EFFECT OF PLYOMETRIC TRAINING AND AQUA PLYOMETRIC ON MUSCULAR ENDURANCE AND EXPLOSIVE POWER AMONG JUNIOR LONG JUMPERS

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Abstract

The principle of the study was to access to effect of plyometric training and aqua plyometric training on muscular endurance and explosive power among junior long jumpers. 45 long jumpers from Chennai region at age ranged between 14 to 17 years. The selected subject was assigned into three equal groups with fifteen subjects with each group. The experimental group-I plyometric group, experimental group-II aqua plyometric training and control group. The experimental groups were under 12 weeks of training and control group was not under experimentation. Muscular endurance was measured by sit-ups test and explosive power was measured by standing broad jump was taken for both groups. The initial and the final readings derived from the experimental and the control group underwent a procedure of statistical analysis using ANCOVA. The confidence level was 0.05. These finding suggest that the plyometric training and aqua plyometric training program has a statistically significant influence in developing the selected criterion variables.

Keywords: Plyometric Training, Aqua Plyometric Training, Muscular Endurance, Explosive Power, Junior Long Jumpers

Introduction

The long jump was considered one of the most difficult of the events have a great deal of skill. The long jump is a track and field event in which athletes combine speed, strength and agility in an attempt to leap as far as possible from a take off point. The approach run, the last two strides, takeoff, action in the air, and landing. Success in many sports depends heavily upon the athletics leg explosive power (Adams 1992). Speed in the run-up or approach and a high leap off the board are the fundamentals of success. Speed is such an important factor of the approach is to gradually accelerate to a maximum controlled speed at takeoff.

Plyometric training is very popular because it provides exercising the lower extremities mainly by using one's own body weight and in the upper limbs. The very structure of plyometric training is such that it requires the adaptation of the muscle from an eccentric to a concentric contraction. Modalities, elicits numerous positive changes in the neural and musculoskeletal systems muscle function and athletic performance of healthy individuals (Markovic 2010).

Plyometric training procedure of high intensity allowing muscles to produce more effective in a short period of time. Jumping performance is determined by a complex interaction among several factors including maximal force capacity, rate of force development, muscle coordination and stretch shortening cycle (Arabatzi 2010). The greater the athlete's ability to generate maximal force or strength to begin with, the more of it can be converted into sport-specific power. Plyometric movements are powerful and high-impact, although the impact should be controlled as much as possible. Plyometric training requires both strength and endurance. Common Plyometric training exercises include various jumps hops and steps or cones (Faigenbaum 2007).

Exercises done in water are designed for the body in an upright position. The primary goal of these activities is to improve physical efficiency, and depth of the water. Shallow water programs are typically performed in water that ranges from mid-rib cage to mid-chest in depth.). Plyometric training in aquatic nature has become increasingly popular it provides a safer and less stressful alternative to land based programme.

Aqua plyometric can be used to decreases the landing force and increase the resistance during the recoil or concentric phase of the stretch shortening cycle. Depth of water determines the level of resistance with chest or shoulder high depths offering greater resistance during landing and takeoff phases, less intense eccentric muscle activity, smaller impact force and enhanced safety (Siff,M.C 2003).

Statement of the problem

The intention of the exploration was effect of plyometric training and aqua plyometric training on muscular endurance and explosive power among junior long jumpers

Methods

Subject and variables

To accomplish the purpose of the study was jumpers 45 long jumpers from Chennai region at age ranged between 14 to 17 years. The selected subject was assigned into three equal groups with fifteen subjects with each group. The Experimental group-I Plyometric Training group, Experimental group-II Aqua Plyometric training and control group. The Plyometric Training and Aqua Plyometric Training underwent training for a period of twelve weeks. The training sessions were conducted three days a week. Measurement of Muscular Endurance and Explosive Power variables was taken for the both groups.

Training protocol

The effect of Plyometric Training and Aqua Plyometric Training were selected as training protocol. The both plyometric training and aqua plyometric training was provided in the morning time. The plyometric exercises are High Knees, Shuttle Run, Squat Jump, Lateral Box Jump, Mini Hurdle Jump, Split Jump and Medicine Ball Chest Push with Partner. Plyometric training protocol in intensity will be increase week by weeks. The water temperature was 83 to86 degrees Fahrenheit (23-30^0 C) and pool depth was 1-1.30M. Aqua plyometric training exercises are High Knees, Back kick, Speed Run, Jump and Reach, Single Leg Bounding, Split Squat Jump, Hopping, Lateral Jump and Tuck Jump. Aqua Plyometric training protocol intensity will be increase week by weeks.

