

INFLUENCE OF PLYO PUSH UP EXERCISES ON SHOULDER STRENGTH AND EXPLOSIVE POWER AMONG SPORTS PARTICIPANTS

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ABSTRACT

The purpose of the study was to find out the influence of plyo push-up exercises on shoulder strength and explosive power among sports participants. To achieve the purpose of the study thirty sports participants were selected randomly as subjects from Kamaraj Higher Secondary School, Pettai, Tirunelveli District, Tamilnadu, India and their age were ranged from 15 to 17 years. The subjects divided into two groups in equal numbers (N=15). Group-I underwent plyo push-up exercises and Group-II acted as control group who did not attend any special training other than their daily school schedule curriculum. The duration of the training period was restricted into six weeks. The selected criterion variables shoulder strength and explosive power were assessed by Push-Up Test and Medicine Ball Throw (4kg) test respectively. The collected data from the two groups prior to and after the experimental treatments on shoulder strength and explosive power were statistically analyzed by using the statistical technique of dependent 't' test and analysis of covariance (ANCOVA). In all the cases level of confidence was fixed at 0.05. The result of the study indicated that plyo push up exercises group had shown significantly improved in shoulder strength and explosive power among sports participants. However the control group did not show any significant improvement on selected variables such as shoulder strength and explosive power.

Keywords: Plyo Push-Up Exercises, Shoulder Strength, Explosive Power, Push-Up Test, Medicine Ball Throw (4kg)

Introduction

Agility is a motor ability important to success in team sports and has been defined traditionally as speed in changing directions (1, 2). Plyometrics, also known as "jump training" or "plyos", are exercises in which muscles exert maximum force in short intervals of time, with the goal of increasing power (speed-strength). This training focuses on learning to move from a muscle extension to a contraction in a rapid or "explosive" manner, such as in specialized repeated jumping. (3) Plyometric exercise involves the use of fast eccentric loading to produce increased concentric force, also known as the stretch-shortening cycle (SSC). (4) Plyometrics has been a popular training modality for athletes and has dominated basketball strength and conditioning programs. Plyometrics is characterized by quick, powerful movements involving a prestretch of the muscle, followed by a shortening, concentric muscle contraction, thus using the stretch-shortening cycle. (5,6) explosive training may also enhance kicking and endurance and balance performance. Although explosive training has consistently showed a positive effect on throwing performance (7) Conclusions Plyometrics training is an effective modality to improve Explosive power and Shoulder Strength performance, and basketball coaches should use multidirectional plyometric training rather than training in only 1 plane. (8) The Active Schools participants network aims to ensure that there are more higher quality opportunities for all

children to participate in sport within schools, while motivating and inspiring them to participate throughout their life and to lead a healthy and active lifestyle. (Scottish Government December 14, 2012)

The Purpose of the study

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Methodology

The purpose of the study was to find out the influence of plyo push-up exercises on shoulder strength and explosive power among sports participants. To achieve the purpose of the study thirty sports participants were selected randomly as subjects from Kamaraj Higher Secondary School, Pettai, Tirunelveli District, Tamilnadu, India and their age were ranged from 15 to 17 years. The active sports participants were assigned at random into two groups of each fifteen (N=15). Group-I underwent plyo push-up exercises and Group-II acted as control group who did not attended any special training other than their regular daily school schedule curriculum. The duration of the training period was restricted to six week for three alternative days per week. The selected criterion variables shoulder strength and explosive power were assessed by Push-Up Test and Medicine Ball Throw (4kg) test respectively. The pre and post data were collected before and after the training period. The dependent variables shoulder strength and explosive power were tested by standardized tests push-up and seated medicine ball throw (4kg). The pre and post tests data were collected on selected criterion variables prior and immediately after the training program. The pre and post-test scores were statistically examined by using the statistical technique of dependent 't' test and Analysis of Co-Variance (ANCOVA) for selected variable. The level of significance was fixed at .05 level of confidence, which was considered as appropriate.

Analysis of the data

The influence of plyo push-up exercises on shoulder strength and explosive power among sports participants were analyzed and presented below.

The t-test on shoulder strength (push-up test) of the pre and post test scores of plyo push-up exercise group and control group have been analyzed and presented in table I.

