IMPACT OF PLYOMETRIC & CYCLE ERGOMETER TRAINING ON HANDBALL PLAYERS' ANAEROBIC PERFORMANCE

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ABSTRACT

The purpose of the present study was to determine impact of plyometric & cycle ergometer training onHandball Players' anaerobic capacity. The participants were 30 men shot putters from Yewatmal Senior Secondary Schools, aged 14 to 18. (Maharashtra). Ten volunteers from each of the two experimental groups (Plyometric and Cycle Ergometer) and the control group were randomly chosen among the participants. The training was provided for six weeks. The two experimental groups got training three times each week, while the control group went about their normal daily activities. Data gathering focused on anaerobic capability. The Pre- and Post-tests were given in order to collect the data. Once the data had been gathered, the t-test was used to see whether there were any significant differences between the groups. For the anaerobic capacity, a covariance analysis was also utilised to identify significant differences. In order to find significant variations between the training regimens, the LSD Post hoc test was performed. The significance threshold was set at 0.05.The finding have shown the significant value of F-ratio's for anaerobic ability of all the experimental groups i.e. plyometric and cycle ergometer training programs as compared with the control group. The plyometric training program proved better than the cycle ergometer training.

Key words: Plyometric, Cycle ergometer, Anaerobic Ability

INTRODUCTION

The performance in most of the sports is determined by three factors namely physical fitness, technique and tactics. Strength is one such component which influences the performance and special attention has to be paid to it. There are three main form of Strength viz. Maximal strength, explosive strength and strength endurance. Strength may be developed in many ways such as weight lifting, bounding with or without resistance, various drills and of course depth jumping or plyometric. In 1996, V.M. Zaciorskij's work, which was published in Russian sports literature, introduced the term "plyometric." Plyometric exercise has also been referred to by various names as shock training, speed strength, bounce training, and elastic reactivity. Exercises like plyometric training are meant to build more powerful muscles. It is preferable for athletes, sprinters, football players, and occasionally boxers to include plyometric training into their training regimen in order to increase their level of explosive power.

Layers should gradually incorporate Handball Players into their workouts and should be sure to include plenty of rest intervals in the workout so that the body can recover sufficiently between sets and between exercises. Polymeric training can be so beneficial to Handball Players because, unlike standard weightlifting, they improve the explosion of the leg muscles rather than just building strength and muscle mass. a stationary one-wheeled bike that is used as an ergometer to evaluate a person's ability to do labor-intensive tasks under controlled conditions. Cycle ergometers are not very good at determining peak performances in those who are not accustomed to riding since the leg muscles often fatigue before the rest of the body. a fitness tool that makes it possible to measure under control the volume and speed of a person's physical activity. There are various distinct ergometer kinds, each with unique benefits and drawbacks.

The ergometer that athletes use should closely reflect their training or competition. To evaluate the labour production of competitive oarsmen under regulated conditions, rowing ergometers were developed. The way they pull on the oars is mimicked. Arm ergo metres work by having the user pedal their arms to turn a flywheel. They are especially well suited for individuals who perform physical activity primarily with their arms and shoulders. Anaerobic energy generation doesn't require oxygen. Lactic acid energy system is another name for the anaerobic energy system. The anaerobic energy system gives us the energy to carry out work when we engage in short-term exercise, but because the oxygen level was low, lactic acid generation began.

METHODS

Participant

For these purpose thirty male Handball Players aged between 14 – 18 years were selected from Senior Secondary Schools of Yewatmal, Maharashtra through purposive sampling technique. The subjects were divided in to three equal groups of ten subjects in each after pre-test of anaerobic ability through fifty meters dash.

