Vol 6 Issue 6 July 2016

ISSN No : 2230-7850

International Multidisciplinary Research Journal

Indian Streams Research Journal

Welcome to ISRJ

RNI MAHMUL/2011/38595 **ISSN No.2230-7850**

Indian Streams Research Journal is a multidisciplinary research journal, published monthly in English, Hindi & Marathi Language. All research papers submitted to the journal will be double - blind peer reviewed referred by members of the editorial board.Readers will include investigator in universities, research institutes government and industry with research interest in the general subjects.

Address:-Ashok Yakkaldevi 258/34, Raviwar Peth, Solapur - 413 005 Maharashtra, India
Cell : 9595 359 435, Ph No: 02172372010 Email: ayisrj@yahoo.in Website: www.isrj.org

ISSN: 2230-7850 Impact Factor : 4.1625(UIF) Volume - 6 | Issue - 6 | July - 2016

Indian Streams Research Journal
International Recognized Multidisciplinary Research Journal
ISSN No : 2230-7850 Impact Factor : 4.1625 (UIF) [Yr. 2016]

Indian Streams Research Journal

IMPACT OF AQUATIC PLYOMETRIC TRAINING ON SELECTED MOTOR FITNESS COMPONENTS AND PHYSIOLOGICAL VARIABLES AMONG COLLEGE MEN STUDENTS

C. Senthil Kumar[1], Dr. K. Murali Rajan[2] and Dr. S. Nagarajan[3]

[1]Ph.D. Scholar, Department of Physical Education, Alagappa University, Karaikudi.
[2]Associate professor, Alagappa University College of Physical Education, Karaikudi.
[3]Associate professor, Alagappa University College of Physical Education, Karaikudi.

ABSTRACT

Aquatic training offers efficiency, comfort, safety, and training at any level of intensity. Performing exercises in the vertical plane maximizes resistance and increases turbulence and drag, which helps to strengthen the active muscles. It can also be expected that injury rate would be lower in water due to the buoyancy that water provides. The purpose of this study was to find out the impact of aquatic plyometric training on selected motor fitness components and physiological variables among college men students. In this study thirty subjects were randomly selected from Alagappa Govt Arts College, Karaikudi, Tamil nadu, during the academic year 2015 -2016. The subject's age ranged between 18-25 years only. They were randomly divided into two equal groups such as Control group and Aquatic plyometric training group. The study was formulated as pre and post test randomized design. The collected data were analyzed statistically through Analysis of covariance (ANACOVA) to find out the significance difference at 0.05 level. Aquatic plyometric training group significantly improved the speed, Agility and Vo2 max of the college men students than to control group.

KEYWORDS :*speed, agility, vo2 max and aquatic plyometrics.*

INTRODUCTION:

Aquatic training offers efficiency, comfort, safety, and training at any level of intensity. Performing exercises in the vertical plane maximizes resistance and increases turbulence and drag, which helps to strengthen the active muscles. It can also be expected that injury rate would be lower in

water due to the buoyancy that water provides. If aquatic plyometric training can provide comparable training gains with reduced risk of injury, coaches and strength specialists would have a more training option for conditioning that would enhance performance while reducing the risk of injury. Aquatic training also allow individuals to exercise almost every muscle and joint in the body at the same time, while conducting heat away from the body more efficiently than air.

Aquatic plyometric training is not a new concept, but it has recently become more popular, mostly because of the potential to decrease injuries, compared with land plyometric contractions, by decreasing impact forces on the joints. Aquatic plyometric training provides a form of training that can enhance performance during a competitive season for a power-based sport (Miller *et al*., 2002; Robinson *et al.*, 2004). It is suggested that Aquatic plyometric training has the potential to provide similar or better improvements in skeletal-muscle function and sport-related attributes of explosive and reactive training than land based plyometrics, with less delayed-onset muscle soreness (Robinson *et al.*, 2004;Martel *et al*., 2005; Stemm & Jacobson, 2007). According to Coetzee (2007), research has shown that aquatic plyometric programmes provide the same or even more performance enhancement benefits than land plyometric programmes.Aqua plyometrics programmes improve your overall joint awareness. You have more control in the water when performing your training so you are mentally able to focus and control your movements. The water activates this sensory awareness as your body moves through the water.

