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EFFECT OF PLYOMETRIC TRAINING ON EXPLOSIVE POWER AMONG UNIVERSITY PLAYERS

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ABSTRACT

The purpose of the study was to find out the effect of plyometric training on explosive power among university players. To achieve this purpose of the study, thirty university students were selected as subjects who were representing various teams of Annamalai University to participate in the Inter University Competition. The selected subjects were aged between 18 to 22 years. They were divided into two equal groups of fifteen each, Group I underwent plyometric training and Group II acted as control that did not participate in any special training apart from their regular curricular activities. The subjects were tested on selected criterion variable such as explosive power prior to and immediately after the training period. The selected criterion variable such as explosive power was determined through using standing broad jump. The analysis of covariance (ANCOVA) was used to find out the significant differences if any, between the experimental group and control group on selected criterion variable. In all the cases, 0.05 level of confidence was fixed to test the significance, which was considered as an appropriate. The result of the present study has revealed that there was a significant difference among the experimental and control group on explosive power.

Keywords

Explosive power –standing broad jump- plyometric training-sports.

1. INTRODUCTION

The primary objective of sports training is to stress various bodily systems to bring about positive adaptation in order to enhance sporting performance. To achieve this objective, coaches and athletes systematically apply a number of training principles including overload, specificity and progression, organized through what is commonly termed periodisation. The application of these principles involves the manipulation of various programme design variables including choice of exercise, order of training activities/exercises, training intensity (load and repetition), rest periods between sets and activities/exercises and training frequency and volume in order to provide periods of stimulus and recovery, with the successful balance of these factors resulting in positive adaptation. Plyometrics, also known as "jump training" or "plyos", are exercises based around having muscles exert maximum force in short intervals of time, with the goal of increasing both speed and power. This training focuses on learning to move from a muscle extension to a contraction in a rapid or "explosive" manner, for example with specialized repeated jumping. Plyometrics are primarily used by athletes, especially martial artists and high jumpers, to improve performance and are used in the fitness field to a much lesser degree. In the depth jump, the athlete experiences a shock on landing in which the hip, knee, and ankle extensor muscles undergo a powerful eccentric contraction. For the muscles to respond explosively, the eccentric contraction is then quickly switched to the isometric (when the downward movement stops) and then the concentric contraction, in a minimum amount of time. This allows the athlete to jump upward as high as possible. In the eccentric contraction, the muscles are involuntarily lengthened, while in the concentric contraction, the muscles are shortened after being tensed. Most of the stretching and shortening takes

place in the tendons that attach to the muscles involved rather than in the muscles. To execute the depth jump, the athlete stands on a raised platform, usually not greater than 20–30 inches (51–76 cm) high, and then steps out and drops down in a vertical pathway to make contact with the floor. The exact height used by most athletes is usually quite low in the early stages of training. The key is how high the athlete jumps in relation to the height of the takeoff platform. Technique and jump height are most important at this time. While the body is dropping, the athlete consciously prepares the muscles for the impact by tensing the muscles. The flooring upon which the athlete drops down on should be somewhat resilient, mainly for prevention of injury. Upon making contact with the floor, the athlete then goes into slight leg flexes to absorb some of the force for safety. However, the main role played by the muscles and tendons is to withstand the force that is experienced in the landing. This force is withstood in eccentric contraction. When muscle contraction is sufficiently great, it is able to stop the downward movement very quickly. This phase is sometimes called the phase of amortization in which the athlete absorbs some of the force and stops downward movement by the strong eccentric contraction of the muscles. The strong eccentric contraction prepares the muscles to switch to the concentric contraction in an explosive manner for takeoff. When the athlete drops down to the floor, the body experiences an impact upon landing. The higher the height of the step-off platform, the greater the impact force upon landing. This creates a shock to the body which the body responds to by undergoing a strong involuntary muscular contraction to prevent the body from collapsing on the ground. This in turn produces great tension in the muscles and tendons which is then given back in a return upward movement. The faster the change in the muscular contractions, the greater the power created and the resulting height attained. More specifically, the muscles and tendons undergo a stretch (eccentric contraction) while landing which is needed to absorb some of the force generated but most importantly, to withstand the force that is produced by the shock that occurs on the landing. The greater the shock (forces experienced on landing), the stronger the eccentric contraction will be, which in turn produces even greater tension. This tension, which is potential force, is then given back in the return movement when the muscular contractions switch to the concentric or shortening regime. However, for maximum return of energy, minimum time must elapse from when the force is received to when they are returned. The greater the time between receiving the forces and giving them back, the less is the return and the less the height that can be achieved in the jump. Most of the lengthening and shortening occurs in the respective muscle tendons which have greater elasticity.

