BHARATHIAR NATIONAL JOURNAL OF
PHYSICAL EDUCATION AND EXERCISE SCIENCES

Effects of aerobic training preceded with proprioceptive neuromuscular facilitation on selected motor ability variables on inter –collegiate women basketball players

P. Anbalagan

Professor Department of Physical Education, Bharathiar University, Coimbatore -46 Tamil Nadu, India

Abstract

The purpose of the study was to find out the effects of aerobic training preceded with proprioceptive neuromuscular facilitation on selected motor ability variables oninter-collegiate women basketball players. To achieve the purpose of the study, sixty women basketball players were selected randomly from affiliated college for Bharathiar University, Coimbatore. The subjects aged from 18 to 25 years. The selected subjects were divided into two equal groups namely experimental-I and control groups of 30 subjects each. The training period was limited to twelve weeks and for six days per week. The aerobic training preceded with proprioceptive neuromuscular facilitation was selected as independent variables and flexibility, muscular strength endurance, arm explosive power, leg explosive power and cardio –respiratory endurance were selected as dependent variables and it was measured by sit and reach, sit-ups, medicine ball throw, stand broad jump, and 12 min run /walk test. All the subjects were tested two days before and immediately after the experimental period on the selected dependent variables. The obtained data from the experimental group and control group before and after the experimental period were statistically analyzed with dependent 't'-test to find out significant improvements. The level of significance was fixed at 0.05 level confidence for all the cases. Significant improvement was found on flexibility, muscular strength endurance, arm explosive power, leg explosive power and cardio –respiratory endurance of experimental group due to the effects of aerobic training preceded with proprioceptive neuromuscular facilitation when compared to the control group.

Keywords: Flexibility, Muscular Strength Endurance, Arm Explosive Power, Leg Explosive Power and Cardio – Respiratory Endurance

1. Introduction

Aerobic training meaning of aerobic with oxygen and refers to the use of oxygen in the body's metabolic system or energy generating process. Aerobic exercises refers to exercise that involves or improve oxygen consumption by the body. Many types of exercise are aerobic, and by definition are performed at moderate levels of intensity for extended periods of time.

Aerobic capacity describes the functional capacity of the cardio respiratory system which includes heart, lungs and blood vessels. Aerobic capacity is defined as the maximum amount of oxygen the body can use during a specified period, usually during intense exercises. It is a function both of cardio respiratory performance and the maximum ability to remove and utilize oxygen from circulating blood.

The recognized benefits of doing regular aerobic exercise are strengthening the muscles involved in respiration, and reducing blood pressure, increasing the total number of red blood cells in the body, facilitating transport of oxygen and improved mental health, including reducing stress and lowering the incidence of depression.

Thus, it can be said that it helps to maintain your overall fitness, on one hand it enables you to have a beautiful fit body and on the other hand, it ensures that your mind remains stress free

Proprioceptive Neuromuscular Facilitation (PNF)

PNF is an abbreviation Proprioceptive Neuromuscular Facilitation. A technique for increasing flexibility which combines muscle tension with passive stretching, also sometimes called isometric stretching.

PNF stretching is currently the fastest and most effective way known to increase static – passive flexibility. PNF is an acronym for proprioceptive neuromuscular facilitation. It is not really a type of stretching but is a technique of combining passive stretching and isometric stretching in order to achieve maximum static flexibility. Actually, the term PNF stretching is itself a misnomer. PNF was initially developed as methods of rehabilitating stoke victims. PNF refers to any of several post- isometric relaxation stretching techniques in which a muscle group is passively stretched, then contracts isometrically against resistance while in the stretched position, and then is passively stretched again through the resulting increased range of motion. PNF stretching usually employs the use of a partner to provide resistance against the isometric contraction and then layer to passively take the joint through its increased range of motion.