1. Anaerobic ability

Sprint or speed tests can be performed over varying distances, depending on the factors being tested and the relevance to the sport.

a) The test consists of a single maximal sprint over 50 meters that is timed. Warm up thoroughly, including some practice starts and accelerations. Begin in a steady standing stance with one foot in front of the other (hands cannot contact the ground). The front foot should be placed behind the starting line. The starter says "set" then "go." when the subject is ready and immobile. The tester should give tips on how to maximize speed (such as staying low and driving hard with the arms and legs), and the participant should be encouraged not to slack down until reaching the finish line.

b) The best time is reported to the closest two decimal places after two attempts. Timing begins with the initial movement (if using a stopwatch) or when the timing system is activated, and ends when the chest crosses the finish line and/or the finishing timing gate is activated.

RELIABILITY OF DATA

The reliability of test score was established by test retest method. The reliability of data ispresented in table-1

Sr.no	Test Item	Coefficient of correlation
1	Anaerobic ability	.83

SIX WEEK OF PLYOMETRIC TRAINING PROGRAMME

Plyometric Training Programme	Cycle Ergo meter Training Programme
Side box-Jumps	Sub-maximal
Foot Obstacle Hops	
Medicine Ball Throw	Supra-maximal
Lateral pass	
Back Toss throw	

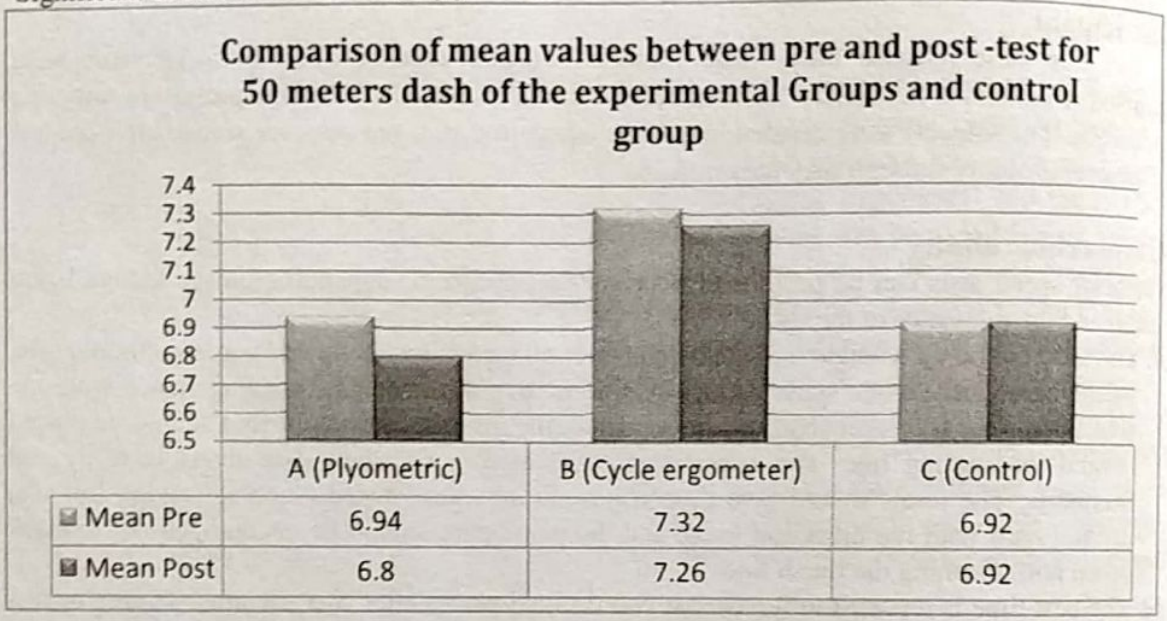
RESULTS

In order to compare the pre and post-test means of all the experimental groups and control group, the 't' ratios were calculated, the results are given in table-

Table- 6: Comparison of mean values between pre and post -test for 50 meters dash of the experimental Groups and control group

Groups	Test	Mean (sec)	S.D.	S.E.	't'- ratio
A (Plyometric)	Pre	6.94	0.436	0.138	4.03*
	Post	6.80	0.426	0.135	
B (Cycle ergometer)	Pre	7.32	0.282	0.089	2.72*
	Post	7.26	0.301	0.095	
C (Control)	Pre	6.92	0.353	0.111	0.43
	Post	6.92	6.92	0.136	

