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## Effects of aerobic exercises with and without proprioceptive neuromuscular facilitation on the selected physical fitness variables of the inter-collegiate basketball players

**N Sivasankar and Dr. M Govindaraj**

### **Abstract**

Introduction The purpose of the study was to find out the effects of the aerobics exercises with and without Proprioceptive Neuromuscular Facilitation formulated as on the selected physical Fitness variables of the inter-collegiate basketball players. METHODOLOGY of the study was formulated as pre and posttest random group design. The selected subjects were the participants of the intercollegiate level basketball tournament in the Coimbatore district. The age of the subjects for the study was ranged in between 18 to 25 years. The subjects were randomly selected and divided into three equal groups - Group I, aerobic group, Group II, aerobic with PNF, and Group III, control group and each group consisting of 15 subjects, totally 45 subjects. The selected subjects were initially tested on the criterion variables used in the study and it is considered as the pre-test. After assessing the pre-test, the subjects belonging to the group-I aerobic group were treated with the aerobic training, the group II treated with the aerobic with PNF and the group III control group was not given specific training. STATISTICAL TOOL, the collected data were statistically analyzed with a paired (sample) t test to find out the significant improvement between pre and posttest of all the groups. The groups during the experimental period of twelve weeks to the criterion measures were tested for the significance by applying t test at 0.05 level. It was considered as sufficient for the study. The collected data was processed by using the Analysis of Covariance (ANCOVA) to determine the significant difference among the treatment means of the each variable. During the analysis of covariance showed significant differences between treatment means, Scheffe's post hoc test was applied to test the significant differences between the paired adjusted means at 0.05 level of the confidence. DISCUSSION, before and after training the pretest and the post test was conducted for the three groups. Subjects in the experimental groups were treated with the respective treatment for three days a week for the duration of 12 weeks. After completion of the treatment period all the subjects were again tested on the criterion variables and considered as the post test. CONCLUSION, it was concluded that the group I, aerobic group and the group II, aerobic with PNF after 12 weeks training showed a significant improvements on the selected physical fitness variables.

**Keywords:** PNF, aerobic training, physical fitness

### **1. Introduction**

Sports are an important ingredient of the physical education and a worldwide phenomenon. The unprecedented popularity and better organization of the sports activity and competition would have been impossible without the recognition of the important sports competitions in the world. The world has realized the importance of sports for the modern civilizations. PNF is an abbreviation of the Proprioceptive Neuromuscular Facilitation. A technique for increasing the flexibility which combines the muscle tension with passive stretching, also called as the isometric stretching. Basketball is one of the most popular team based sports played and watched throughout the world. The Basketball game is played with the continuous flow of activity has been considered as a game of precision, timing, accuracy and agility. Having greater intensity throughout the game the player can possess the ability to move faster, stronger and more ensuring throughout the game.

**2. Methodology**

The selected subjects were the participants of the intercollegiate level basketball tournaments in the Coimbatore District. The age of the subjects for the study was ranged in between 18 to 25 years. The subjects were randomly selected and divided into three equal groups namely Experimental group-I, Aerobic training (ATG), Experimental group-II, Aerobic training with PNF (ATWPNFG) and Group-III, Control Group (CG) each consisting of 15 subjects. The selected subjects were initially tested on the criterion variables used in the study and it was considered as the pre-

test. After assessing the pre-test, the subjects belonging to the experimental group-I were treated with the aerobic training and the subjects belonging to the experimental group-II were treated with the aerobic training with PNF. As far as the subjects in the group III - Control Group (CG) was concerned they were not given any specific training. Subjects in the experimental groups I and II were treated with their respective treatments for three days a week and for a duration of 12 weeks. After completion of the treatment period, all the subjects were again tested on the criterion variables and considered as the post-test.

**Table I:** Significant Differences of the Mean and T-Test Values among the Three Groups

Group	Variables	Pre- Test	Post- Test	MD	SD	SEM	t-ratio
ATG	Agility	15.12	17.18	2.05	0.21	0.245	9.38*
ATWPNFG		15.34	16.55	2.05	0.21	0.065	3.65*
Control		16.14	15.92	0.22	0.13	0.065	1.65
ATG	MSE	23.07	27.60	4.53	2.177	0.398	11.41*
ATWPNFG		23.42	27.98	4.03	0.999	0.182	22.10*
Control		23.77	26.70	2.93	2.15	0.392	1.48
ATG	Flexibility	21.93	24.17	2.23	0.971	0.177	12.59*
ATWPNFG		22.60	24.70	2.10	0.803	0.147	14.32*
Control		21.93	22.70	0.767	0.72	0.133	0.77
ATG	AEP	6.49	6.92	0.43	0.04	0.249	9.12*
ATWPNFG		6.42	6.51	0.08	0.04	0.166	2.85*
Control		6.49	6.48	0.006	0.02	0.213	0.25
ATG	LEP	2.01	2.16	0.15	0.59	1.32	4.82*
ATWPNFG		2.06	2.27	0.20	0.05	0.142	3.98*
Control		2.04	2.01	0.03	0.09	0.142	0.33

\*0.05 level of significance (2.02)