Speed is a complex ability that is necessary to perform fast motor actions in the shortest possible time; it depends on central nervous motor programmes, which are activated by intense will power. Speed is an important factor in almost all court and field games.Agility is the ability of a player to make changes in body direction and position rapidly and accurately without losing balance, in combination with fast movements of limbs (Ellis *et al*., 2000; Kent, 2004). Roozen (2004) found what determined agility was the ability to combine muscle strength, starting strength, explosive strength, balance, acceleration, and deceleration. Vital Capacity is a critical component of good health. Measurement of Vital Capacity is useful diagnostically and is an important pulmonary function test (Williams DE, *et al*.1978)

OBJECTIVES OF THE STUDY

1.To find out the effectiveness of aquatic plyometric training on selected motor fitness components like speed and agility among college men students.

2.To find out the effectiveness of aquatic plyometric training on selected physiological variable vo2 max of the among college men students.

HYPOTHESES

1.It was hypothesized that there was significant improvement on selected motor fitness components and physiological variables responses to eight weeks of aquatic plyometric Training.

SIGNIFICANCE OF THE STUDY

- The study may be helpful in the importance of Aquatic plyometric training.
- The result of the study may be helpful in the focus of new dimension in the aquatic training.
- This study may be helpful of new way idea to the athletes and coaches for improving performance.
- This study may be helpful to prove the essential of Aquatic training to improve the physical variables.

MATERIALS AND METHODS

The purpose of this study was impact of aquatic plyometric training on selected selected motor fitness components and physiological variables among college students. The thirty subjects were randomly selected from Alagappa Govt Arts College, Karaikudi, Tamil nadu, during the academic year 2015 -2016. The subject's age ranged between 18-25 years only. They were randomly divided into two equal groups. Control group and Aquatic plyometric training group. All the subjects were healthy and physically fit. The nature and importance of the study was explained to the subjects and subjects expressed their willingness to serve as subjects in this study. The study was formulated as pre and post test random group design.

INDEPENDENT VARIABLES

Control group - No training
Experimental group - Aquatic Plyometric training

DEPENDENT VARIABLES

Motor fitness components: Speed, Agility
Physiological variables : Vo2 max

Table-1
Criterion measures

Sl. NO.	Variables	Test items	Unit of measurement
1	Speed	50 mts run	In seconds
2	Agility	'T' test	In seconds
3	Vo_2 max	step Test	$Ml/kg^{-1}/min^{-1}$

TRAINING PROGRAMME

The experimental group participated in the aquatic plyometric training for 3 days a week, one session per day and for 8 weeks each session lasted 45 minutes. The control group maintained their daily routine activities and no special training was given. Aquatic Plyometric training group consisted of a 10- minute warm-up and warm down. Rest interval between repetitions 60 seconds. Rest interval between Set 2 to 3 minutes. The water level was just above the hip level. These exercises were performed for 45 min in a day and for 3 days/week. The subjects were tested on selected variables prior and immediately after the training period.

Table-II

AQUATIC PLYOMETRIC TRAINING PROGRAMME DETAIL

Weeks	Exercises	Sets	Repetitions	Foot Contact
I &II Weeks	Squat Jump Split squat Jump Two foot ankle Hop Standing long jump Lateral jump over barrier	1 1 1 1 1	8 8 8 8 8	40
III &IV Weeks	Squat Jump Split squat Jump Two foot ankle Hop Standing long jump Lateral jump over barrier	2 2 2 2 2	8 8 8 8 8	80
V &VI Weeks	Squat Jump Split squat Jump Two foot ankle Hop Standing long jump Lateral jump over barrier	2 2 2 2 2	10 10 10 10 10	100
VII &VIII Weeks	Squat Jump Split squat Jump Two foot ankle Hop Standing long jump Lateral jump over barrier	2 2 2 2 2	10 10 10 10 10	100

STATISTICAL ANALYSIS

The collected data were analyzed statistically through Analysis of covariance (ANACOVA) to find out the significance difference, if any between the groups. The 0.05 level of confidence was fixed.

