

IMPACT OF PLYOMETRIC TRAINING AND COMPLEX TRAINING ON SELECTED PHYSICAL FITNESS VARIABLES OF COLLEGE MEN HANDBALL PLAYERS

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Abstract - The purpose of the study was to find out the effect of plyometric training and complex training on selected physical fitness variables of college men handball players. Randomly 45 male students were selected from various colleges in Coimbatore, Tamilnadu. They were divided into three equal groups and each group consisted of 15 subjects. Group-I was performed plyometric training, group II was performed complex training and group-III was acted as a control group. The selected criterion variables are Muscular strength, strength endurance and explosive power. The collected data were statistically examined by applying Analysis of Covariance (ANCOVA). Since three groups were involved, Scheffe,s test was used as post-hoc test to find out any difference between the groups. The result of the plyometric training and complex training had shown that significantly improved muscular strength, strength endurance and explosive power of college men handball players.

Key Words: Plyometric Training, Scheffe,s, Handball & Ancova...

1.INTRODUCTION

Plyometrics are training techniques used by athletes in all types of sports to increase strength and explosiveness. Plyometrics consists of a rapid stretching of a muscle (eccentric action) immediately followed by a concentric or shortening action of the same muscle and connective tissue.

Strength work has been shown to improve sports performance particularly for sprinters, jumpers and throwers but it is not beneficial in developing rate of force - the speed with which force is achieved in a movement. It takes around 400 msec to develop maximum force during a squat exercise, but the foot-ground contact time in sprinting is around 90 msec so there is not enough time to produce maximum force and therefore it is the rate of force development that is important.

Complex training is a workout comprising of a resistance exercise followed by a matched plyometric exercise e.g. squats followed by squat jumps, bench press followed by plyometric press up. The logic behind these matched pair of exercises is that the resistance work gets the central nervous system (CNS) into full action so that more Type IIb fibres are available for the explosive exercise, hence a better training benefit.

Weight training, also called as resistance training or strength training, is pitting muscles against a resistance such as a weight or other type of resistance, to build the strength, anaerobic endurance, and or size of skeletal muscles. A well-rounded program of physical activity includes strength training, to improve bone, joint function, bone density, muscle, tendon and ligament strength, as well as improves heart and lung fitness. These activities should work all the major muscle groups of our body (legs, hips, back, chest, abdomen, shoulders, and arms). Plyometric is a method of developing explosive power, an important component of the athletic performance as plyometric movements are performed in a wide spectrum of sports.

Speed is considered to be the combination of two factors - stride rate and stride length. Greater forces increase the stride length and decrease the contact time so stride rate increases. To improve these factors coaches have focused on developing leg strength that in turn has resulted in an increase in body weight. What we ideally require in our runner is a high power to weight ratio. The objective of training program was to increase strength with minimal gain in bulk thereby achieving a high power to weight ratio.

2.METHODOLOGY

The purpose of the study was to find out the effect of plyometric training and complex training on selected physical fitness variables of college men handball players. To achieve this purpose, randomly 45 male students were selected from various colleges in Coimbatore, Tamilnadu, were selected. They were divided into three equal groups and each group consisted of 15 subjects. Group-I was performed plyometric training, group-II have performed Complex training and groupIII acted as a control group. Muscular strength, strength endurance and explosive power

were selected as criterion variables. The variables were

measured by using Push-ups, sit-ups and Sergeant jump as tests.

Table-I:

CRITERION MEASURES

| S.NO | VARIABLES | TEST ITEMS |
|------|--------------------|---------------|
| 1. | Muscular strength | Push -Ups |
| 2. | Strength Endurance | Sit-Ups |
| 3. | Explosive power | Sergeant Jump |

3. TRAINING PROGRAMME

The experimental group-I performed plyometric training, group-II performed complex training and group-III acted as a control group who had not participate any special training apart from the regular curricular activities. The subjects of experimental group I was performed plyometric training with the training intensity of 65-80% of their 1RM and the subjects of experimental group-II was performed complex training (weight and plyometric training) with the training intensity of 65-80% of their 1RM. After assessing the 1 RM of experimental group subjects, the training load was fixed accordingly. The both experimental groups were trained 3 days per week for six weeks under carefully monitored and controlled conditions.