It may be performed, however, without a partner, although it is usually more effective with a partner's assistance **(Adams,2010).**

Methodology

For the purpose of this study, altogether sixty women basketball players were chosen on random basis from affiliated colleges for Bharathiar University, Coimbatore. Their age group ranges from 18 to 25 years. They were divided into two groups of 30. The Experimental group would undergo aerobic training preceded with proprioceptive neuromuscular facilitation. The second group Control group. Pre – test and post – test would be conducted. Treatment would be given for twelve weeks. It would be find out finally the effect of aerobic training preceded with proprioceptive neuromuscular facilitation on the basketball players in scientific methods.

The selected tests were measured by following units for testing:

Training Programme

The following schedule of training was given for the aerobic training preceded with proprioceptive neuromuscular facilitation training group.

Criterion Variables	Test Items	Unit Measurements
Flexibility	Sit and reach	Centi Meters
Muscular Strength Endurance	sit-ups	Score in numbers
Arm Explosive Power	medicine ball throw	meters
Leg Explosive Power	stand broad jump	meters
Cardio–Respiratory Endurance	12 min run /walk test	meters

Group	Design of the Training
Experimental Group	aerobic training preceded with proprioceptive neuromuscular facilitationtraining group
Control Group	Did not do any Specific Training
Training Duration	60 Minutes
Training Session	6 Days a week
Total Length of Training	Twelve weeks

TABLE- I Progression of load for experimental group (ATWPNFTG)

Weeks	Aerobic Training (Monday,Wednesday, Firday)	Duration (5+15+30+10=60 min)	Load
I to IV	**Warming up** 1000M Walking / Jogging **Aerobic Exercises** Alternate toe touch Shuttle run Double leg lift Skipping Leg swing forward Hexagon drill **Warming down**	**5 minutes** 15 minutes **30 minutes** **10 minutes**	4 to 8rep x 2 sets
V to VIII	**Warming up** 2000 M Walking /Jogging **Aerobic Exercises** Alternate leg circle Side ward shuttle run Alternate leg thrust Side skipping Donkey kick Hexagon hopping **Warming down**	**5 minutes** 15 minutes **30 minutes** **10 minutes**	8 to12rep x 3 sets
IX to XII	**Warming up** 3000 M Walking /Jogging Shuttle run Double leg lift Skipping Alternate leg thrust Side skipping Donkey kick **Warming down**	**5minutes** 15 minutes **30 minutes** **10 minutes**	12 to15 rep x 4 sets
Weeks	**PNF Stretching Exercises (Tuesday, Thursday, Saturday)**	**Duration(5+15+30+10 = 60 min)**	**Load**
I to IV	**Warming up** 1000M Walking / Jogging **Wall push ups** **v-sit ups** **trunk lifts** **half squat** **Warming down**	**5 minutes** 15 minutes **30 minutes** **10 minutes**	
V to VIII	**Warming up** 2000 M Walking /Jogging **Knee push ups** **Crunches** **Tummyn lying leg lifts** **Flutter kicks** **Warming down**	**5 minutes** 15 minutes **30 minutes** **10 minutes**	8 to12rep x 3 sets
IX to XII	**Warming up** 3000 M Walking /Jogging **Push ups** **90 degree leg scissors** **Incline sit ups** **Combined trunk** **Warming down**	**5minutes** 15 minutes **30 minutes** **10 minutes**	12 to15 rep x 4 sets