The Table-I reveals that the pre and posttest values of the aerobic training, aerobic group with combination of PNF stretch technique group and control group on the selected physical fitness components namely Agility, Muscular strength endurance, Flexibility, Arm Explosive power and Leg Explosive Power. The pre-test mean values of the aerobic group are 15.12, 23.07, 21.93, 6.49 and 2.01 respectively. The pre-test mean values of the aerobic training with combination of PNF group are 15.34, 23.42, 22.60, 6.42 and 2.06 respectively. The pre-test mean values of the control group are 16.14, 23.77, 21.93, 6.49 and 2.04 respectively. The post-test mean values of the aerobic group are 17.18, 27.60, 24.17, 6.92 and 2.16 respectively. The post-test mean values of the aerobic group with combination of PNF group are 16.55, 27.98, 24.70, 6.51 and 2.27 respectively. The post-test mean values of the control group are 15.92, 26.70, 22.70,

6.48 and 2.01 respectively. The obtained t-values of the ATG and ATWPNFG groups are 9.38, 3.65, 11.41, 22.10, 12.59, 14.32, 9.12, 2.85, 4.82 and 3.98 respectively. The required table value is 2.02. Since the obtained t-ratios are greater than the required table value at 0.05 level of confidence so there are a significant difference, between the pre and post test values of the physical fitness components among the intercollegiate basketball players. The obtained t-values of the control group are 1.65, 1.48, 0.77, 0.25, and 0.33 respectively. The required table value is 2.02. Since the obtained t-ratios are less than the required table value at 0.05 level of confidence so there are an insignificant difference, between the pre and post test values of the physical fitness components among the intercollegiate basketball players.

**Table II:** Significant Differences of the Adjusted Post Mean Values among the Three Groups

Variables	SV	SQ	df	Mean square	'F'
Agility	Between	190.69	2	95.35	33.46*
	within	245.08	41	2.85	
Muscular Strength Endurance	Between	1142.13	2	571.01	9.32*
	within	5267.10	41	61.25	
Flexibility	Between	7.95	2	3.97	15.59*
	within	21.91	41	0.25	
Arm Explosive Power	Between	19.38	2	9.69	8.03*
	within	103.74	41	1.21	
Leg Explosive Power	Between	42.31	2	21.16	14.35*
	within	126.82	41	1.46	

\*0.05 level of significance (3.22)

The obtained 'F' ratio for the adjusted posttest mean of the ATG, ATWPNFG and CG on the Agility, Muscular strength endurance, Flexibility, Arm Explosive power and Leg Explosive Power is 33.46, 9.32, 15.59, 8.03 and 14.35

respectively, since F - value is higher than the required table value of 3.22 for the degree of freedom 2 and 41, it is significant at the 0.05 level of confidence. Whenever the 'F' value among the adjusted posttest mean of

the aerobic training group (ATG), aerobic training with PNF group (ATWPNFG) and control group (CG) groups are found to be significant, in order to find which of the training group

had improved the physical fitness variables was higher than the other training groups the scheffe's post hoc test was applied

**Table III:** Scheffee's Post Hoc Values Of The Adjusted Post Test Mean Difference On The Experimental Group-I Aerobic Group, Group -Ii Aerobic With PNF And Group-Iii Control Group

S. No	Aerobic group (Group-I)	Aerobic with PNF (Group-II)	Control Group (Group-III)	Mean difference	C.I
Agility	26.22	28.02		1.80*	1.03
		28.02	28.45	3.57*	
	26.22		28.45	1.77*	
Muscular Strength Endurance	19.62	16.65	-	2.97	4.75
	-	16.65	10.96	5.69	
	19.62	-	10.96	8.66	
Flexibility	5.32	5.89	-	0.57	0.31
	-	5.89	4.66	0.69	
	5.32	-	4.66	0.12	
Arm Explosive Power	36.10	35.42	-	0.23	0.67
	-	35.42	35.02	0.85	
	36.10	-	35.02	1.08	
Leg Explosive	28.02	26.82	-	1.20	0.74
	-	26.82	28.45	1.62	

Table III reveals that the result is inferred that the twelve weeks of the Aerobic training group is improved on the muscular strength endurance and arm explosive power significantly higher than the other training groups of the ATWPNFG and CG.

From the result it is inferred that the twelve weeks of the Aerobic training with the PNF group is improved on the Agility, flexibility and leg explosive power significantly higher than the other training groups of the ATG and CG.

**3. Conclusion**

- In light of the above findings of the present study the following conclusions was made. It was concluded that the aerobic training produced significant development on the selected physical fitness components namely Agility, Muscular strength endurance, Flexibility, Arm Explosive power, and Leg Explosive power of the intercollegiate basketball players.
- It was concluded that the aerobic training with PNF practices produced a significant development on the selected physical fitness components namely Agility, Muscular strength endurance, Flexibility, Arm Explosive power, and Leg Explosive power of the intercollegiate basketball players.
- It was concluded that the control group do not produce significant difference between the pre and post test on the selected physical fitness components namely Agility, Muscular strength endurance, Flexibility, Arm Explosive power, and Leg Explosive power of the intercollegiate basketball players.
- It was concluded that the aerobics training has shown a significant improvement than the aerobic training with PNF practice group and control group on the selected physical fitness components namely, Muscular strength endurance and Arm Explosive power of the intercollegiate basketball players. It was concluded that the aerobics training with PNF practices has shown a significant
- improvement than the aerobic training group and control group on the selected physical fitness components namely Agility, Flexibility and Leg Explosive power of the intercollegiate basketball players.

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