TABLE-I

THE PRE TEST AND POST TEST SCORES OF EXPERIMENTAL AND CONTROL GROUP ON SHOULDER STRENGTH TEST

Group	Pre Mean	Post Mean	Mean difference	Obtained t-ratio
Experimental	20.66	25.80	5.14	17.69*
Control	19.46	20.00	0.54	1.42

*Significant at .05 level. (The table value required for 0.05 level of significance with df 14 is 2.14)

The table-I shows that the pre-test mean value of experimental group and control group on shoulder strength are 20.66 and 19.46 respectively and the post test means are 25.80 and 20.00 respectively. The obtained dependent t-ratio values between the pre-and posttest means of plyo push up exercises group and control group are 17.69 and 1.42 respectively. The table value required for significant difference with df 14 at 0.05 level is 2.14. From the above table the dependent 't'-test values of shoulder strength between the pre and post tests means of experimental groups were greater than the table value 2.14 with df 14 at .05 level of

confidence, it is concluded that experimental group had significant improvement in the shoulder strength compared to control group.

Analysis of covariance (ANCOVA) on shoulder strength of experimental and control groups have been analyzed and presented in table II.

TABLE II
ANALYSIS OF COVARIANCE (ANCOVA) ON SHOULDER STRENGTH TEST OF EXPERIMENTAL GROUP AND CONTROL GROUP

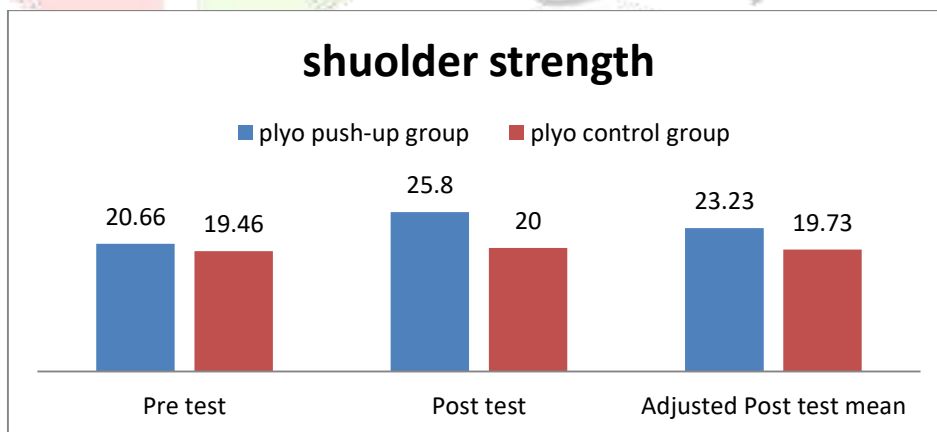
Adjusted Post Test Means		Source of variance	Sum of squares	Ddf	Mean square	F – ratio
Experimental Group	Control Group	Between	207.14	1	207.14	81.32*
23.23	19.73	Within	68.77	27	2.54	

* Significant at 0.05 level. (The table value required for significance at 0.05 levels with df 1 and 17 is 4.21)

Table II shows that the adjusted post test means values on shoulder strength. The obtained f- ratio of 81.32 for adjusted post test mean is greater than the table value 4.21 with df 1 and 27 required for significance at 0.05 level of confidence. The results of the study indicate that there is a significant mean difference exist between the adjusted post test means of plyo push-up exercise and control groups on shoulder strength.

The bar diagram shows the mean values of pre test, post test and adjusted post test on shoulder strength test of plyo push-up exercise group and control group.

FIGURE I
PRE TEST, POST TEST AND ADJUSTED POST TESTMEAN VALUES OF PLYO PUSH-UP EXERCISE AND CONTROL GROUPS ON SHOULDER STRENGTH (PUSH-UP)



The t-test on explosive power of the pre and post test scores of plyo push-up exercise group and control group have been analyzed and presented in table III.