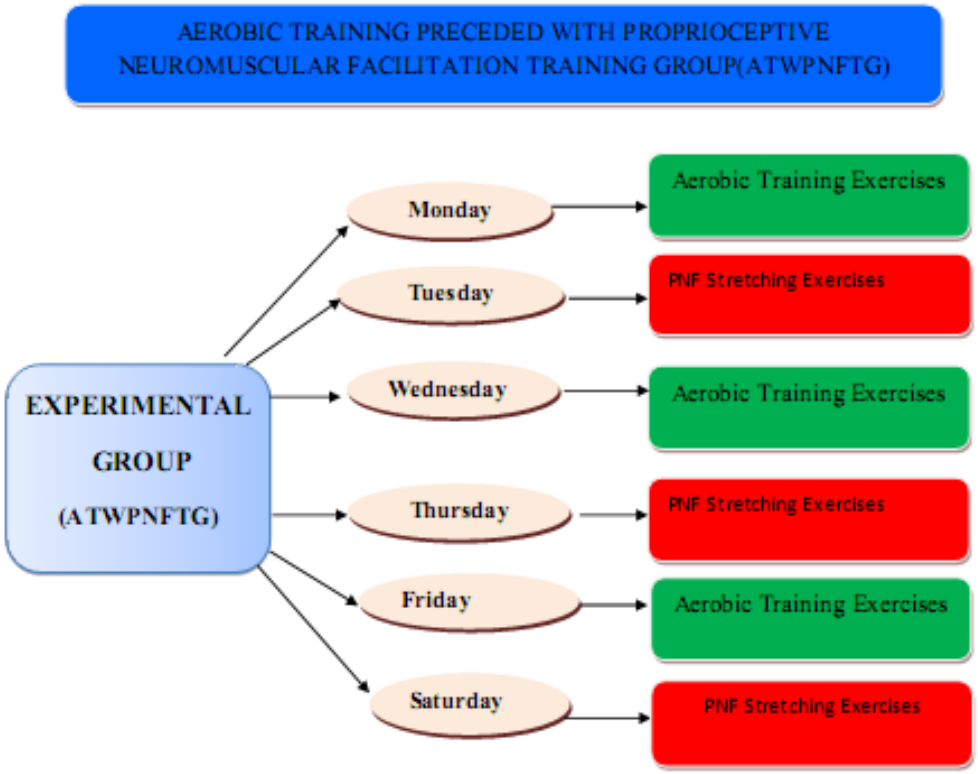

CHART-1 Experimental treatment adopted for experimental

Experimental Design

The experimental group was given aerobic training preceded with proprioceptive neuromuscular facilitation stretching exercises after taking an initial test. After the initial test selected aerobic training with proprioceptive neuromuscular facilitation stretching exercises were given for twelve weeks in all days except Sunday. The time of practice was from 6.00A.M to 7.00 A.M. The control group were not participating in any of the special training programme. However, they were allowed to participate in their regular education classes in the college as per their curriculum.

Statistical Technique

The achieved data since the experimental group and control group previously and subsequently the experimental dated were statistically evaluated with dependent t-test to discovery obtainable significant development. The level of significance was secure at 0.05 level of confidence for all the cases.

Results and Discussions

The effect of independent variables on each criterion variables was considered by dependent 't' – test on the data achieved for flexibility, muscular strength endurance, arm explosive power, leg explosive power and cardio – respiratory endurance. The pre-test and post- test means of experimental group and control group have been analyzed and existing in Table II&III.

The table II and III, shows that, the obtained 't'–ratio between the pre and post-test means of experimental group were 7.50,7.50,7.22,9.32,3.94 and control group were 0.54,1.59,1.73,1.23,1.92 respectively. The table values required for significant difference with df 1,29 at 0.05 level of confidence. Since the obtained 't' – ratio value of experimental and control group on flexibility, muscular strength endurance, arm explosive power, leg explosive power and cardio–respiratory endurance were greater than the table value 2.045,it was concluded that the aerobic training followed by proprioceptive neuromuscular facilitation stretching exercises had significantly improved

flexibility, muscular strength endurance, arm explosive power, leg explosive power and cardio–respiratory endurance of experimental group.