ANALYSIS OF DATA

Table-III

Computation of analysis of Co-variance of the Pre test and post test means on speed, agility and vo2 max of training groups (Scores in Seconds and Ml/kg^{-1}/min^{-1})

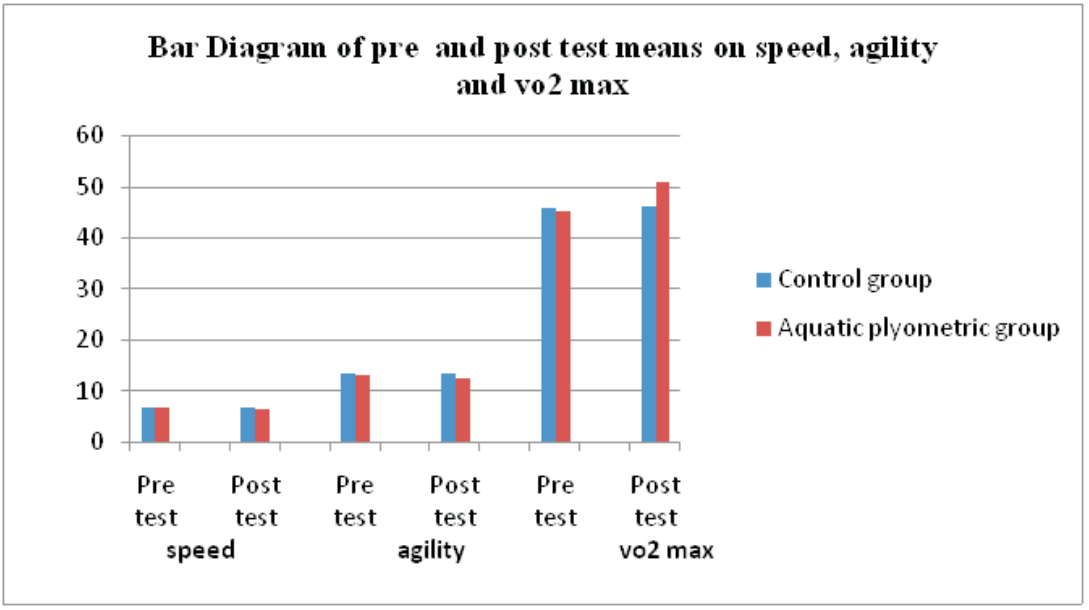
variables	Mean values	Control group	Aquatic plyometric group	Source of Variance	Sum of Squares	df	Means Squares	F- ratio
Speed	Pre test	7.07	7.00	B	0.033	1	0.033	1.000
				W	0.933	28	0.033	
	Post test	7.07	6.67	B	1.200	1	1.200	**7.875***
				W	4.267	28	0.152	
	Adjust post test	7.03	6.70	B	0.805	1	0.805	**6.517***
				W	3.33	27	0.123	
Agility	Pre test	13.60	13.13	B	1.633	1	1.633	1.163
				W	39.333	28	1.405	
	Post test	13.53	12.53	B	7.500	1	7.500	**6.674***
				W	31.467	28	1.124	
	Adjust post test	13.35	12.71	B	2.972	1	2.972	**9.576***
				W	8.381	27	0.310	

Vo_2 max	Pre test	45.93	45.07	B	5.633	1	5.633	0.781
				W	201.867	28	7.210	
	Post test	46.00	51.00	B	187.500	1	187.500	**39.773***
				W	132.000	28	4.714	
	Adjust post test	45.72	51.27	B	224.362	1	224.362	**116.270***
				W	52.101	27	1.930	

