



ISSN Print: 2394-7500
ISSN Online: 2394-5869
Impact Factor: 5.2
IJAR 2016; 2(3): 449-451
www.allresearchjournal.com
Received: 15-01-2016
Accepted: 18-02-2016

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Strength parameters response to the influence of isometric strength training on school level handball players

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Abstract

This study investigated the strength parameters response to the influence of isometric strength training on school level handball players. To achieve the purpose of the study 40 school level women handball players were selected from GKD higher secondary school, Coimbatore. The subjects were randomly assigned to two equal groups (n=20). Group- I underwent isometric strength training (ISTG) and group - II was acted as control group (CG). The isometric strength training was given to the experimental group for 3 days per week (Monday, Wednesday and Friday) for the period of twelve weeks. The control group was not given any sort of training except their routine work. The strength parameters of arm explosive power (medicine ball throw), leg explosive power (standing broad jump) and maximum strength (sit-ups) were measured before and after training period. The data collected from the subjects was statistically analyzed with 't' test to find out significant improvement if any at 0.05 level of confidence. The result of the arm explosive power, leg explosive power and maximum strength speculated significant improvement due to influence of isometric strength training with the limitations of (diet, climate, life style) status and previous training. The result of the present study coincide findings of the investigation done by different experts in the field of sports sciences. Influence of isometric strength training significantly improved arm explosive power, leg explosive power and maximum strength of school level handball players.

Keywords: Isometric strength training, Arm explosive power, Leg explosive power and Maximum strength.

Introduction

Isometric

In this contraction tension is developed in the muscle working against resistance, but there is no change in the length of the muscle. The literal meaning of the word isometric is constant length i.e., iso means constant and metric means length. The reason why the muscle does not shorten in this contraction is because the external resistance against which the muscle pulling is much higher than the maximum tension (internal force) the muscle can produce.

Strength

Young people generally have the strength to carry out everyday tasks, but in the elderly, even the healthy strength and power are often near to or below functionally important threshold and they have lost the ability to perform vital tasks, such as getting out of a chair or climbing the stairs. Strength training with weights may not translate into improved sports performance. When training with weights free weights are preferable as the movement patterns are adaptable. Sports people, however adding resistance during participation in the sports, So long as that resistance is not so great as to alter technique, may provide the most appropriate training for sports performance, (Hayes, 1991)

The hypothesis argued in this paper is that school level handball players can significantly increase the strength parameters of arm explosive power, leg explosive power, and maximum strength and by combining normal technical and tactical sessions with a Isometric strength training program over a consecutive 12 weeks period. Therefore, the object of this study was to investigate the changes in the parameters produced during 12 weeks of Isometric strength training in 20 school level handball players.

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Methods

Experimental Approach to the Problem

In order to address the hypothesis presented herein, we selected 40 school level women handball players from GKD higher secondary school, Coimbatore. The subjects were randomly assigned in to two equal groups namely, Isometric strength training group (ISTG) (n=15) and Control group (CG) (n=15). The respective training was given to the experimental group the 3 days per weeks (alternate days) for the training period of twelve weeks. The control group was not given any sort of training except their routine.

Design

The evaluated strength parameters were arm explosive power was assessed by medicine ball throw and the unit of measurement was in meters, leg explosive power was assessed by standing broad jump the unit of measurement was in meters, maximum strength was assessed by sit-ups the unit of measurement was in count for 30 second. The parameters were measured at baseline and after 12 weeks of isometric strength training were examined.

Training Programme

The training programme was lasted for 45 minutes for session in a day, 3 days in a week for a period of 12 weeks duration. These 45 minutes included 10 minutes warm up, 25 minutes isometric strength training and 10 minutes warm down. Every three weeks of training 5% of intensity of load was increased from 65% to 80% of work load. The volume of isometric strength training is prescribed based on the number of sets and repetitions. The equivalent in isometric strength training is the length of the time each action in total 3 day per weeks (Monday, Wednesday and Friday).