Table –I

Selection of the test measures

Sn.no	Variables	Test Items	Units
1.	**Muscular endurance**	Sit-ups test	counts
2.	**Explosive Power**	Standing Broad Jump	Meters

The data's were collected before and after the training period. The initial and the final readings derived from the experimental and the control group underwent a procedure of statistical analysis using ANCOVA. The IBM-SPSS-V22 software was used and the confidence level is maintained at 0.05 levels.

Result and Discussion

Table -II
Analysis of Co-Variance of Muscular Endurance and Explosive Power of Plyometric Training and Aqua Plyometric Training of Junior Long Jumpers

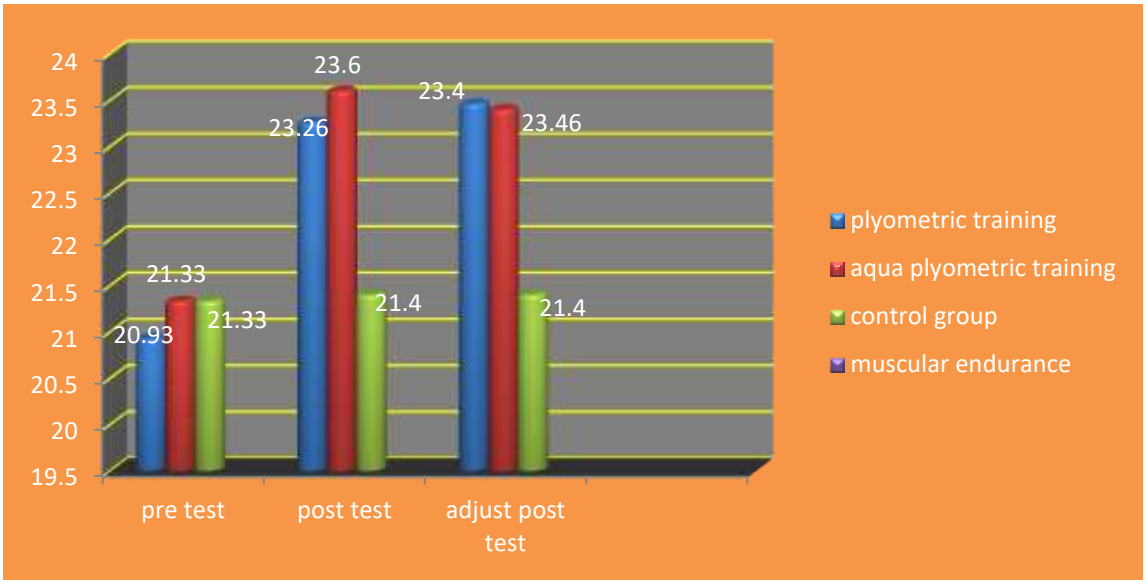
Muscular Endurance							
tests	Plyometric training group	Stationary training group	Control group	Sum of square	df	Mean square	F ratio
Pre test	20.93	21.33	21.33	1.20	2	.600	0.144
				174.00	42	4.14	
Post test	23.26	23.60	21.40	42.17	2	21.08	**4.52***
				196.13	42	4.66	
Adjust post test	23.46	23.40	21.40	41.26	2	20.68	**25.68***
				33.02	41	.805	
Explosive power							
tests	Plyometric training group	Stationary training group	Control group	Sum of square	Df	Mean square	F ratio
Pre test	1.38	1.37	1.36	.003	2	.001	.730
				.083	42	.002	
Post test	1.42	1.43	1.36	.039	2	.020	**7.31***
				.107	42	.003	
Adjust post test	1.41	1.43	1.37	.022	2	.011	**46.09***
				.010	41	.002	

