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An Analytical Study Of Isotonic And Isokinetic Training On Endurance Of Cricketers

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ABSTRACT
The purpose of this study was to intend the effect of a 10- week isotonic & iso-kinetic training program on endurance of cricketers.For this purpose, 15 male cricketers as subjects aged 15 to 18 years were selected for the study. They were assigned into 3 groups: isotonic (IT; n=5), iso-kinetic (IK; n=5), and subjected to control (C; n=5) training lasting 10 weeks, 3 days a week. Isotonic workload consisted of 3 sets of (8 minutes each set) 40-45 repetitions/minute with 3 kg load, spaced by 2-5-minute intermission. Bicycle Ergometerwas used for isotonic training in the study. Iso-kinetic exercises consisted of 3 sets of extensions/flexions (both knees) at 180°/s, 45 repetitions with 10 torque spaced by 2-5-minute intermissions. HUMAC NORM testing & rehabilitation system; CYBEX (CSMI Norm Iso-kinetic System) through VOLANT TECHNOGY COMPANY was used in this study and the dependent variable (endurance) was assessed using standard test and procedure, before and after the training supervision. Endurance was analysed by the 12 min. cooper test and recorded distance in meters covered in 12 minutes. The data was analysed by applying one-way analysis of variance (ANCOVA). After the intervention, there is a significant difference was found in isotonic training group and no significant difference was found in the iso-kinetic & control group.
Key words:Isotonic Training, iso-kinetic training, Endurance, Cricketers.

1. INTRODUCTION

Training for sport has become increasingly scientific. Yet training is not just a science but also an art, the art of intelligent application of scientific methods produce a level of fitness for a particular activity. (Tudor O. Bompa, 2009).

At the point when rehashed times of activity happen over a period certain Physiological changes happen in the body, incorporating changes in the respiratory, cardiovascular and solid framework, which permits better and enhanced execution. Every cricketer has a different role, position, action or technique and fitness training should recognise these differences and be programmed accordingly. (Cricket specific fitness, 2014).

Isotonic muscle action refers to an exercise performed at a variable speed with fixed resistance. The term isotonic implies constant tension. Isotonic muscle preparing includes withdrawals where strain is equivalent all through the scope of movement. (Kamlesh, M.L. 2009). Ergometer bicycles are exercise bicycles that are stationary. It resembles a normal

bicycle and the exercise is done in an upright, seated position. Ergometer bicycles are good for the joints and do not put a lot of strain on the knees. (Ergometer Bicycles, 2013).

Iso-kinetic muscular activity is a comparatively new concept in the field of training. Iso-kinetic muscle preparing is a sort of compression where the speed of development is settled and protection changes with the power applied. It includes muscle constrictions that abbreviate the muscle at a steady speed (Melissa Behr, 2009).

2. OBJECTIVE:

The purpose of this study was to analyze the effect of isotonic & iso-kinetic training programme on endurance of cricketers.

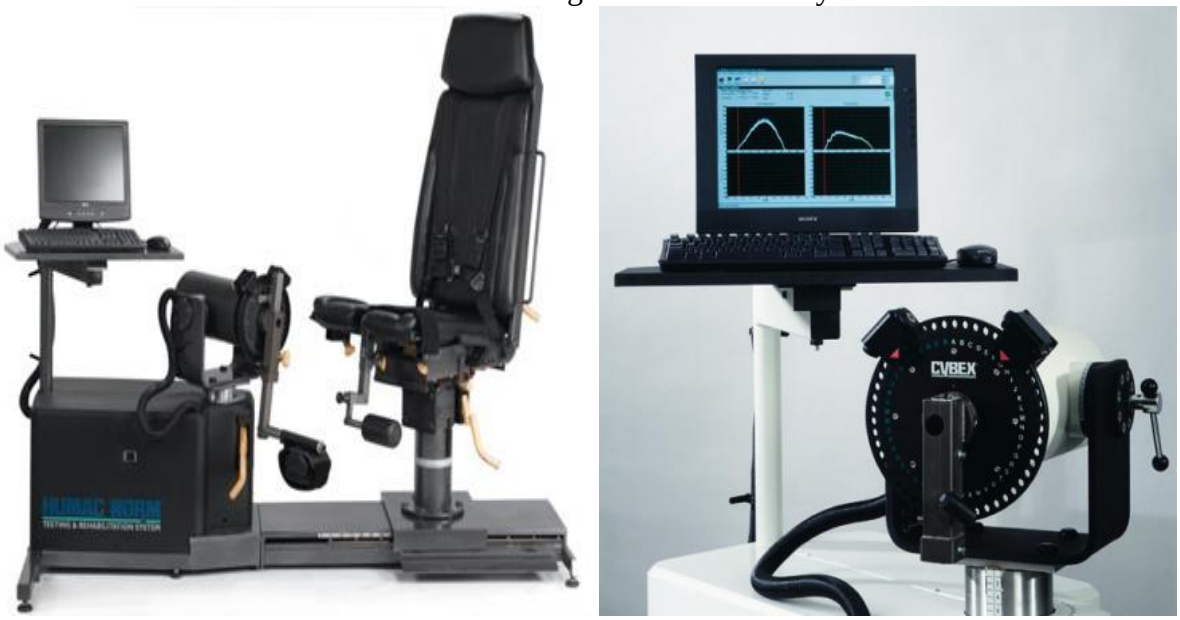
3. METHOD:

A total of 15 male cricketers, aged 15 to 18 years took part in the study. They were volunteered participate in the training. Pre-test and post-test randomized group design was adopted for this study as all subjects were randomly selected and divided into three groupsi.e. two experimental and one control group. An isotonic training program was conducted for 3 days a week for 10 weeks i.e. Monday, Wednesday and Friday & iso-kinetic training program was applied to the subjects 3 days a week for 10 weeks i.e. Tuesday, Thursday and Saturday.Prior to every field training session, the experimental groups had a ten minute warm-up exercise, which included jogging, stretching and the like. The selected dependent variables were assessed using standard tests and procedures, before and after the training programme.

FIGURE-1

BICYCLE ERGOMETER

FIGURE-2
HUMAC NORM testing & rehabilitation system



SCHEDULE OF THE TRAINING PROGRAM	
Training programme	Time
Warm up	10 minutes
Training	20-30 minutes
Cooling down	10 minutes
Total	50 minutes

4. STATISTICAL TECHNIQUE:

In order to test the hypothesis of the study, descriptive statistics such as mean and standard deviation was used. To determine the effect of isotonic & isokinetic training programme on endurance of cricketers, the analysis of covariance (ANCOVA) was employed and level of significance was set at 0.05. The SPSS statistical package was used for statistical calculations.

5. RESULTS:

For the analysis of data, the following results were drawn. The descriptive statistics of endurance is shown in table-1.

TABLE-1
DESCRIPTIVE STATISTICS FOR THE SCORES OF CARDIORESPIRATORY ENDURANCE IN DIFFERENT GROUPS FOR TEN WEEKS

	Groups	Mean	Std. Deviation	N
Pre endurance	Isotonic	2.22	0.03	5

	Isokinetic	2.09	0.08	5
	Control	2.39	0.24	5
Post endurance	Isotonic	2.52	0.11	5
	Isokinetic	2.19	0.10	5
	Control	2.38	0.13	5

Table-1 reveals the descriptive statistics for the scores of endurance in different groups for ten weeks and the mean value and standard deviation for pre-test endurance on different training groups were for isotonic group (2.22 ± 0.037), isokinetic group (2.09 ± 0.089), and control group (2.39± 0.24) respectively and while for the post test endurance on different training groups i.e. isotonic group (2.52± 0.11), isokinetic group (2.19 ±0.10) and control group (2.38 ±0.13).

ILLUSTRATION 1
GRAPHICAL REPRESENTATIONS OF THE PRE TEST MEAN SCORES AND POST TEST MEAN SCORES OF CARDIORESPIRATORY ENDURANCE ON DIFFERENT GROUPS FOR TEN WEEKS

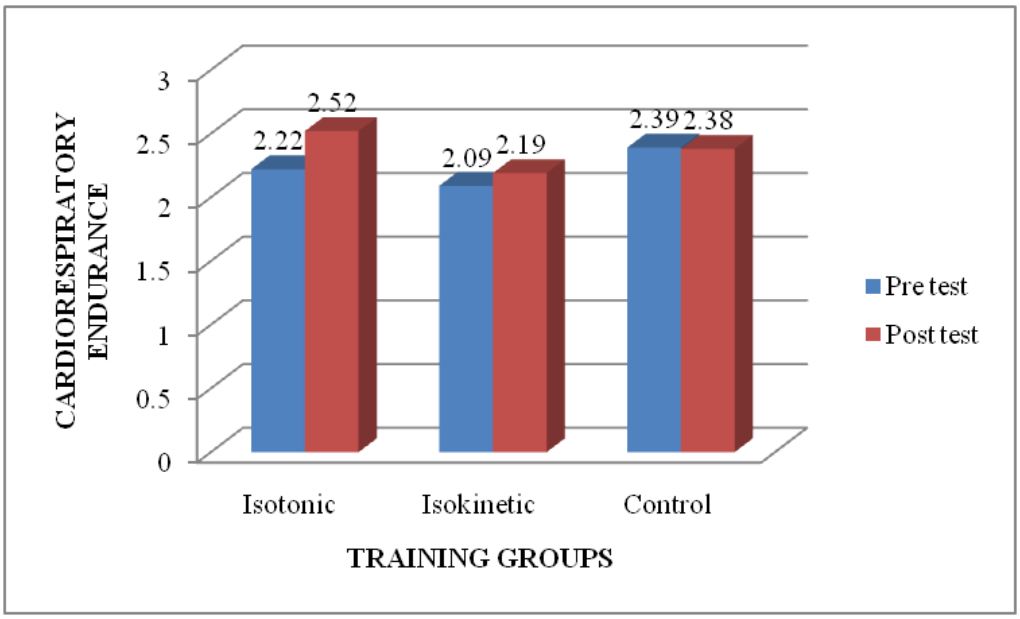


TABLE-2
TEST OF BETWEEN SUBJECT EFFECTS FOR THE SCORES OF CARDIORESPIRATORY ENDURANCE AFTER DIFFERENT TRAININGS FOR TEN WEEKS

Source	Sum of Squares	df	Mean Square	F	Sig.
Pre Endurance	0.096	1	0.096	8.921	0.012
Treatment Groups	0.134	2	0.067	6.248	0.015
Error	0.118	11	0.011		
Corrected Total	0.348	14			
a. R Squared = .661 (Adjusted R Squared = .568)					

Table-2 represents the test of between subject effects for the scores of endurance before and after different trainings for ten weeks and it concluded that pre-test score on endurance were significant as the ‘P’ is less than 0.05.