*Significant at 0.05 level. Tab t .05 (9) = 2.26



Scores of 50 meter in case of plyometric training group. The obtained value of t-test was 4.03 which were found significant at 0.05 level confidences. In case of group B which trained with cycle ergometer training exercises has also shown the lesser value of post-test mean 7.26 than the pre-test mean value 7.32. The obtained t- test value 2.72 was more than the table value of 2.26 which shown significant value at 0.05 level confidence. In case of control group (Group-C) the value of pre-test mean 6.92 and post -test mean 6.92 did not differ significantly since the obtained value of t-test was 0.43, which was found insignificant at the selected level of 0.05 The results as shown in table-6 have exhibited that all the experimental groups (A, B) have shown the significant improvement in the performance of subjects in the test of fifty meter dash however the control group did not exhibit the significant improvement. Since the means of experimental groups differ significantly from each other, therefore, the data were subjected to analysis of co-variance. The results of analysis of co-variance are given in table m 7

Table- 7: Analysis of co-variance for the experimental groups and the control group of 50 meter dash

Test	Group Means (sec)			Source of variation	Sum of squares	df	Mean Sum of squares	F-ratio
	A	B	C					
Pre-test Mean	6.94	7.32	6.91	Among	1.0421	2	0.5211	3.963*
				Within	3.5493	27	0.1314	
Post-test Mean	6.80	7.26	6.91	Among	1.1287	2	0.5644	4.591*
				Within	3.3613	27	0.1245	
Adjusted Post-test Mean	6.69	7.01	7.05	Among	0.0859	2	0.0429	6.018*
				Within	0.1856	26	0.0071	

*Significant at 0.05 level F.05 (2, 27) = 3.35 F.05 (2, 26) = 3.37

As shown in table-7 that significant value of F-ratios were obtained for the comparison of pre- test means (3.963), post -test means (4.591) and adjusted post- test means (6.018). The obtained values were higher than the required value for the selected degree of freedom and the significant level. The data were further subjected to LSD post hoc test. The results of the Post hoc analysis and the difference between the means among the four groups are shown in table-8

Table- 8: Paired adjusted final means and differences between means among the experimental groups and control Group of 50 meters dash (seconds)

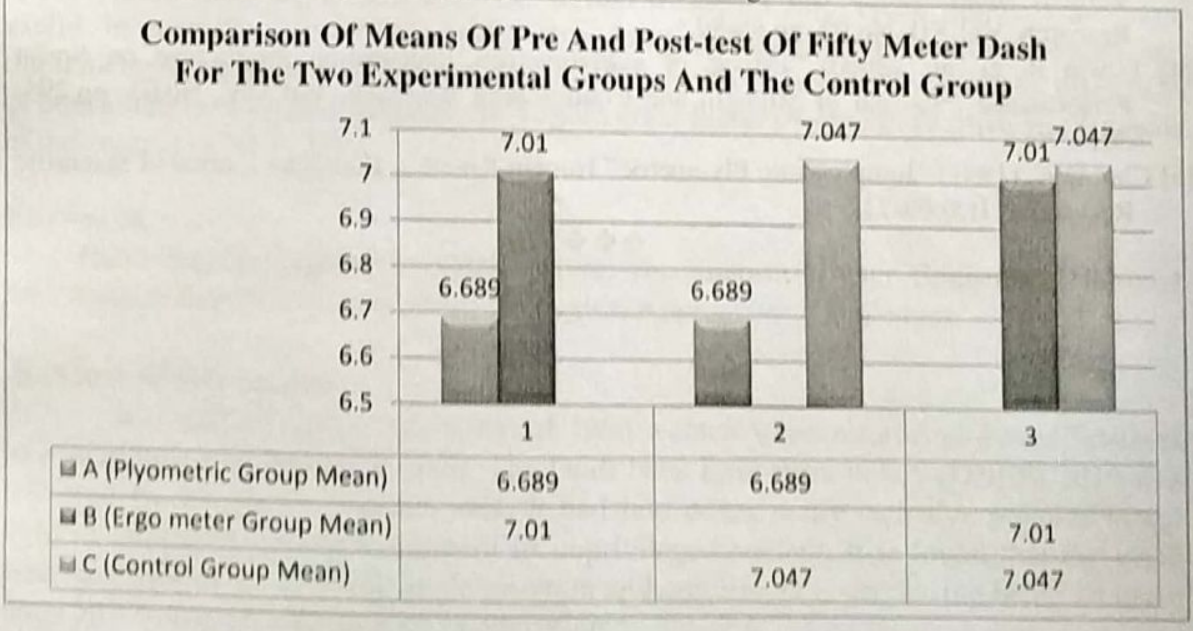
Groups			Mean Difference
A (Plyometric Group Mean)	**B (Ergo meter Group Mean)**	**C (Control Group Mean)**	
6.689	7.010		0.321*
6.689		7.047	0.321*
	7.010	7.047	0.037