Statistical Analysis

The collected data before and after training period of 12 weeks on the above said variables due to the influence of isometric strength training was statistically analyzed with ‘t’ test to find out the significant improvement between pre and post test. In all cases the criterion for statistical significance was set at 0.05 level of confidence. (P < 0.05)

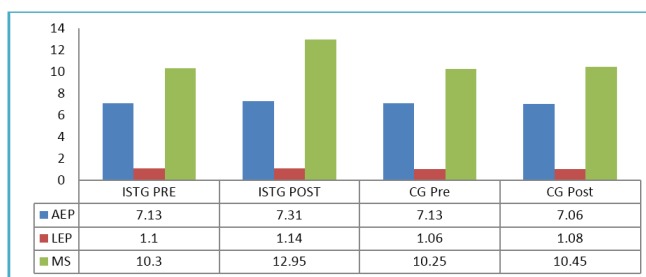
Table I: Computation of ‘T’ Ratio on Selected Strength Parameters of School Level Women Handball Players on Experimental Group and Control Group (Scores in numbers)

Group	Variables	Mean	N	Std. Deviation	Std. Error Mean	T ratio	
Experimental Group	AEP	Pre test	7.13	20	2.00	0.05	3.43*
		Post test	7.31	20	1.95		
	LEP	Pre test	1.10	20	0.20	0.01	3.94*
		Post test	1.14	20	0.16		
	MS	Pre test	10.30	20	2.40	0.26	3.20*
		Post test	12.95	20	2.54		
Control group	AEP	Pre test	7.13	20	2.02	0.81	0.93
		Post test	7.06	20	1.96		
	LEP	Pre test	1.06	20	0.19	0.01	1.59
		Post test	1.08	20	0.18		
	MS	Pre test	10.25	20	2.75	0.95	0.94
		Post test	10.45	20	2.87		

*significant level 0.05 level degree of freedom (2.09, 1 and 19)

Table I reveals the computation of mean, standard deviation and ‘t’ ratio on selected strength parameters namely arm explosive power, leg explosive power, and maximum strength of experimental group. The obtained ‘t’ ratio on arm explosive power, leg explosive power, and maximum strength were 3.43, 3.94 and 3.20 respectively. The required table value was 2.09 for the degrees of freedom 1 and 19 at the 0.05 level of significance. Since the obtained ‘t’ values were greater than the table value it was found to be statistically significant.

Further the table reveals the computation of mean, standard deviation and ‘t’ ratio on selected strength parameters namely arm explosive power, leg explosive power, and maximum strength of control group. The obtained ‘t’ ratio on arm explosive power, leg explosive power, and maximum strength were 0.93, 1.59 and 0.94 respectively. The required table value was 2.09 for the degrees of freedom 1 and 19 at the 0.05 level of significance. Since the obtained ‘t’ values were greater than the table value it was found to be statistically not significant.



Bar diagram showing the mean value on selected strength parameters of school level women handball players on experimental and control group
(Scores in numbers)

Discussion and Findings

The present study experimented the effect of isometric strength training programme on strength components of school level handball girls. The result of this study indicated that the isometric strength training improved the strength variables such as arm explosive power, leg explosive power and maximum strength. The findings of the present study had

similarity with the findings of the investigations referred in this study. Premkuma *et al.*, (2013) the results of the study stated that the abdominal strength training had significantly improved the strength endurance and explosive power of women players. Vassil *et al.*, (2011) Testing results statistical analysis has shown athletes legs and arms speed force reliable improvement. Standing long jump, depth leap long jump and maximal vertical jump height test results. Nikola *et al.*, (2010) Respondents achieved significantly better results in the test RS because of biomechanical freer movement

The results of the present study indicates that the isometric strength training programme is effective method to improve arm explosive power, leg explosive power and maximum strength of school level handball girls. The discrepancy between the results and the results of previous studies might be attributed to several reasons, such as the training experience level of the subjects, the training programme, the intensity used and the duration of the training programme.

Conclusions

1. It was concluded that 12 weeks of isometric strength training program produced significant improvement in arm explosive power, leg explosive power and maximum strength of school level handball girls.
2. Isometric strength training is one among the most appropriate means to bring about the desirable changes over strength variables of handball players. Hence, suggested that coaches and the experts deal with handball players to isometric strength training as a component in their training programme.

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