fifteen subjects randomly assigned to the group out of the total of hundred and five subjects selected. Among these seven six activity groups were given combination of stretching, plyometric training, aerobics and weight training. These groups skill related physical fitness components were measured pre and post experimentation and Analysis of Covariance (ANCOVA) to know whether the experimental variables caused significant change in the criterion variables and also Scheffe's post hoc test at 0.05 level of significance.

Results of the study: Analysis of Covariance elicits that the Skill related physical fitness among the seven experimental groups differ significantly as the obtained F value ie 7.47 was higher when compared to the critical F value ie 2.21.

Conclusions: Stretching, Plyometrics and Weight Training group recorded highest significant difference on post test mean value of the Skill Related Physical Fitness and hence, Stretching, Plyometrics and Weight training in sequence showed effective results in improving the Skill Related Physical Fitness than any other combination. Stretching, Plyometrics and Weight Training protocol and Stretching, Aerobics and Weight Training protocols caused for significant improvement in the Skill Related Physical Fitness of the subjects.

Keywords: Stretching, Plyometric training, Skill related physical fitness, weight training, physical fitness, aerobic dancing

1. Introduction

Fitness denotes a person's status of physique in relation to it's physical achievements. The scientific evidences also elicit the same fact that for internal physiological soundness the physical fitness is necessary. Physical fitness is a specialized concept and the meaning of the term is highly volatile and it is difficult to delineate the meaning as there are different streams denoted to the concept of fitness. For physical education teachers and for health professionals the meaning of this term revolves around the health and happy living. In view of a physical educationist and a health or fitness expert the meaning of physical fitness denotes, the fitness of an individual in physical terms to meet the exercise demands without getting undue fatigue to develop the optimum health. In this way physical fitness means optimum levels of the fitness of the various systems so as an individual can lead a healthy life and can participate in the health promoting physical activities. The term physical fitness in view of a sports coach or a sports trainer is something different. In their view the term physical fitness denotes the physical capacity to tackle the external load that is placed by various exercises. These people describe the physical fitness in terms of the capacity to do work.

The concept of physical Fitness includes the elements of strength, muscular endurance, circulorespiratory endurance, flexibility and freedom from obesity. While the elements identified to different components like strength, Speed, Endurance, Flexibility, Agility, Co ordination for Physical fitness. Different experts in the field of physical education and sports sciences identified different components for physical fitness. Some other qualities which underlie motor performance, but are not essential for basic physical fitness are included in motor fitness. In other words, a person does not have to possess speed, agility, power, etc., which gives success in some athletic performances in order to be physically fit. Though this controversy exists since long time it is strongly believed that development of very good levels of physical fitness needs the help of the motor fitness to participate in various kinds of physical movements of complex in nature.

The development of a sports person depends directly on the development of the skill related physical fitness. Though the skill related physical fitness may be required in different combinations by different sporting persons, according to the sport they are participating, the development of physical fitness is a compulsory aspect of training of such people. For

some sports some components may be required in more ratios when compared to the other components. For example, to improve the sprinting performance an individual needs to concentrate more on the power, speed, response time and fine coordination components. If a person would like to improve one's performance in gymnastics, the person has to concentrate more on the balance, coordination, power, agility. In this way the treatment and development of the components of the skill related physical fitness differs from the sporting area to another sporting area. The components of Health Related Physical fitness are Cardio-vascular endurance, muscular endurance, muscular strength, Body composition and Flexibility.

The exercise performed in relation to the type of exercise, quality of exercise, intensity with which the exercise performed, volume of exercise performed and the density of exercise altogether could be termed as 'Load' of physical exercise. Load placed on the physical body causes for the physiologic disturbances and adaptations in the body leading to the changes in the systemic efficiency. These changes might cause the enhanced performance in the components of the Skill Related Physical Fitness. Load dynamics are intensity, volume and density of physical exercises done. These three factors of load may be attributed to one single session of physical exercise or to any period consisting of days, weeks, months or years. Not only the different kinds of exercises but also the load dynamics of these exercises also show very good impact in bringing major adaptations. Aerobic type of exercises place stress on the respiratory system, circulatory system and endocrinal systems simultaneously. There is stress on the muscular system also. All these stresses cause for certain adaptations and prolonged working capacity of the individual is enhanced rapidly. This capacity of the individual is also called as the endurance component of the skill related physical fitness. Stretching exercises place significant stress on the muscle elasticity and responsiveness in terms of sports power derivation during activities. There are several kinds of stretching protocols and methods, but static stretching has its own advantages over the other methods of stretching. Resistance training in the form of weight training also affects significantly the protein anabolism among sports persons leading to higher muscle protein and muscular strength and power. But, different intensities and different methods are involved in the weight training or resistance training. Plyometric training is one such training which places emphasis on the power aspect in the muscle. Eccentric and concentric muscular contractions in succession at a very faster rate are the regimen of the plyometric training and this brings several muscular adaptations especially with respect to the power ratio of the muscles after the training. The purpose of the study was to analyse the effects of four months of training, incorporating the selected exercise modalities viz stretching, Aerobic dancing, Weight training and Plyometric power exercises in several combinations on the Skill Related Physical Fitness components among young men of 20 to 24 years and who were never exposed to any kind of regular physical conditioning earlier.

