



EFFECTS OF PLYOMETRIC TRAINING AND STRENGTH TRAINING ON SELECTED PHYSICAL COMPONENT AND PHYSIOLOGICAL VARIABLE AMONG MEN BASKETBALL PLAYERS

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Abstract

The examination means to look at the impact of plyometric training and strength training on speed perseverance and essential limit among men basketball players. To accomplish the reason for the examination 45 (N=45) men basketball players as subjects from Chengalpattu region, Tamil Nadu, India matured between 17 to 21 years at arbitrary. Three groups with fifteen subjects each were chosen as experimental group A - plyometric training group, experimental group B - strength training group and group C - control group. The subjects were tried when the two months (8 weeks) of experimentation. The training protocol was trailed by appropriate warm up and cooling down regimens. For speed endurance 300 meters run and vital capacity peak flow measurement is used as test parameters. The information data from the experimental and control group with the underlying and final readings were analyzed statistically with analysis of variance (ANOVA). The level of confidence was fixed 0.05. After effect of the investigation plyometric training and strength training has showed better execution on speed endurance and vital capacity it showed better improvement.

Keywords: Plyometric Training, Strength Training, Speed Endurance, Vital Capacity, Men Basketball Players.

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Introduction

The general advancement of identity of a sports individual depends upon a multifaceted sports training paving way through the physical, physiological, mental, social, intellectual and moral perspectives. In other words, the performance of a sportsman improves as a result of the development of total personality. The aim of it is to prepare a sports person physically, physiologically and hematological for a possible highest sports performance at the time of main competition, in a specific sport. In order to make a sports person capable of putting up optimal performance, systematic improvement of performance capacity and readiness performance are to be carried out. Physical Education and Sports is a keen area which needs many kinds of training means and methods to improve the overall performance of the sports person.

One of the most commonly played and famous games in the world is basketball. In 1891, James Naismith, a physical education coach at the Christina Training School of Foreign Young Men, invented basketball. Basketball, as it is played today, has undergone numerous improvements over the years in uniforms, rules and style of play. In the end, it has earned a decent name in the world of gaming. Basketball is played by two teams of five players each. Either team's aim is to put the ball into the basket of the opponent and to avoid the other team from capturing the ball or scoring. The ball can, according to the constraints laid down in the rules, be passed, tossed, or dribbled in any direction. Basketball is one of the most popular sports in the world as a spectator sport in terms of player attendance. It is quick, fast, violent and appealing. As the game involves a high degree of health, intellect and an attentive mind, it is considered a strenuous game. The basic skills required for all the basic movements in basketball are coordination, calming and defense. A player's ability to own natural motions and master basic movements can be a resource for mastering the game in which one plays.

Plyometric exercise is a popular form of training used to improve athletic performance. It involves a stretch of the muscle tendon unit immediately followed by a shortening of the muscle unit. The stretch shortening cycle process significantly enhances the ability of the muscle tendon unit to produce maximal force in the shortest amount of time. The importance of two factors the serial elastic components of muscle, which include the tendons and the cross bridging characteristics of

the actin and myosin that make up the muscle fibers and the sensors in the muscle spindles (proprioceptors) that play the role of presetting muscle tension and relaying sensory input related to rapid muscle stretching for activation of the stretch reflex **Chu, D.A.1983**

Strength training is a more intense form of includes a mix of both cardio and resistance training exercises. The whole body moves and tries alternating between upper and lower body moves so one muscle group rests while another works. This type of HIIT workout works so well is because of the work-to-rest ratio **Tereda, 2004**. The duration of Strength training also depends on the intensity of the session. Strength workouts provide improved athletic capacity and condition as well as improved glucose metabolism. **Scott, C 2015**

Statement of the problem

The study aim was to examine the effects of plyometric training and strength training on selected physical component and physiological variable among men basketball players

Methodology

For achieving the aim of the study forty five (N=45) men basketball players were selected randomly as subjects from Chengalpattu region, TamilNadu, India aged between 17 to 21 years at random. Three groups with fifteen subjects each were selected as experimental group A - plyometric training group, experimental group B-strength training and group C- control group. The subjects were tested before and after the two months (eight weeks) of experimentation. The plyometric training and the strength training were selected as training protocol.

