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PHYSICAL EDUCATION

EFFECT OF STRENGTH TRAINING ON HORMONAL VARIABLE INSULIN AMONG PRE PUBESCENT, PUBESCENT AND POST PUBESCENT MALES

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ABSTRACT

The purpose of the study was to find out the effect of strength training on variable insulin among pre pubescent, pubescent and post pubescent males. To achieve this purpose fifteen (n = 15) male pre pubescent (age 9-12 years), fifteen (n = 15) male pubescent (age 13-18 years) were randomly selected from Sri Ramakrishna Higher Secondary School, Chidambaram, Tamil Nadu, India and fifteen (n = 15) male post pubescent (age 19-25 years) from Faculty of Arts, Annamalai University, Annamalai Nagar were randomly selected as subjects for this study (N = 45). The selected subjects were assigned as Group I pre pubescent (PP), Group II pubescent (PU) and Group III post pubescent (POP) respectively. All the three groups underwent strength training. The selected criterion variable namely insulin was assessed before and after the training period. The data collected from experimental group I, group II and group III prior to and after the completion of the training period were statistically analysed for significant difference if any, by applying dependent 't' test. The paired mean gains of experimental groups were tested for significance by applying independent 't' ratio. The level of confidence was fixed at 0.05 level.

Keywords: Strength training, Strength variable and Strength endurance.

INTRODUCTION

A hormone can be defined as a discrete chemical substance secreted into the body fluids by an endocrine gland and which has a specific effect on the activities of other cells, tissues and organs. The cell, tissue, or organ upon which a hormone has an effect is called a target cell, or target tissue, or target organ, respectively. Hormone causes a specific effect on the activities of target organs. This effect, which may require minutes or hours to occur, is brought about mainly increasing or decreasing an ongoing cellular process rather than by initiating a new one. For example, hormones may activate enzyme systems, alter cell membrane permeability, cause muscular contraction or relaxation, cause protein synthesis, and cause cellular secretion. Three general characteristics of hormone action that need to be discussed are specificity of hormone action, physiological mechanisms of hormone action and control of hormone secretion (Fox and Mathews, 1981).mFour major organs play a dominant role in fuel metabolism are liver, adipose, tissue, muscles and brain. These tissues contain unique sets of enzymes, as such each organ is specialized for the storage, use and generation of specific fuels. These tissue do not function may provide substrates to another, or process compounds produced by other organs (Champe, Harvey and Ferrier, 2005).

Insulin is the most important hormone coordinating the use of fuels by tissues. Its metabolic effects are anabolic, favoring, for example, synthesis of glycogen, triacylglycerols and protein. Insulin is composed of 51 amino acids arranged in two polypeptide chains. The biosynthesis involves two inactive precursors, perproinsulin and proinsulin, which are sequentially cleaved to form the active hormone plus the C-peptide. The C-peptide is essential for proper insulin folding. Also, because of its longer half-life in the plasma, the C-peptide is a good indicator of insulin production and secretion in early diabetes. Insulin is stored in the cytosol in granules that, given the proper stimulus are released by exocytosis. Insulin is degraded by the enzyme insulinase present in the liver and, to a lesser extent, in the kidneys. Insulin has a plasma half-life of approximately six minutes. This short duration of action permits rapid changes in circulating levels of the hormone (Champe, Harvey and Ferrier, 2005). 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. Glucagons on the other hand, causes just the opposite effects, i.e., glucose mobilization from the adipocytes. During exercise, in which both glucose and free fatty acids are needed as metabolic fuels, glucagons has been shown to increase and insulin to decrease (Fox and Mathews, 1981).

Strength 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 breakdown of the muscle fiber is called "catabolism", and the repair and re-growth of the muscle tissue is called "anabolism". Anabolic means to grow, and that's exactly what happens after break down of muscle fibers with strength exercise. In fact, many biological processes of growth in the body require some breakdown, or catabolism, prior to re-growth. The testosterone, insulin, growth hormone, protein, and other nutrients rush to the muscle after a strength-exercise session to repair the muscles and make them stronger. Importantly, the muscles heal and grow when they aren't working out, and so that's why it's necessary to leave time between workouts for recovery. According to Hooks (1988) strength is the key to success in sports and games. The value of strength in athletics is not a new idea. There is a vast need for every one for a better understanding of strength. The primary objective in strength training is not to learn to lift as much strength as possible but to increase strength for application to the relevant sport. This is possible only when the coaches and physical education teachers use the correct and the most beneficial and economical means to train their sportsmen. Strength in the form of explosive power is used more in sports and games competition. Whenever an athlete has to accelerate himself, an external object, or both, his ability to generate force with speed will be a primary determinant of his success. Strength and speed are integral components of fitness found in varying degrees in virtually in all athletic movements. Simply put the combination of strength and speed is power. Power represents the one component of athletic fitness that may be most indicative of success in sports, requiring extreme and rapid force production. Maximal strength and power are not distinct entities, they have a hierarchical relationship with one another. Maximum strength is the basic quality that influences power performance. Power performance is affected by the interaction between agonist, antagonist and synergic muscles involved in joint movements