4. STATISTICAL TECHNIQUE

The data were collected on selected criterion variables such as muscular strength, strength endurance and explosive power were measured by using Push-ups, sit-ups and

Sergeant jump as tests. the subjects were tested before and after the six weeks of plyometric and complex training. Analysis of covariance (ANCOVA) was applied to find out significant difference if any between the experimental and control group. The level of confidence was fixed at 0.05 to test the significance.

5. ANALYSIS OF THE DATA

The influence of plyometric and complex training on each of the selected criterion variables were analyzed and presented below.

Table-II:

Summary Analysis of Covariance and 'F' ratio and scheffés test for the difference between the adjusted post-test mean for Muscular Strength, Strength Endurance and Explosive power of Experimental Groups and Control Group:

| Variables | Testing conditions | Plyometric training group | Complex training group | Control group | Mean differ -ence | Confidence interval at .05 level | F |
|--------------------|--------------------|---------------------------|------------------------|---------------|-------------------|----------------------------------|--------|
| Muscular Strength | Pre(M± SD) | 9.90 ± 0.035 | 9.20±0.321 | 9.13± .542 | 0.39 | 2.09 | 1.96 |
| | Post(M±SD) | 10.8 ± 0.91 | 12.7 ± 0.83 | 9.10 ± 0.03 | 2.72 | 2.09 | 16.45* |
| | Adjusted (M) | 12.16 | 12.55 | 9.44 | 3.11 | 2.09 | 35.14* |
| Strength Endurance | Pre(M± SD) | 12.3 ± 1.3 | 12.3 ± 1.4 | 12.2 ± 1.31 | 0.42 | 1.11 | 0.328 |
| | Post(M±SD) | 13.5 ± 1. | 13.9± 1.58 | 12.0 ± 1.7 | 1.28* | 1.11 | 5.08* |
| | Adjusted (M) | 13.38 | 13.8 | 12.1 | 1.70* | 1.11 | 10.40* |
| Explosive Power | Pre(M± SD) | 23.3 ± 1.28 | 23.8 ± 1.13 | 23.2 ± 1.45 | 0.268 | 1.763 | 0.328 |
| | Post(M±SD) | 25.5 ± 1.22 | 25.9 ± 1.43 | 23.5 ± 1.41 | 1.84 | 1.763 | 8.00* |
| | Adjusted (M) | 25.122 | 25.39 | 23.28 | 2.11 | 1.763 | 11.21* |

*Significant at 0.05 level of confidence

Further, table 1 clearly shows that after adjusting pre-test scores, there was a significant difference between the three groups on adjusted post test scores on Muscular Strength ($F = 35.14, p < 0.05$), Strength Endurance ($F = 10.40, p < 0.05$) and Explosive power ($F = 11.21, p < 0.05$).

6. DISCUSSION

The investigator framed the first hypothesis It was hypothesized that there may be a significant improvement in Muscular strength, Strength Endurance and Explosive power due to six weeks training. hypothesis was accepted for those variables. the study showed that there was a significant difference between pre-test and post-test in Plyometric training and complex training to the college men athletes

Research on the effect of weight and plyometric training on health and fitness determinants revealed that weight and plyometric training, like other types of exercise, improves physical performance and number of health parameters (Miller, et al., 1984; Poehlman, 1992; Stone, 1991; Toth, et al., 1995). Almost every study revealed an increase in muscular strength, power muscular endurance, flexibility and jumping ability due to weight training compared with other training. Plyometric training is an effective intervention to improve muscle power without adverse effects on joint laxity (Bieler & Sobol, 2014), mobility and muscle strength (Krist, Dimeo and Keil, 2013). Supervised plyometric training represents an efficacious intervention for improving strength with residual benefits lasting longer than previously expected (Sherk et al., 2012), strength and power-related measurements (Ronnestad et al., 2008) Hanson et al., (2009) suggested that changes in strength, power, and fat free mass are predictors of strength training induced improvements in functional tasks. Dorgo et al., (2009) found significant improvements in muscular strength and muscular endurance of the manual resistance training and weight and plyometric training groups.

7. CONCLUSIONS

The results of the study shown that there was a significant improvement on selected Physical fitness components of college men handball players due to the effect of plyometric and complex training however, no significant differences were found between the experimental groups.

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