The plyometric group subjects were trained in each exercise and sets, and the load administered between 10to 15 repetitions in a set with the time labs of 1 to 1.30 minutes for a set. The training protocol was given with proper warming up and cooling down regime. The plyometric training protocol were High Knee Action with ladder, Vertical Depth Jump, Jumping Squat, Jumping Jack, Single Arm 1kg Medicine Ball Throw, Plyo Box Bounding, Hurdle Vertical Jump, Scoop-Hopping, Burpees, Russian Twist, V-Step. The strength group subjects were trained in Strength set doing each for 20 seconds and resting 10 seconds between each exercise for a total of four minutes for each set and 4 minutes will given as rest period between each set. The Strength training protocol

were Rope jump, Jump and jack, Ready position shuffle, Push-ups, Approach jumps, Side to side jumping lunge, line block jumps, abdominal crunches.

The criterion variables were measured using 300 meters run test and peak flow measure. The initial

and the final readings derived from the experimental and the control group underwent a procedure of statistical analysis using ANOVA. The IBM-SPSS – v21 software was used and the confidence level is maintained at 0.05.

Results and Discussions

Table I:-Descriptive analysis of experimental groups and control group on Speed Endurance and Vital Capacity

Speed endurance			
Test	Plyometric Training Group	Strength Training Group	Control Group
Pre Test	47.38	47.45	47.53
Post Test	46.67	46.33	47.53
Vital capacity			
Test	Plyometric Training Group	Strength Training Group	Control Group
Pre Test	3.43	3.42	3.44
Post Test	3.50	3.54	3.43

Table II: ANOVA on Speed Endurance and Vital Capacity of Experimental Groups and Control Group

Speed Endurance				
Test	Sum of square	Df	Mean square	F Ratio
Pre Test	.169	2	.085	.074
	47.71	42	1.137	
Post Test	11.54	2	5.77	5.13*
	47.26	42	1.125	
Vital Capacity				
Test	Sum of square	Df	Mean square	F Ratio
Pre Test	.001	2	.001	.077
	.398	42	.009	
Post Test	.083	2	.041	5.85*
	.324	42	.007	

*Significant at 0.05 level of confidence

The above table shows I and II that the pre-test mean values on speed endurance of plyometric group, strength group and control group were 47.38, 47.45 and 47.53 respectively. The obtained F-ratio of .074 for pre-test was lesser than the table value 3.22 for df2 and 42 required for significance at 0.05 level of confidence on speed endurance.

The post-test mean values on speed endurance of plyometric group, strength group and control group were 46.67, 46.33 and 47.53 respectively. The obtained F-ratio of 5.13* for post-test was greater than the table value 3.22 for df2 and 42 required for significance at 0.05 level of confidence on speed endurance.

The above table I and II shows that the pre-test mean values on vital capacity of plyometric group, strength group and control group were 3.43, 3.42 and 3.44 respectively. The obtained F-ratio of .077

for pre-test was lesser than the table value 3.22 for df2 and 42 required for significance at 0.05 level of confidence on vital capacity.

The post-test mean values on vital capacity of plyometric group, strength group and control group were 3.50, 3.54 and 3.43 respectively. The obtained F-ratio of 5.85* for post-test was greater than the table value 3.22 for df2 and 42 required for significance at 0.05 level of confidence on vital capacity.

Conclusion

Basketball specific plyometric training involves exercises that require maximal force in short time intervals thereby improving the athlete's performance. Like plyometric training takes advantage of the stretch-shorten cycle to develop power. However, plyometric training emphasizes the intent, velocity and continued acceleration of

the concentric phase of exercises, rather than the storage and utilization of elastic energy to improve the athletic capabilities of athletes.

Strength training, a range of loads can be used so that power, rate of force development, and motor-unit recruitment, as well as intra- and inter-muscular coordination can be developed across the force-velocity curve. These factors may enhance the dynamic correspondence of this method of training. Strength programmes are planned properly, working from unloaded to loaded, and only undertaken after adequate strength levels have been achieved.

In the light of the study undertaken with certain limitations imposed by the experimental conditions, the following conclusions were drawn. The result of the study reveals that there was a significant improvement in the experimental groups on selected variables when compared to the control group after the completion the impact of plyometric and strength training. The plyometric training and strength training has showed better performance on speed endurance and vital capacity also it showed better improvement.