TABLE-3
ESTIMATES FOR THE SCORES OF CARDIORESPIRATORY ENDURANCE AFTER DIFFERENT TRAININGS FOR TEN WEEKS

Treatment Groups	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
Isotonic	2.527[a]	.046	2.425	2.629
Isokinetic	2.428[a]	.054	2.309	2.547
Control	2.269[a]	.056	2.392	2.392
a. Covariates appearing in the model are evaluated at the following values: Pre Endurance = 2.2340.				

Table-3 represents the estimated scores of endurance after different training programmes for ten weeks i.e. isotonic group (2.527[a]), isokinetic group (2.428[a]), and control group (2.269[a]).

ILLUSTRATION-2
GRAPHICAL REPRESENTATION OF ADJUSTED MEANS OF CARDIORESPIRATORY ENDURANCE AFTER DIFFERENT TRAININGS FOR TEN WEEKS

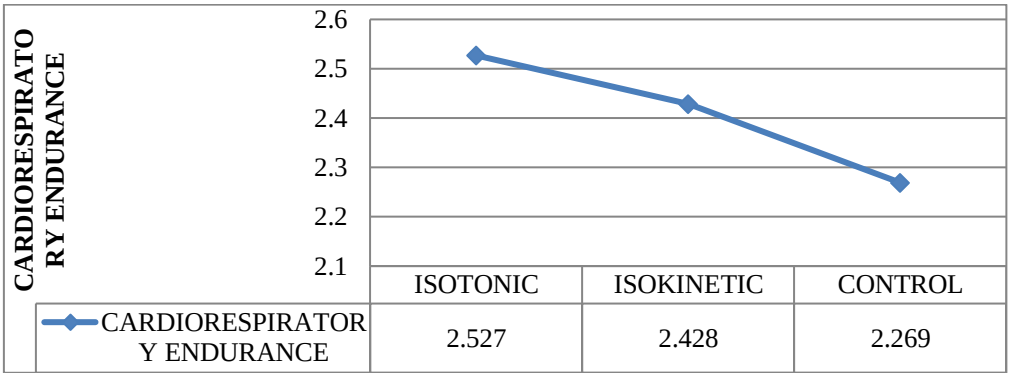


TABLE-4
PAIR WISE COMPARISONS FOR THE SCORES OF CARDIORESPIRATORY ENDURANCE AFTER DIFFERENT TRAININGS FOR TEN WEEKS

Isotonic	Isokinetic	Control	Absolute difference	Sig.
2.527	2.428		0.099	0.18
2.527		2.269	0.258*	0.005
	2.428	2.269	0.159	0.10

*The mean difference is significant at the .05 level.

It is evident from table-4 shows means difference of scores between isotonic training group and isokinetic training group were found insignificant as the 'p' value is more than 0.05. In case of isotonic training group and control group the mean difference was found to be significant the 'p' value is less than 0.05. In case of isokinetic training group and control group the mean difference was found to be insignificant as the 'p' value is more than 0.05.
Table further exhibited the significant difference between isotonic group and control group as the obtained mean difference is 0.258 against the critical value of 0.005 at 0.05 level. Table

has clearly shown that the isotonic group brings significant effect after ten weeks of training. However, the isokinetic and control group has not shown any significant difference.

6. DISCUSSIONS-

Muscles fibres develop in the wake of preparing because of various reasons. These incorporate the generation of more myofibrils. The filaments additionally broaden because of the expanded store of glycogen and the vitality providing mixes of ATP and phosphocreatine (PC). The heavier weights being lifted will make the muscles experience a lot of pressure. This extends them with the goal that whenever they are better arranged for the assignment; that is, because of adjustment.

Much of the improvement in endurance which was evidenced in ten weeks of training is attributable to neural adaptation i.e. more number of motor unit were probably involved in one muscle contraction, motor units were greater in size, and their rate of firing was faster than before training. The other reason could be increased in cross sectional area of the muscles, architecture of the muscle and resting length of muscles at the time of contraction.

Similarly with different adjustments that happen because of preparing, hypertrophy sets aside opportunity to create and strong decay will happen when preparing stops. Strong intense exercise will help with diminishing the level of fat around the muscle and this will prompt solid definition yet not strong hypertrophy. Ten weeks of isotonic training on bicycle ergometer has caused significant improvement in endurance but iso-kinetic training on HUMAC NORM testing & rehabilitation system has caused no significant improvement in endurance.

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