STAR
Research Journal

Available online at www.starresearchjournal.com (Star International Journal)
PHYSICAL EDUCATION
Star. Phy. Edn 3 (2014)

EFFECT OF VARIED FREQUENCIES OF SCIENTIFIC TRAINING ON ANTHROPOMETRY AND SKILL PERFORMANCE OF FIELD HOCKEY PLAYERS

MUNIRAJ.S
Assistant professor, Sri Ramakrishna Mission Vidyalaya Maruthi College of Physical Education, Coimbatore - 641020

Abstract

Now a days the term scientific is mostly used in the field of training and sports. Science knowledge should predominate the performance of the athletes. The word scientific, widely used but there is no specific derivations to describe that, with reference of the many scientist the study attempt to describe what scientific training is and its effect, for that purpose there are 45 field hockey players were randomly selected, they were divided into three equal groups namely experiment group I was treated weekly 5 days training (F1), experiment group II underwent weekly 3 days training (F2) and as control group (CG) not exposed to any treatment. After 12 weeks of training it produced significant improvement over the F1 and F2 groups. Finally it was concluded that F1 training was most appropriate training to improve the anthropometry and skill performance of the players.

Introduction

From 20th century the term scientific training or scientific knowledge was very popular or famous talk in the field of sports and physical education. Since the sports and physical education syllabus were accomplished with sports sciences. Sport science is a discipline that studies the application of scientific principles and techniques with the aim of improving sporting performance. Human movement (kinesiology) is a related scientific discipline that studies human movement in all contexts including that of sport. The study of sport science traditionally incorporates areas of physiology, psychology, motor control and biomechanics but also includes other topics such as nutrition and diet, sports technology, anthropometry, kinanthropometry, and performance analysis. Due to the knowledge and development of the sport science, scope towards the sports field also increased in the recent era. Through the study of science and sport, researchers have developed a greater understanding on how the human body reacts to exercise, training, different environments and to various stimuli.

Kurz and Zagorski(1997) said the optimal sequence of types of efforts (exercises) in a workout, in a weekly cycle of workouts and in longer periods, and explains physiological basis for these arrangements. Science of training covers all effective methods of developing any physical ability, skill or mental ability and it tells how and when to change the training loads, how to make training plans for any period of time (single workout, week, month, year, several years). You will learn, during a day and during a workout, when the best time is for technical, speed, strength, endurance, or flexibility exercises; when during a week should you do a given type of a workout; when and how much should you

work on any ability or skill during an annual training plan. The examples, illustrating the principles of training and the methods of controlling it, are taken from sports with which most people are familiar (track and field, swimming, boxing, wrestling, gymnastics, and ball games).

Other than above statements many of the scientists conducted the study about influence of science improvement of sports performance. **Moor (1905)** was one of the first American pioneer physicians, studied physiological responses to exercise in his influential medical textbook. **Hitchcock (1806)** Amherst College Professor of hygiene and physical education devoted his academic career to the scientific study of physical exercise, training and the body on exercise physiology. **Fitz (1891)** created the first departmental major in Anatomy, Physiology, and Physical Training at Harvard University. **Krogh** won the 1920 Nobel Prize in physiology for discovering the mechanism that controlled capillary blood flow in resting or active muscle.

Hence, "*scientific training is nothing but varied type of exercises framed for improvement of physique, physical, physiological and psychological of participants progressively and systematically"*.

Methods

Selection of subject:

To achieve the purpose of the study, 45 college men hockey players were randomly selected from three different college teams. They were divided into 3 equal groups consisting of 15 each (N = 15). The experiment group I was treated weekly 5 days training (F1), experiment group II underwent weekly 3 days training (F2) and as control group (CG) not exposed to any treatment. The experimental groups under gone their respective training for 5 days and 3 days per week for a period of 12 weeks.

Selection of the variables

Considering the purpose of the study, the following variables were selected: Anthropometric variables and Skill performance variables.