METHODOLOGY

The purpose of the study was to find out the effect of strength training on selected hormonal variable insulin among pre pubescent, pubescent and post pubescent males. To achieve this purpose fifteen (n = 15) male pre pubescent (age 9-12 years), fifteen (n = 15) male pubescent (age 13-18 years) were randomly selected from Sri Ramakrishna Higher Secondary School, Chidambaram, Tamil Nadu, India and fifteen (n = 15) male post pubescent (age 19-25 years) from Faculty of Arts, Annamalai University, Annamalai Nagar were randomly selected as subjects for this study (N = 45). The selected subjects were assigned as Group I pre pubescent (PP), Group II pubescent (PU) and Group III post pubescent (POP) respectively. All the three groups underwent strength training. The selected criterion variable namely insulin was assessed before and after the training period byImmunoen zymometric assay test. The data collected from experimental group I, group II and group III prior to and after the completion of the training period were statistically analysed for significant difference if any, by applying dependent 't' test. The paired mean gains of experimental groups were tested for significance by applying independent 't' ratio. The level of confidence was fixed at 0.05 level.

INSULIN

The mean, standard deviation and dependent 't' ratio on the data obtained for insulin of pre and post-test of pre pubescent (PP), pubescent (PU) and post pubescent (POP) groups have been presented in Table I.

TABLE – I
MEAN, STANDARD DEVIATION AND 't' RATIO ON INSULIN FOR PRE AND POST TEST STRENGTH TRAINING OF PRE PUBESCENT, PUBESCENT AND POST PUBESCENT MALES

Groups		Mean	S.D	DM	't'-ratio
Pre Pubescent Group	Pre-test	4.92	0.94	0.56	7.42
	Post-test	5.48	0.81		
Pubescent Group	Pre-test	5.98	0.80	0.62	8.71
	Post-test	6.60	0.59		
Post Pubescent Group	Pre-test	5.68	0.61	1.19	14.07
	Post-test	6.87	0.68		

The table value required for significant for df 14 is 2.14.

Table I shows the mean value of insulin of pre pubescent group before the commencement of strength training was 4.92 and after the completion of twelve weeks training the mean was 5.48. It resulted with a mean difference of 0.56. The obtained 't' ratio was 7.42 and it was higher than the table value of 2.14 required for significance at 0.05 level for df 14. It was concluded that the strength training improved the insulin of pre pubescent boys. The

mean values of insulin before and after the strength training for pubescent group were 5.98 and 6.60 respectively. The mean difference of 0.62 resulted with a 't' ratio of 8.71. The table value required for significance at 0.05 level for df 14 is 2.14. As the obtained 't' ratio was higher than the table value it was concluded that the strength training has resulted in a significant improvement in insulin for pubescent group. The pre test mean value of insulin of post pubescent group was 5.68 and the post test insulin was 6.87. The mean difference was 1.19. The obtained 't' ratio was 14.07 and it is higher than the table values 2.14 required for significance at 0.05 level for df 14. It was inferred that the strength training had caused significant improvement on insulin for the post pubescent group.

TABLE II
COMPARISON OF MEAN GAIN ON INSULIN BETWEEN PAIRED MEANS AMONG PRE PUBESCENT, PUBESCENT AND POST PUBESCENT MALES

Groups	Mean	S.D	SE	t-ratio
Pre Pubescent	0.56	0.29	0.0075	6.00
Pubescent	0.62	0.27	0.0071	
Pre Pubescent	0.56	0.29	0.0075	57.27
Post Pubescent	1.19	0.32	0.0084	
Pubescent	0.62	0.27	0.0071	57.00
Post Pubescent	1.19	0.32	0.0084	

The table value required for significance for df 28 is 2.05

Table II shows the mean gain for pre pubescent and pubescent group as a result of strength training were 0.56 and 0.62 respectively. It resulted with a 't' ratio of 6.00 and it was higher than the table value of 2.05 required for significant at 0.05 level to the df 28. It is concluded that improvement in insulin was significantly higher for pubescent boys than pre pubescent boys. The mean gain for pre pubescent and post pubescent group as a result of strength training were 0.56 and 1.19 respectively. It resulted with a 't' ratio of 57.27 and it was higher than the table value of 2.05 required for significant at 0.05 level to the df 28. It is concluded that improvement in insulin was significantly higher for post pubescent boys than pre pubescent boys. The mean gains for pubescent and post pubescent group as a result of strength training were 0.62 and 1.19 respectively. It resulted with a 't' ratio of 57.00 and it was higher than the table value of 2.05 required for significant at 0.05 level to the df 28. It is concluded that improvement in insulin was significantly higher for post pubescent boys than pubescent boys. Therefore the results of the study indicate that strength training improved insulin for all the three groups namely pre pubescent, pubescent and post pubescent males. It also indicated that the improvement for post pubescent was greater than pubescent and pre pubescent. The improvement for pubescent was significantly greater than pre pubescent.

CONCLUSIONS

Based on the results of the study, it was concluded that strength training improved insulin for all the three groups namely pre pubescent, pubescent and post pubescent males. It also indicated that the improvement for post pubescent was greater than pubescent and pre pubescent. The improvement for pubescent was significantly greater than pre pubescent.

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