TABLE – II Mean and dependent 't' – test for the pre and post tests on flexibility, muscular strength endurance, arm explosive power, leg explosive power and cardio–respiratory endurance of experimental group

S.No	Variables	Pre- test Mean± SD	Post -test Mean± SD	Diff	SE	't' –ratio
1.	Flexibility	5.26 ± 2.57	6.73 ± 0.35	1.47	0.99	7.50*
2.	Muscular Strength Endurance	14.26 ± 2.57	16.73 ± 3.05	2.47	0.99	7.50*
3.	Arm Explosive Power	50.71 ±7.01	54.87±7.00	4.16	.58	7.22*
4.	Leg Explosive Power	2.52±.38	2.58±.32	.06	.006	9.32*
5.	Cardio–Respiratory Endurance	789.06 ±43.62	968.93 ±32.74	179.87	0.69	3.94*

*Significance at 0.05 level of confidence

TABLE – III Mean and dependent 't' – test for the pre and post tests on flexibility, muscular strength endurance, arm explosive power, leg explosive power and cardio–respiratory endurance of control group

S. No	Variables	Pre test Mean± SD	Post test Mean ± SD	Diff	SE	't' –ratio
1.	Flexibility	4.20 ± 1.65	4.61 ± 1.69	0.41	0.36	0.54
2.	Muscular Strength Endurance	13.20 ± 1.51	13.54 ± 1.45	0.34	0.37	1.59
3.	Arm Explosive Power	50.56±5.20	50.24±5.11	.33	.19	1.73
4.	Leg Explosive Power	2.51±0.06	2.52±0.05	.02	.012	1.23
5.	Cardio–Respiratory Endurance	728.86 ±45.55	890.26 ± 68.26	161.40	20.09	1.92

*Significance at 0.05 level of confidence

The pre and post- test mean value of experimental and control group on flexibility, muscular strength endurance, arm explosive power, leg explosive power and cardio–respiratory endurance were graphically represented in the figure 1.

Discussion on Findings

The finding of the study reveals that the aerobic training followed by proprioceptive neuromuscular facilitation stretching exercises cause significant improvement in their motor ability variables. In the view of control group there was no significant improvement in their motor ability variables.

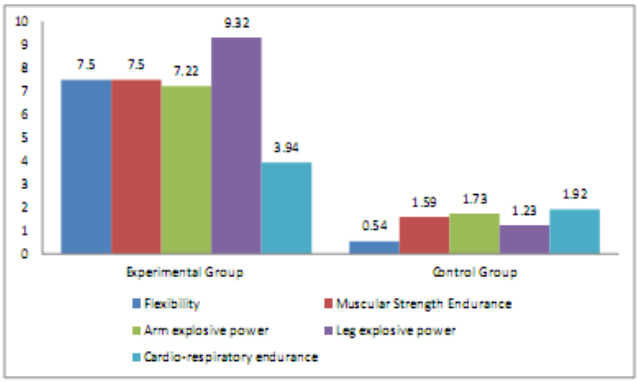

Figure 1

The findings of the study Darby (1995), Bell JM (1996), Miyahara (2012), Herda (2011) in their study, they stated that aerobic training preceded with proprioceptive neuromuscular facilitation stretching exercise developed motor ability variables.

Conclusion

It was concluded that improvement of flexibility, muscular strength endurance, arm explosive power, leg explosive power and cardio–respiratory endurance was found significantly on experimental group due to the effect of aerobic training preceded with proprioceptive neuromuscular facilitation stretching exercises when compared to the control group.

References

1. Darby LA,BrowderKD, Reeves BD, (1995),Effects of cadence, impact, and step on physiological responses to aerobic dance exercise, ,research Q Exercise Sports,(3),P231-238.
2. Yutetsu Miyahara, Hisashi Naito,(2012), Effects of Proprioceptive Neuromuscular Facilitation Stretching and Static Stretching on Maximal Voluntary Contraction, The Journal of Strength and Conditioning Research 27(1).

Funding

This study was not funded by any grant

Acknowledgements

The authors would like to thank every participant for his effort and time.

Conflict of interest

None of the authors have any conflicts of interest to declare.

How to Cite this Article

P. Anbalagan, Effects of aerobic training preceded with proprioceptive neuromuscular facilitation on selected motor ability variables on inter –collegiate women basketball players, Bharathiar National Journal of Physical Education and Exercise Sciences 10(4) (2019) 22-27.