Criterion Measures

The subjects were done following standardized tests from that the scores were collected:

Chest Girth, Upper arm Girth, Thigh Girth, Calf Girth- **Norton & Olds, 1996.**

Slalom Speed and Dribble Test

Experimental design and statistical technique

To find the effect of the training, the subjects were underwent pre and posttest random group design."t" test was done for find the effect of the training after the pretest. ANCOVA test was done to find out the significance of adjusted post-test mean, whenever F found significant the scheffe's post hoc test was applied to test the significant difference between the paired adjusted means. All statistical analysis were carried out with the help of statistical package SPSS at 0.05 level of confidence.

Result

The scientific programme was confined to 45 college men hockey players, the treatment significantly improved the Anthropometric and Skill performance variables. It was shown below:

Table-1

Computation of 't' ratio on Upper arm girth, chest girth, thigh girth, calf girth (Scores in centimeters) and SSDT (Scores in seconds)

Variables	Groups	Pre mean	Pre SD(±)	Post mean	Post SD(±)	't' ratio
Arm girth	F1	29.80	1.15	30.50	0.84	5.94*
	F2	29.33	0.97	29.82	0.77	2.61*
	CG	29.53	0.91	29.60	1.06	1.06
Chest girth	F1	91.16	1.97	93.23	2.67	10.38*
	F2	89.13	4.31	90.04	3.99	5.69*
	CG	89.13	4.08	89.01	4.02	1.45
Thigh girth	F1	54.60	2.82	56.63	2.82	15.39*
	F2	54.07	2.40	55.62	2.20	3.87*
	CG	54.33	2.41	54.23	2.43	0.96
Calf girth	F1	35.27	1.44	36.77	1.47	8.18*
	F2	34.73	1.39	35.68	1.58	5.24*
	CG	35.13	1.12	34.97	1.66	0.49
SSDT	F1	23.07	0.14	21.57	0.30	21.05*
	F2	23.05	0.12	22.36	0.21	17.31*
	CG	23.07	0.10	22.88	0.40	1.81

* Significant at 0.05 level for the degrees of freedom 1 and 14, (2.145).

Table- 1 shows that the 't' ratio's on Anthropometric and Skill performance of F1 and F2were higher than the required table value of 2.145, it was found to be statistically significant at 0.05 level of confidence for degrees of freedom1and 14. Further, the obtained 't' ratio between pre and posttests of control group was lesser than the required table value of 2.145, it was found to be statistically not significant.

Table- 2

Analysis of covariance on Upper arm girth, chest girth, thigh girth, calf girth (Scores in centimeters) and SSDT (Scores in seconds)

Variables	Test	F1	F2	F3	SV	SS	df	MS	F
Arm girth	Pretest	29.80	29.33	29.53	B	2	1.64	0.82	0.79
					W	42	43.46	1.03	
	Posttest	29.80	29.33	29.53	B	2	7.46	3.73	5.23*
					W	42	29.94	0.71	
	Adjusted	30.32	29.94	29.54	B	2	4.51	2.25	13.12*
					W	41	7.04	0.17	

Chest girth	Pretest	91.16	89.13	89.13	B	2	41.15	20.57	1.57
					W	42	547.93	13.04	
	Posttest	93.23	90.04	89.01	B	2	145.35	72.67	5.94*
					W	42	513.06	12.21	
	Adjusted	91.94	90.69	89.65	B	2	37.14	18.57	54.18*
					W	41	14.05	0.34	
Thigh girth	Pretest	54.60	54.07	54.33	B	2	2.13	1.06	0.16
					W	42	273.86	6.52	
	Posttest	56.63	55.62	54.23	B	2	42.23	21.11	3.38*
					W	42	262.03	6.23	
	Adjusted	56.72	55.86	54.27	B	2	36.59	18.30	20.80*
					W	41	36.05	0.87	
Calf girth	Pretest	35.27	34.73	35.13	B	2	2.31	1.15	0.65
					W	42	73.60	1.75	
	Posttest	36.77	35.68	34.97	B	2	24.76	12.38	4.98*
					W	42	104.22	2.48	
	Adjusted	36.75	35.86	34.88	B	2	21.74	10.87	11.81*
					W	41	37.74	0.92	
SSDT	Pretest	23.07	23.05	23.07	B	2	0.003	0.001	0.09
					W	42	0.673	0.016	
	Posttest	21.57	22.36	22.88	B	2	13.08	6.54	65.67*
					W	42	4.18	0.10	
	Adjusted	21.57	22.37	22.88	B	2	13.06	6.53	72.36*
					W	41	3.70	0.09	