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References

1. R. Manoranjith, Prof. S. Nagarajan,(2020) Collusion of Different Ground Surface of Plyometric with Aerobic Training on Selected Agility and Explosive Power Among School Boys Volleyball Players International Journal of Advanced Science and Technology Volume 29, Issue No.03 Pages 3827-3833
2. Anand, M., Vaithianathan, K., Saran, K. S., & Prasanna, T. A. (2019). Effect of Game Specific Circuit Training and Plyometrics on Selected Physiological and Hematological Variables of Handball Players. *Indian Journal of Public Health Research & Development*, 10(7).
3. Prasanna, T. A., & Vaithianathan, K. (2019). The Combined Effect of Continuous Run, Alternate Pace Run and Fartlek Training on Selected Physiological Variable among Male Athletes. *Indian Journal of Public Health Research & Development*, 10(3), 238-241.
4. Saran, K. S., Vaithianathan, K., Anand, M., & Prasanna, T. A. (2019). Isolated and Combined Effect of Plyometric and Weight Training on Selected Physical Fitness and Hematological Variables of Football Players. *Indian Journal of Public Health Research & Development*, 10(7), 362-364.
5. Arunprasanna, T., Sundar, M., & Jaskar, K. M. M. (2019). Isolated and Combined Effect of Continuous Run Alternate Pace Run on Selected Motor Fitness Physiological Haematological Variables among Male Athletes. *Indian Journal of Public Health Research & Development*, 10(11).
6. Dr. M. Sundar Dr. T. Arun Prasanna Effect Of Core Training With And Without Yogic Practices Of Selected Psychological Variables Among College Men Athletes, *Journal_ International Journal Of Advanced Science And Technology*, 2019/11, Volume 28, Issue 16, P.No:326-331.
7. Kumaran, R. S., Prasanna, T. A., & Sundar, M. Comparative Study Of Corporeal Variables Between Male And Female Kabaddi Players Of Karaikudi District. *Journal - AEGAEUM JOURNAL*, Volume-8, Issue – 3 , P.No:585 – 589.
8. Baskar, D., Teacher, P. E., Rajan, K. M., Anitha, J., Prasanna, T. A., & Kumar, P. Effect Of Traditional Strength Training And Functional Strength Training On Arm Strength Of Polevaulters.
9. E. Deeva, ,Effect Of Varied Intensities And Frequency Of Aerobic Exercises On Selected Motor Ability And Physiological Variables Amonginter School Handball Players , *Journal Aegaeum Journal*, Volume-8, Issue-3, P.No: 1071-1076.
10. Jerin, C. M., Prasanna, T. A., Chandrasekhar, J. A., & Senthikumar, M. S. D. R. An Influence Of Yogic Practices On Selected Motorfitness Variable Among Men Kho-Kho Player. , *Journal - Xi'an University Of Architecture & Technology*, Vol: XII. Issue: IV, 2020. P.No: 2030 -2036J
11. R. Meera, Dr. R. Mohanakrishnan, Effect Of Comprehensive Yoga Practice On Selected Psychological Variable Among Women Students, *Journal - Xi'an University Of Architecture & Technology*, Vol: XII. Issue: Iv, 2020. P.No: 3248-3289
12. Pounraj, Consequence Of Jump Rope Training And Kettle Bell Training On Selected Agility And Muscular Strength Of College Men Badminton Players, *Journal –Xidian University*, Volume:14, Issues5, 2020, P.No: 664-669.
13. R. Mano Ranjith, Consequences Of Bulgarian Bag Training And Swiss Ball Training On Selected Explosive Power And Muscular