Objectives of the study

The main objective of the study was to assess the effect of plyometric training on explosive power which would help to enhance physical fitness of college boys. The present study was designed to obtain the data on the university players from Annamalai University, Tamilnadu.

1.2 Statement of the problem

The purpose of the study was to determine the effect of plyometric training on explosive power among university players .

1.3 Delimitations

1. The study was delimited to players from Annamalai University, Tamilnadu.
2. The study was delimited to 30 college students; their age was 18 to 22 years.
3. The study was restricted to the dependent variable is explosive power and independent variable is plyometric training.

1.4 Significance of the Study

1. The findings of the study may be helpful for university players to apply plyometric training which will help in better performance.
2. The findings of the study would be helpful for the exercise physiologist to know the

role of explosive power influence their physical fitness.

3. The results of the study may be helpful to fitness trainers, coaches, physical educationist and exercise physiologists to design proper training protocol for other populations.

2. METHODOLOGY

In the present study all the students were representing university teams of Annamalai University were considered as population for the study. A representative sample of 30 university players in the age of 18-22 years was chosen as sample for the study. The selected participants were divided into two groups. Group I underwent plyometric training and group II act as control group. The experimental groups underwent eight weeks of training in their particular workout. For this study dependent variable is explosive power.

2.1 Analysis of Data

The data obtained were analyzed by analysis of covariance (ANCOVA). Analysis of covariance was computed for any number of experimental groups, the obtained 'F' ratio compared with critical F value for significance.

3. RESULTS

Findings: The statistical analysis comparing the initial and final means of explosive power due to plyometric training have been presented in Table I.

TABLE I

COMPUTATION OF ANALYSIS OF COVARIATION ON EXPLOSIVE POWER

TEST	PLYOMTRIC TRAINING GROUP	CONTROL GROUP	F RATIO
PRE TEST	1.93	1.84	1.22
POST TEST	2.26	1.87	3.42*
AD POST TEST	2.28	1.88	7.54*

Table I shows the analyzed data of explosive power. The explosive power pre means were 1.93 for the plyometric training group and 1.84 for the control group. The resultant 'F' ratio of 1.22 was not significant at .05 levels indicating that the two groups were no significant variation. The post test means were 2.26 for the plyometric training group and 1.87 for the control group. The resultant 'F' ratio of 3.42 at .05 level indicating that was a significant difference. The difference between the adjusted post-test means of 2.28 for the plyometric training group and 1.88 for the control group yield on 'F' ratio 7.54 which was significant at.05 level.

The results of the study indicate that there is a significant difference among plyometric training and control groups on the explosive power.

4. DISCUSSION/CONCLUSIONS

The results of the study proved that there was a significant difference between control group and plyometric training group. The eight weeks of experimental treatment significantly influence on explosive power content in university players. The above results are supported by (Johnson, Salzberg and Stevenson, 2011 and Brown and others 2007).

5. RECOMMENDATIONS

1. It was recommended that adequate steps may be taken to include plyometric training in the physical education curriculum as these exercises significantly improves the explosive power of the subjects.
2. Similar study may be conducted on a larger population.
3. Similar study may be undertaken and its influence on psychological and biochemical parameters may be assessed.

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