2. Methodology

Six experimental groups and one control group, each group consisted of fifteen subjects randomly assigned to the group out of the total of hundred and five subjects selected from among the colleges of the Sri Venkateswara University area. The seven groups were, SA group or Stretching and Aerobics group, SP group or Stretching and Plyometrics groups, SW group or Stretching and Weight Training group, SAP group or Stretching, Aerobics and Plyometrics group, SAW group or Stretching, Aerobics and Weight Training group, SPW group or Stretching, Plyometrics and Weight Training group and CG group or Control Group. The age group of the subjects was between 20 to 24 years. Static stretching for twenty five seconds is the main idea for the stretching exercises for selected different muscles groups. Medium intensity of aerobic dancing or aerobic rhythmic was given for the subjects in this protocol. Weight training exercises were designed to provide strength to those muscles which are mainly worked out in stretching and aerobics session. Weight training was designed mainly to enhance the strength endurance. Light and medium difficult plyometric exercises were included in this protocol for the experimentation. Various experimental groups performed the designed exercise protocols of experimentation for four months. Skill Related Physical Fitness components were tested for all the subjects and the scores for the components were recorded both prior to the experimentation commenced and after the four months of experimentation period. Muscular Strength component of the Skill Related Physical Fitness was measured through the Pull Up test. Muscular Endurance component of the Skill Related Physical Fitness was measured through the Sit up test. Agility component of the Skill Related Physical Fitness was measured through the Shuttle Run. Speed component of the Skill Related Physical Fitness was measured through the 50 meters dash timing. Co-ordination component of the Skill Related Physical Fitness was measured through the Standing Broad Jump. Cardio Respiratory endurance component of the Skill Related Physical Fitness of the subjects was measured through the test of One mile run. Analysis of Co-Variance technique (ANCOVA) was used to study the effect of the experimental variables on the selected criterion variable i.e. Skill Related Physical Fitness and its components as a whole. Scheffe's Post Hoc considerations were made to find out the source of the significant difference among the groups.

3. Results of the study

Analysis of Covariance as per table I elicits that the Skill related physical fitness among the seven experimental groups differ significantly as the obtained F value ie 7.47 was higher when compared to the critical F value ie 2.21. This specifies that the experimental groups experienced significant changes in their Skill related physical fitness due to the experimental protocols as specifically given to all the six groups of the experimentation.

Table 1: Analysis of covariance for skill related physical fitness

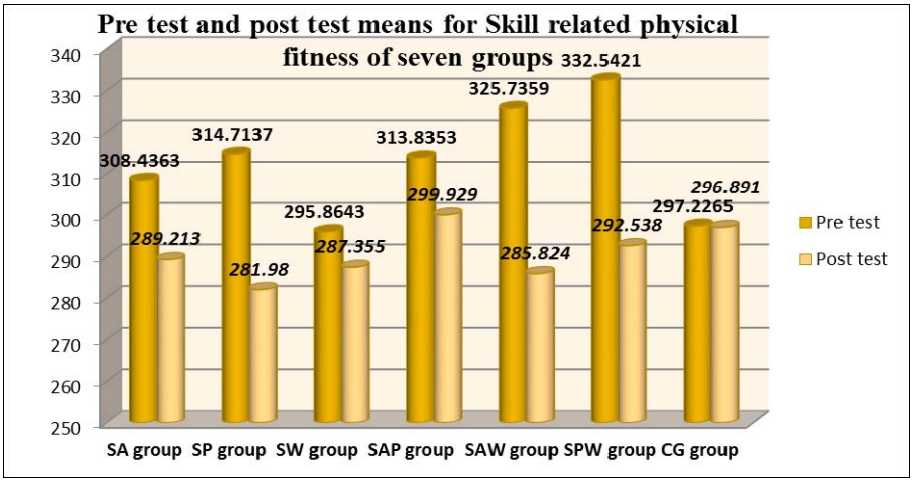
Source	DF	SS	MS	F	CR. F
Total	104	53028.69			
BG	6	16643.21	2773.868	7.471087	2.21
WG	98	36385.48	371.2804		