***Significant at 0.05 level of confidence**

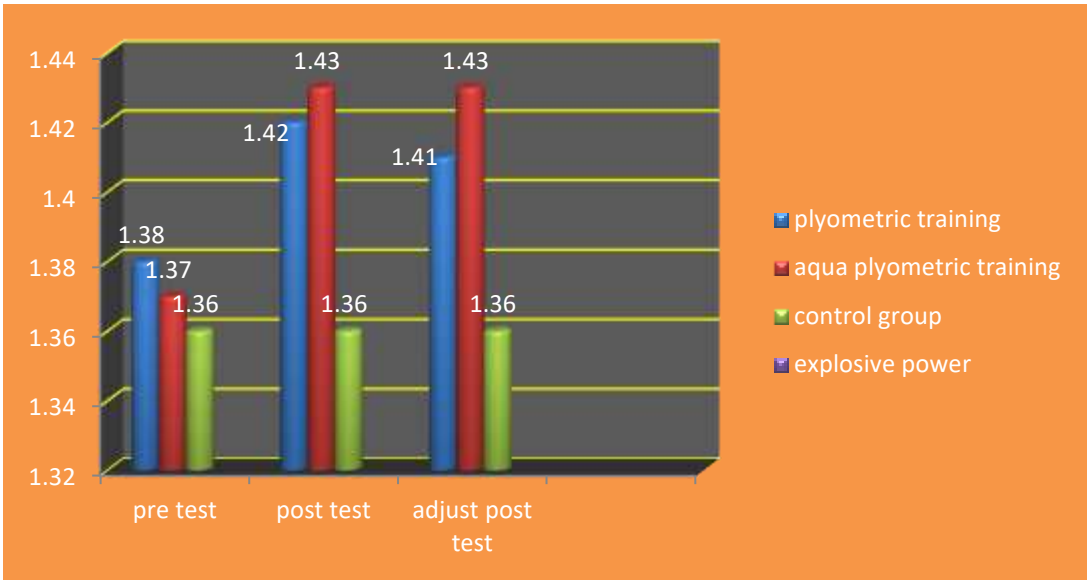
The table shows that the pre-test mean value of muscular endurance for plyometric training group and aqua plyometric training group and control group are 20.93, 21.33 and 21.33 respectively. The table value 3.23 for df 2 and 42 required the obtain f ratio 0.144 is lowest than the table value 3.23 and 0.05 level of confidence. The post-test means value of muscular endurance for plyometric training group and aqua plyometric training group and control group are 23.26, 23.60 and 21.40 respectively. The table value 3.23 for df 2 and 42 required the obtain f ratio **4.52*** highest than the table value 3.23 and 0.05 level of confidence. The adjust post-test means value of muscular endurance for plyometric training group and aqua plyometric training group and control group are 23.46, 23.40 and 21.40 respectively. The table value 3.23 for df 2 and 41 required the obtain f ratio **25.68*** highest than the table value 3.23 and 0.05 level of confidence.

The table shows that the pre-test mean value of explosive power for plyometric training group and aqua plyometric training group and control group are 1.38, 1.37 and 1.36 respectively. The table value 3.23 for df 2 and 42 required the obtain f ratio 0.730 is lowest than the table value 3.23 and 0.05 level of confidence. The post-test means value of explosive power for plyometric training group and aqua plyometric training group and control group are 1.42, 1.43 and 1.36 respectively. The table value 3.23 for df 2 and 42 required the obtain f ratio **7.31*** highest than the table value 3.23 and 0.05 level of confidence. The adjust post-test means value of explosive power for plyometric training group and aqua plyometric training group and control group are 1.41, 1.43 and 1.37 respectively. The table value 3.23 for df 2 and 41 required the obtain f ratio **46.09*** highest than the table value 3.23 and 0.05 level of confidence.

Bar Diagram of Muscular Endurance of Plyometric Training and Aqua Plyometric Training of junior long jumpers



Bar Diagram of Explosive Power of Plyometric Training and Aqua Plyometric Training of junior long jumpers



Conclusion

The aquatic plyometric training can be an important piece of the rehabilitation and return-to-play process in order to improve lower body strength, speed, and power while reducing the physical stress of land-based plyometric training (Nicholas James 2019). Based on the result the conclusion was drawn. The result of the study reveals that there was a significant improvement in the experimental group on muscular endurance and explosive power when compare to the control group after the twelve weeks of plyometric training and aqua plyometric training.

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