* Significant at 0.05 level of confidence. (The table values required df 1 and 28, 1 and 27 for 4.20 and 4.21)

Table -III shows the analyzed data on speed assessed through 50 meters run test. Pre test means of speed for control group and aquatic plyometric training group were 7.07 and 7.00 respectively. The obtained F ratio 1.000 was less than the required table value of 4.20. Hence the pre test was not significant. The post test means for control group and aquatic plyometric training group were, 7.07 and 6.67 respectively. The obtained F ratio was 7.875 which were greater than the required table value of 4.20. Hence the post test was significant at 0.05 level of confidence for the degrees of freedom 1 and 28.The adjust post test means for control group and aquatic plyometric training group were, 7.03 and 6.70 respectively. The obtained F ratio was 6.517 which were greater than the required table value of 4.21. Hence the post test was significant at 0.05 level of confidence for the degrees of freedom 1 and 27. The analyzed data on agility assessed through T test. Pre test means of agility for control group and aquatic plyometric training group were 13.60 and 13.13 respectively. The obtained F ratio 1.163 was less than the required table value of 4.20. Hence the pre test was not significant. The post test means for control group and aquatic plyometric training group were, 13.53 and 12.53 respectively. The obtained F ratio was 6.674 which were greater than the required table value of 4.20. Hence the post test was significant at 0.05 level of confidence for the degrees of freedom 1 and 28.The adjust post test means for control group and aquatic plyometric training group were, 13.35 and 12.71 respectively. The obtained F ratio was 9.576 which were greater than the required table value of 4.21. Hence the post test was significant at 0.05 level of confidence for the degrees of freedom 1 and 27.

The analyzed data on vo2 max assessed through step test. Pre test means of vo2 max for control group and aquatic plyometric training group were 45.93 and 45.07 respectively. The obtained F ratio 0.781 was less than the required table value of 4.20. Hence the pre test was not significant. The post test means for control group and aquatic plyometric training group were, 46.00 and 51.00 respectively. The obtained F ratio was 39.773 which were greater than the required table value of 4.20. Hence the post test was significant at 0.05 level of confidence for the degrees of freedom 1 and 28.The adjust post test means for control group and aquatic plyometric training group were, 45.72 and 51.27 respectively. The obtained F ratio was 116.270 which were greater than the required table value of 4.21. Hence the post test was significant at 0.05 level of confidence for the degrees of freedom 1 and 27.



DISCUSSION AND FINDINGS

The result of the study on speed indicates the experimental group namely aquatic plyometric training group brought about significant improvement after the training programme. The analysis of the data indicates that there was no significant difference on speed between control groups. Several studies have suggested that plyometric training may enhance speed, because the use of stretch-shortening cycles during plyometrics performance has been shown to have a significant relationship to speed. The many studies proved that aquatic plyometrics had positive effect to improve the speed **Rameshkumar.S And K.Mohan (2013), Kamaraj.p et al (2013) Kamalakkannan.k et al (2010).** In present study has also showed that for significant improvement on speed aquatic plyometric training group.Agility is usually involving stopping, starting and changing directions in an explosive manner. These movements are components, which can assist in developing agility. The analysis of the data indicates that there was no significant difference on agility between control groups. A study proved that aquatic plyometrics had positive effect to improve the agility **Kamaraj.p et al (2013).** Aquatic plyometrics can improve agility are due to the physical properties of water. Viscosity and cohesion of water increases this resistance, providing an important training stimulus for agility within an aquatic environment. Also, the collective effect of speed specificity, repetitive jump training with the shorter amortization phase, could too result in improved agility **(Behm and Sage, 1993).**The result of the study on in vo2 max indicates aquatic plyometric training group brought about significant improvement after the training programme. The analysis of the data indicates that there was no significant difference on in vo2 max between control groups.

CONCLUSIONS

1.Aquatic plyometric training group significantly improved speed of the college students compared to control group.