The table no II depicts that the adjusted Post test mean of the total skill related physical fitness of Stretching, Plyometrics and Weight training group is highest when compared to the all other groups without considering the pretest averages of the

skill related physical fitness. The above table does not consider the pretest means of the skill related physical fitness for comparison. The table depicts that all exercise groups post test mean values show significant difference when compared to the control group. Hence, all the six combinations of the experimental protocols assigned to all the six activity groups brought significant change in the Skill Related Physical Fitness.

Table 2: Difference between adjusted post test means and pre test means of the total skill related physical fitness of seven group of the study

Groups	N	My. X	MX	Differe
SA	15	308.4363	289.213	19.223
SP	15	314.7137	281.98	32.734
SW	15	295.8643	287.355	8.509
SAP	15	313.8353	299.929	13.906
SAW	15	325.7359	285.824	39.911
SPW	15	332.5421	292.538	40.004
CG	15	297.2265	296.891	0.335



The Scheffe's post hoc comparison test was done by finding the comparative difference (CD), which was compared to each groups post test adjusted mean value of the total Skill Related Physical Fitness. The comparisons were made from the highest value of the post test mean to the lowest value of the post test mean and if the difference was less than the comparative difference, the difference was assumed as non significant and if more than the comparative difference, the difference was assumed as significant. In this way the table analyses and explains the source of the significant improvement due to the effect of the exercise protocols of the experimentation.

Table 3: CD= $\sqrt{(a-1)F}\sqrt{((2(MsError)/n))} = 25.617$

Individual comparisons from highest value for total fitness post test adjusted means

Groups and Values	SAW 325.735	SP 314.71	SAP 313.835	SA 308.436	SW 295.864	*CG 297.226*
SPW 332.542	6.807N.S	17.832N.S	18.707N.S	24.106N.S	36.678SIG	*35.316SIG*
SAW 325.735		11.02N.S	11.90N.S	17.299N.S	29.871SIG	*28.509SIG*
SP 314.71			8.75N.SIG	6.274N.SIG	18.846N.SIG	*17.844N.SIG*
SAP 313.835				5.399N.SIG	17.971N.SIG	*16.609N.SIG*
SA 308.436					12.572NSIG	*11.21N.SIG*
SW 295.864						*1.362N.SIG*

Table III depicts the differences in means between the Adjusted Post Test total Skill related Physical fitness and Pre Test total Skill Related Physical fitness. The following analysis has been noted from the above table. Stretching, Plyometrics and Weight Training group derived the highest difference between the values of Post Test adjusted mean and the pretest mean for the Total Skill Related Physical fitness. Stretching, Aerobics and Weight training group follows the SPW group in terms of the mean difference and these two groups showed significant response to the training protocols of the experimentation. Among the three variable groups of experimentation only Stretching, Aerobics and Plyometrics group showed much lower mean difference for adjusted Post test and pre test total Skill related Physical Fitness. Stretching and Plyometrics group showed highest mean difference for Post test adjusted mean and pre test mean of the total Skill Related Physical Fitness among the two variable groups. Stretching and Aerobics group showed higher mean difference for Post test adjusted mean and pre test mean of the total Skill Related Physical Fitness when compared to Stretching, Aerobics and Plyometrics group and Stretching and Weight Training groups. Stretching, Aerobics and Plyometrics groups showed less mean difference for when compared to other three variable groups and also Stretching and Plyometrics group and

Stretching and Weight training groups of two variable groups. All the groups of the experimentation showed much higher mean difference values for adjusted post test means and pre test means when compared to the Control Group.

4. Conclusions from the study

Stretching, Plyometrics and Weight Training group recorded highest significant difference on post test mean value of the Skill Related Physical Fitness and hence, Stretching, Plyometrics and Weight training in sequence showed effective results in improving the Skill Related Physical Fitness than any other combination. Stretching, Plyometrics and Weight Training protocol and Stretching, Aerobics and Weight Training protocols caused for significant improvement in the Skill Related Physical Fitness of the subjects.

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