- Strength Of College Men Volleyball Players, Journal-
14. Meera A, R., Mohanakrishnan B, R., & Prasanna A, T. A. Effect of Comprehensive Yoga Practice on Selected Psychological Variable among Women Students. Journal -Xi An University Of Architecture & Technology, Volume-XII, Issue-IV, P. No: 3284-3289.
 15. Dr. T. Arunprasanna, A. Vidhya, D. Baskar, Dr. K. Usha Rani, Dr. M. Sundar, Dr. Soumya Joseph, Effect of Yogic Practices and Physical Exercise Training on Flexibility of Urban Boys Students, Journal-High Technology Letters, Volume-26, Issue-6, P.No:40-44.
 16. Dr. T. Arunprasanna, Relationship of Psychological variables in Volleyball, Journal-High Technology Letters, Volume-26, Issue-6, P.NO:304-312.
 17. Dr. T. Arunprasanna, Dr. R Mohanakrishnan, Analysis on Anthropometric Characteristics of Srms Ist Kabaddi Players, Journal-High Technology Letters, Volume-26, Issue-6, P.NO: 313-316.
 18. Dr. T. Arunprasanna, Dr. Y.C. Louis Raj, Effect of Pranayama and Yoga Nidra on Anxiety Self Confidence and Achievement Motivation In Kho-Kho, Journal-High Technology Letters, Volume-26, Issue-6, P.NO:317-326.
 19. Dr. T. Arun Prasanna, Dr. M. Senthil Kumar, Factor Structural Study On Athletic Coping Skills Among National Level Men Fencers In Kerala, Journal-High Technology Letters, Volume-26, Issue-6, P.NO:327-325.
 20. Dr. T. Arun Prasanna, Dr. D.J Asath Ali Khan, Quantification of Physical and Physiological Aspects of Acclimation to Altitude and Related Changes on Physical Education Training Colleges In Kerala, Journal-High Technology Letters, Volume-26, Issue-6, P.NO:385-390.
 21. Dr. T. Arun Prasanna, Dr. N.C. Jesusraj Kumar, Assessing Common Sports Injuries among Sportsmen in Kerala. Journal-High Technology Letters, Volume-26, Issue-6, P.NO:391-408.
 22. Dr. T. Arun Prasanna, Comparison on Selected Physical Fitness Variables Among Women Athletes During and After Menstruation, Journal-Xi'an University of Architecture & Technology, Volume-XII, Issue - VI, P.No:716-720.
 23. Dr. K. Vaithianathan, A Factor Structure Study on Selected Physical fitness Variables Of National Level Women Hockey Players In Kerala, Journal - Xidian University, Volume-14, Issue - 6, P.No: 1064-1072.
 24. Dr. T. Arun Prasanna, Dr. M. Sundar, Effect of Continuous Training and Interval Training on Selected Physiological Variables among Delhi University College Men Students, Journal - AEGAEUM JOURNAL, Volume-8, Issue - 16, P.No:304 - 316.
 25. Dr. T. Arun Prasanna, Dr. M. Sundar, Effect of Continuous Training and Interval Training on Selected Physical Variables among Delhi University College Men Students, Journal - AEGAEUM JOURNAL, Volume-8, Issue - 16, P.No:946 - 956.
 26. Dr. T. Arun Prasanna, Prof. S. Nagarajan, Dr. M. Sundar, Impact of Circuit Based Skill Training on Skill Performance of Men Footballers, Journal - Xidian University, Volume-XII, Issue - III, P.No: 2980-2985.
 27. Dr. S. Varalakshmy, Dr. T. Arun Prasanna, Dr. M. Sundar, Pounraj, R. Mano Ranjith, Dr. R. Senthil kumaran, Collision of Ballistic and Plyometric Training on Selected Explosive Power and Vital Capacity of College Men Volleyball Players, Journal-High Technology Letters, Volume-26, Issue-6, P.NO:593 -601.
 28. R. Mano Ranjith, Dr. T. Arun Prasanna, Dr. M. Sundar, Pounraj, Dr. S. Nagarajan, Coalesce Cause of Plyometric and Tabatta Training on Explosive Power And Endurance Among Men Volleyball Players, Journal- Proteus Journal, Volume-11, Issue-6, P.NO:130-139.
 29. Vaithianathan, K. Isolated and Combined Effect of Continuous Run Alternate Pace Run and Fartlek Training on Selected Motor Fitness Physiological and Hematological Variables among Alagappa University College Athletes.
 30. Breeze, S. R., & Senthilkumar, M. (2018). Effect of Fartlek Training on Explosive Strength among Inter-Collegiate Athletes. Ganesar College Of Arts and Science, 306.
 31. Kumaravelu, P., Devi, C. U., & Prasanna, T. A. (2022). Effect of Aerobic Training, Resistance Training and Concurrent Training on Selected biomotor Abilities. *Vegueta. Anuario de la Facultad de Geografía e Historia*, 22, 6.
 32. Devi, C. U., Saran Sakthivel, S., & Prasanna, T. A. IMPACT OF MOTOR FITNESS VARIABLES AND PLAYING ABILITY AMONG BASKETBALL MEN PLAYERS.