2. Aquatic plyometric training group significantly improved agility of the college students compared to control group.

3. Aquatic plyometric training group significantly improved vo2 max of the college students compared to control group.

REFERENCES

1)Behm, D.G. & Sage, D.G. (1993).Velocity specificity of resistance training. Sports Medicine, 15 (6):374-388.
2)Chu, Donald (1998). Jumping into plyometrics (2nd ed.). Champaign, IL: Human Kinetics.1–4.
3)Coetzee, b. (2007). An overview of plyometrics as an exercise technique. South African Journal for Research in Sport, Physical Education and Recreation. 29(1):61-82.
4)Ellis, L; Gastin, P.; Lawrence,S.; Savage, B.; Shiels, A.; Stapff, A.; Timilty, D.; Quinn, A.; Woolform, S.N. & Young, W. (2000). Protocols for the physiological assessment of team sports. In: Human Kinetics.
5)Kamalakkannan K, Vijayaragunathan N, Kalidasan R.(2010) Analysis of aquatic and land training on selected physical fitness variables among volleyball players. Journal of Recent Research in Science and Technology. 2(4):69-73.
6)Kamaraj.p , A. Domnic, & S.Rameshkumar (2013) impact of aquatic based plyometric training on selected skill related motor fitness components namely agility, coordination, power and speed among male Handball players. Star Physical Education. 04.
7)Martel GF, Harmer ML, Logan JM,(2005). Aquatic Plyometric Training Increases Vertical Jump in Female Volleyball Players. Journal of Medicine & Science in Sports & Exercise. 37(10):1814-1819.
8)Kent, M. (2004). Oxford dictionary of sport science and medicine. (2nd ed). New york: oxford university press.
9)Miller, M.G. Berry, D.C. Bullard,S. Gilders, R. (2002). Comparisons of land-based and aquatic-based plyometric programs during an 8-week training period. Journal of Sport Rehabilitation. 11:268-283
10)Robinson, L.E., Devor, S.T., Merrick, M.A., & Buckworth, J. (2004). The effects of land vs aquatic plyometrics on power, torque, velocity, and muscle soreness in women. Journal of Strength and Conditioning Research.18 (1), 84-91.
11)Rameshkumar.S And K.Mohan (2013) Influence of aquatic based plyometric training on selected physical fitness components namely speed, muscular strength, explosive strength, endurance among male Handball players. Journal of International Academic Research for Multidisciplinary. Volume 1 Issue 6. Issn : 2320 – 5083.
12)Roozen, M. (2004). Action-reaction: Illinois Agility Test. NSCA's Performance Training Journal, 3(5):5-6.
13)Stemm, J.D., Jacobson, B.H., (2007) Comparıson of land- and aquatic-based plyometric training on vertical jump performance, Journal of Strength and Conditioning Research, 21,568-571
14)Williams DE, Miller RD, Taylor WF. (1978) Pulmonary function studies in healthy Pakistani adults. Thorax 1978; 33:243–9.

Publish Research Article
International Level Multidisciplinary Research Journal
For All Subjects

Dear Sir/Mam,

We invite unpublished Research Paper,Summary of Research Project,Theses,Books and Book Review for publication,you will be pleased to know that our journals are

Associated and Indexed,India

- International Scientific Journal Consortium
- OPEN J-GATE

Associated and Indexed,USA

- Google Scholar
- EBSCO
- DOAJ
- Index Copernicus
- Publication Index
- Academic Journal Database
- Contemporary Research Index
- Academic Paper Databse
- Digital Journals Database
- Current Index to Scholarly Journals
- Elite Scientific Journal Archive
- Directory Of Academic Resources
- Scholar Journal Index
- Recent Science Index
- Scientific Resources Database
- Directory Of Research Journal Indexing

Indian Streams Research Journal
258/34 Raviwar Peth Solapur-413005,Maharashtra
Contact-9595359435
E-Mail-ayisrj@yahoo.in/ayisrj2011@gmail.com
Website : www.isrj.org