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EFFECT OF PLYOMETRIC TRAINING ON INSULIN AMONG UNIVERSITY BASKETBALL PLAYERS

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ABSTRACT

To achieve this purpose thirty (N = 30) male basketball players were randomly selected from Mar Baselios College of Engg. & Tech., and Mar Ivanios College, Trivandrum, Kerala, India. . 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 experimental group underwent twelve weeks for 3 days per week training. The selected criterion variable insulin to assess Immunoenzymometric Assay method was used. Pre-test data were collected before the training program and post-test data were collected after the training program. 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 positively improves the secretion of insulin due to the plyometric training.

KEYWORDS: plyometric training, basketball players, insulin.

Introduction

Health related physical fitness of a patient is dependent on both life-style related factors such as daily physical activity levels, nutritional habits and genetic factors, and is an important indicator of health status (Takken, 2003). 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 (Starks, 2013). 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 (Michael Yessis 2009). Plyometric training, or strength training, is an important tool for achieving a complete healthy life. Plyometric training is essential for athletes, who want to build or tone muscle. Plyometric training works by causing microscopic damage or tears to the muscle cells, which in turn are quickly repaired by the body to help the muscles to regenerate and grow stronger. The testosterone, insulin, growth hormone, protein, and other nutrients rush to the muscle after a resistance-exercise session to repair the muscles and make them stronger. Increasing the size and strength of skeletal muscle is an important feature during childhood and adolescence. The key areas of interests in strength training during childhood are related to the risk of injury, the effectiveness of training to increase strength especially during pubertal years, and the mechanisms underlying training induced strength gains and changes in strength during detraining. Research conducted over past ten to fifteen years clearly demonstrates that children and adolescents may benefit from strength training activities. (Burgeson, 2001). The training program for the elders help to improve their health and decrease the risks brought about by the age. They can be more independent, without needing to rely on other people for doing simple things. Being able to do so will also decrease the risk of injuries in the elders. Regular training can result in a lowered heart rate and lowered blood pressure, especially after exercise. Thus, the risk of heart diseases is reduced. This kind of training however must be properly done. It requires commitment and consistency. It will have to be done in a regular basis. This is the real challenge when it comes to exercise and improving one's health. It's not hard to exercise for 30 minutes, but its difficult to consistently do this 5 days a week for 3 or 4 months (Parker, 2006). The predominant hormonal control system is the negative feedback mechanism. In this mechanism, the secretion of the hormone is turned off or decreased due to the end result of the response caused by that hormone. The nervous system is also involved in the control of hormone secretion. Insulin causes an increase in cellular uptake of glucose resulting in a lowered blood glucose level. In addition to this function, insulin also inhibits glucose release from the liver and free fatty acid release from adipose tissue. Glucagon on the other hand, cause just the opposite effects, i.e., glucose mobilization from the adiposities. During exercise, in which both glucose and free fatty acids are needed as metabolic fuels, glucagon has been shown to increase and insulin to decrease (Fox and Mathews, 1985).

Methodology

To achieve this purpose thirty (N = 30) male basketball players were randomly selected from Mar Baselios College of Engg. & Tech., and Mar Ivanios College, Trivandrum, Kerala, India. . 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 experimental group underwent twelve weeks for 3 days per week training. The selected criterion variable insulin to assess Immunoenzymometric Assay method was used. Pre-test data were collected before the training program and post-test data were collected after the training program. 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.

Training Program

The intensity variations in 12 weeks training for experimental groups are given in Table - I.

TABLE-I

Weeks	1&2	3&4	5&6	7&8	9&10	11&12
% of intensity	70	74	78	82	86	90

Results

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

TABLE II
COMPUTATION OF ANALYSIS OF COVARIANCE ON INSULIN

TEST	PLYOMTRIC TRAINING GROUP	CONTROL GROUP	F RATIO
PRE TEST	5.68	5.65	1.02
POST TEST	6.84	5.71	4.12*
AD POST TEST	6.88	5.69	10.23*

Table II shows the analyzed data of insulin. The insulin pre means were 5.68 for the plyometric training group and 5.65 for the control group. The resultant 'F' ratio of 1.02 was not significant at .05 levels indicating that the two groups were no significant variation. The post test means were 6.84 for the plyometric training group and 5.71 for the control group. The resultant 'F' ratio of 4.12 at .05 level indicating that was a significant difference. The difference between the adjusted post-test means of 6.88 for the plyometric training group and 5.69 for the control group yield on 'F' ratio 10.23 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 insulin.

Discussion on Findings

Systematically performed physical exercise result in greater changes in the organism. The changes take place on the level of cellular structures, tissues, organs and body build, including levels of cellular auto regulation, hormonal regulation and neural regulation. Most of the training induced changes express adaptation to the conditions of enhanced muscular activity. The top level performance depends on effective training as well as on genetic peculiarities. Therefore, the tasks of training and of sport selection have to be discriminated, but it must be emphasized that there are no genetically induced factor that directly determine the level of sports results in any event. Insulin causes an increase in cellular uptake of glucose resulting in a lowered blood glucose level. In addition to this function, insulin also inhibits glucose release from the liver and free fatty acid release from adipose tissue. Glucagon, on the other hand, causes just the opposite effects, i.e., glucose mobilization from liver and free fatty acid mobilization from the adiposities (fat cells). During exercise, in which both glucose and free fatty acids are needed as metabolic fuels, glycogen has been shown to increase and insulin to decrease. Insulin resistance increases with weight gain and conversely, diminishes with weight gain and conversely, diminishes with weight loss. This suggests that fat accumulation is important in the development of insulin resistance. Adipose tissue is not simply an energy storage organ, but also a secretary organ. Regular substances produced by adiposities include lepton, resisting all of which may contribute to the development of insulin resistance. In addition, the elevated levels of free fatty acids that occur in obesity have also been implicated in the development of insulin resistance. The effects of insulin on glucose metabolism are most prominent in three tissues; liver, muscle and adipose. In the liver, insulin decreases the production of glucose by inhibiting gluconeogenesis and the breakdown of glycogen. In the muscle and liver, insulin increases glycogen synthesis. In the muscle and adipose tissue insulin increases glucose uptake by increasing the number of glucose transporters in the cell membrane. The intravenous administration of insulin thus causes an glucose **Ahmadized *et al.* (2007), Hulver *et al.* (2002)** revealed, aerobic exercise enhance the insulin sensitivity. **Brooks *et al.* (2007)** reported, strength training improves muscle quality and whole-body insulin sensitivity. **Bluher *et al.* (2007)** reported physical exercise improve the insulin resistance response. **Klimcakova *et al.* (2006)** concluded dynamic training resulted in an improvement of whole-body insulin sensitivity. **Marcell *et al.* (2005)** reported, moderate intensity of resistance training improves insulin sensitivity. **Nassis *et al.* (2005)** concluded, 12 weeks of aerobic training improves insulin sensitivity on overweight and obese girls.

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