* Significance at 0.05 level

Required value of critical difference at 0.05 level is 0.077 A – Plyometric training, B – Cycle ergo meter training, C –Control group The results in table-8 have shown that the mean differences of experimental groups when compared with the control group have exhibited the significant values of critical difference at the selected level of 0.05

The mean difference of the A and C which are given plyometric training are shown greater value as compared with the groups A (Plyometric training) and B (Cycle ergo meter training), and B
(Cycle ergo meter training) and C (Control group). Therefore the plyometric training group shows a significant value of critical difference when compared with cycle ergo meter training group and control group respectively.

The comparison of means of pre and post-test of fifty meter dash for the two experimental groups and the control group are presented in Figure- 9



DISCUSSION:

Today the sports persons are trained scientifically with the latest training methods and sophisticated instruments for higher performance improvement in different sphere of sports [1].As a result, it is determined that if a decision must be made between two training techniques, namely plyometric training and cycle ergo metre training. Plyometric training may be preferable

for enhancing sprinting players' anaerobic abilities. Other reports back up these conclusions. Plyometric workouts improve muscle power and are most effective when they are tailored to match the exact motions required by the athletic activity [2]. Plyometric training is also the most effective strategy for increasing vertical leaping ability, positive energy output, and elastic energy use [3]. Sprint performance is improved by an 8-week sprint-specific plyometric training programme. [4].

CONCLUSIONS

On the basis of the findings of this study, the following conclusions are drawn: Six weeks of Plyometric and cycle ergo meter training exercises are useful program to improve the anaerobic ability. The plyometric training program has greater effect on Sprinting players in comparison to cycle ergometer training.

APPLICATIONS IN SPORT

The world of training methodology has crossed many milestones. In modern time athletes are being trained by highly sophisticated means for better achievements in their concerned sports, and greater stress has been laid on the quality rather than the quantity of training. Six weeks of Plyometric and cycle ergometer training exercises are useful program to improve the anaerobic ability of Handball Players.

REFERENCES

[1] Peter Arnold, (1972) Education, Physical Education and Personality Development, (London: Heinemann, Educational Books Ltd.), p.114.

[2] Damon P.S. Andrew et. al., (2010) "Effects of Three modified plyometric depth jumps and per iodized weight training on lower extremity power" The Sport Journal, Vol. 13, No. 4, p.5

[3] D. JGehriet. al.,(1998) "A Comparison of Plyometric Training Techniques for Improving Vertical Jump Ability and Energy Production", Journal of Strength and Conditioning Research, Vol.XII, No.02, pp.85-89.

[4] Edwin R. et. al., (2000) "Effects of a Plyometrics Intervention Programme on Sprint Performance", Journal of Strength and Conditioning Research, Vol.XIV, No.03, pp.295-301.

[5] Chu, D.A. (1991) "Jumping into Plyometric" Human Kinetics. European Journal of Scientific Research, 11(3):69-71.

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