TABLE-III
THE PRE TEST AND POST TEST SCORES OF EXPERIMENTAL AND CONTROL GROUP
ON EXPLOSIVE POWER

Group	Pre Mean	Post Mean	Mean difference	Obtained t-ratio
Experimental	3.46	4.25	0.79	13.67*
Control	3.23	3.27	0.04	1.05

*Significant at .05 level. (The table value required for 0.05 level of significance with df 14 is 2.14)

The table-III shows that the pre-test mean value of experimental group and control group on explosive power are 3.46 and 3.23 respectively and the post test means are 4.25 and 3.27 respectively. The obtained dependent t-ratio values between the pre-and posttest means of plyo push up exercises group and control group are 13.67 and 1.05 respectively. The table value required for significant difference with df 14 at 0.05 level is 2.14. From the above table the dependent 't'-test values of explosive power between the pre and post tests means of experimental groups were greater than the table value 2.14 with df 14 at .05 level of confidence, it is concluded that experimental group had significant improvement in the explosive power compared to control group

Analysis of covariance (ANCOVA) on explosive power of experimental and control groups have been analyzed and presented in table IV.

TABLE IV
ANALYSIS OF COVARIANCE (ANCOVA) ON EXPLOSIVE POWER OF EXPERIMENTAL
GROUP AND CONTROL GROUP

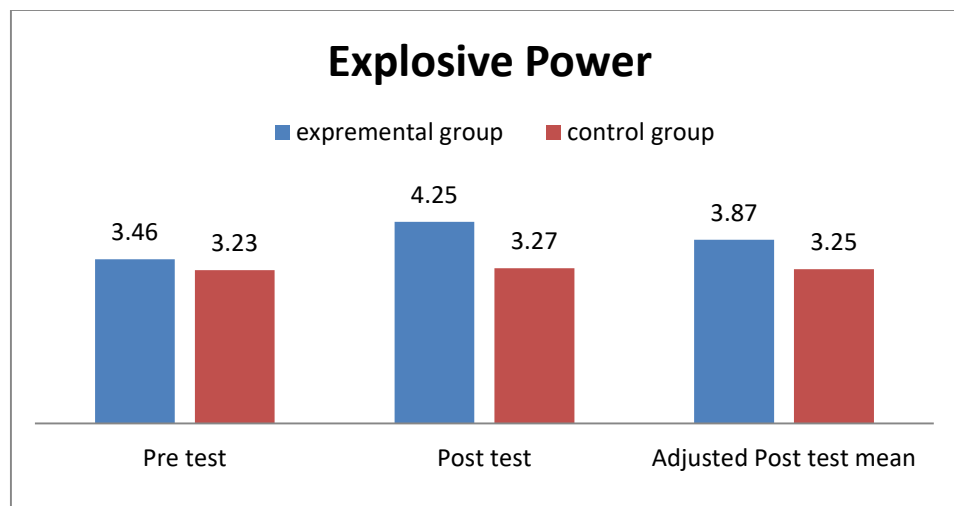
Adjusted Post Test Means		Source of variance	Sum of squares	Ddf	Mean square	F – ratio
Experimental Group	Control Group	Between	15.17	1	15.17	126.42*
3.87	3.25	Within	3.24	27	0.12	

* Significant at 0.05 level. (The table value required for significance at 0.05 levels with df 1 and 17 is 4.21)

Table II shows that the adjusted post test means values on explosive power test. The obtained f- ratio of 126.42 for adjusted post test mean is greater than the table value 4.21 with df 1 and 27 required for significance at 0.05 level of confidence. The results of the study indicate that there is a significant mean difference exist between the adjusted post test means of plyo push-up exercise and control groups on explosive power test.

The bar diagram shows the mean values of pre test, post test and adjusted post test on explosive power test of plyo push-up exercise group and control group.

FIGURE II
PRE TEST, POST TEST AND ADJUSTED POST TEST MEAN VALUES OF PLYO PUSH-UP
EXERCISE AND CONTROL GROUPS ON EXPLOSIVE POWER
(MEDICINE BALL THROWS)



CONCLUSIONS

1. There was significant improvement on shoulder strength test (push-ups) due to the influence of plyo push-ups exercise active school participants
2. There was significant improvement on explosive power test (4kg medicine ball throw) due to the influence of plyo push-ups exercise active school participants
3. However the control group had not shown any significant improvement on any of the selected variables.

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