* Significant at 0.05 level for the degrees of freedom (2, 42) and (2, 41), 3.22

Table- 2 reveals the computation of 'F' ratios on pretest, posttest and adjusted posttest means of F1, F2 and CG on Anthropometric and Skill performance.The obtained 'F' ratio for the pretest means of F1, F2and CG was less than the required table value of 3.22, it was found to be statistically not significant at 0.05 level of confidence.Further,the 'F' ratio for posttest means of F1, F2 and CG was higher than the required table value of 3.22 for the degrees of freedom 2 and 42, it was found to be statistically significant at 0.05 level of confidence

Table- 3

Scheffe's Post hoc test for the differences between the paired Adjusted Post-test means of upper arm girth, Chest girth, thigh girth, Calf girth and SSDT

Variables	F1	F2	CG	Difference	CI
Arm girth	30.32		29.54	0.78*	0.38
	30.32	29.94		0.38*	
		29.94	29.54	0.40*	
Chest girth	91.94		89.65	2.29*	0.55
	91.94	90.69		1.25*	
		90.69	89.65	1.04*	
Thigh girth	56.72		54.27	2.45*	0.86
	56.72	55.86		0.86*	
		55.86	54.27	1.59*	
Calf girth	36.75		34.88	1.87*	0.88
	36.75	35.86		0.89*	
		35.86	34.88	0.98*	
SSDT	21.57		22.88	1.31*	0.28
	21.57	22.37		0.80*	
		22.37	22.88	0.51*	

* Significant at 0.05 level

Table- 3 shows that there is a significant difference between control group and experimental groups. Moreover, it shows that there is a significant difference between the two experimental groups. The above data also reveal that Scientific Training with F1 group had better performance compared to other groups.

Discussion

Following investigations are closely associate with the present study, they are **Retief (2004), Marrin and Bampouras (2008)** and **Manna et al., (2010).** In the present study, after 12 week of weekly five days training (F1) programme, parametric test and independent sample t- tests revealed statistically significant ($p<05$), gains and improvement in Anthropometric variables of upper arm girth (2.35%), chest girth (2.27%), thigh girth (3.72%) and calf girth (4.25%).

The weekly three days (F2) training improved upper arm girth, chest girth,thigh girth and calf girth over 1.67%, 1.02%, 2.87%, and 2.73% respectively there by finding significant differences in comparison from base line to post test. It is noted that the subjects of weekly five days training (F1) group had greatly improved their results, in upper arm girth (2.35% vs 1.67%), chest girth (2.27% vs 1.02% and 0.13%), thigh girth (3.72% vs 2.87% and 0.11%), and calf girth (4.25% vs 2.73% and 0.45%) better

than other groups F2 and CG .The greatest growth increase of 4.25% was found in calf girth and the least growth increase was found in chest girth 1.02%.

The exercise that were selected for 12 weeks F1 and F2 programs involved slow jogging to most vigorous activity like complex training, etc., and all these types of exercises helped to improve the skill performance. The result of the study speculated that 5days/week training (F1) reduced SSDT time over 6.76% and 0.82% respectively, by finding significantly differences in comparison between base line and posttest.The observed improvement (reduced) in SSDT time due to influence of 3days/week training (F2) was 2.21% and 0.82% respectively. However, there were no statistically significant changes in SSDT time of control group. The result relates with **Elferink-Gemser et al (2004)**.

CONCLUSIONS

Based on the results of the study the following conclusions have been arrived.

- ✓ Within the limitation and on the basis of the finding of the study, it was very clear that 12 weeks of scientific training programme produced significant changes in anthropometry and skill performance variables of field hockey players.
- ✓ The experimental group I weekly five days of training for a period of 12 weeks produced significant changes over selected anthropometry variables (upper arm girth, chest girth, thigh girth and calf girth), and skill performance variable (slalom speed dribble test) of field hockey players than experimental group II weekly three days training.
- ✓ From the results, it is inferred that the 12 weeks of five days of scientific training is found to be most appropriate training protocol to bring out desirables changes over anthropometry and skill performance variables of field hockey players.

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