Impact of Aqua Resistance and Resistance Training on Selected Anthropometric Variables Among Basketball Players

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ABSTRACT

Background: the main aim of this research is to evaluate the effectiveness of Aqua resistance and resistance training packages and its impact on selected anthropometric variables among Basketball players.

Method: Therefore the purpose of the study is to investigate the Resistance and Aqua resistance training on arm span and hand span among men basketball players. The selected subjects (N=45) would be classified into three equal groups of fifteen each (n=15) at random, Age ranged between 15 to 17 years. Group-I undergo Resistance training, Group-II Aqua resistance training, and Group III act as control group.

Timeline: The resistance and aqua resistance training consisted of 60 min/day, 3 days in a week till twelve weeks from the Hyderabad, Telangana, India. Anthropometric variables completed of the both groups at zero time and after twelve weeks of aqua resistance and resistance training intervention group.

Results: The results on anthropometric variables of arm span and hand length of men basketball players produced significant changes.

Conclusion: The advantage of aqua resistance training group had shown significant improvement compared in all the other groups the selected anthropometric variables. Therefore effect of aqua resistance training and resistance training covered in this study is beneficial for the men basketball players.

Keywords: Aqua resistance training, Resistance Training, Anthropometric variables, Men Basketball players.

INTRODUCTION

Basketball is a team sport that comprises high levels of powerful physical attributes such as jumping and sprinting (**Schelling and TorresRonda, 2016**). The ability to perform such actions requires optimal combination of force and velocity, and therefore producing maximal power output which is a crucial determinant in basketball. Resistance training is broadly used to develop muscular strength and power (**Suchomel et al., 2018**).

Resistance and aqua resistance training should be an integral part of an adult fitness programmes and of a sufficient intensity to enhance strength, endurance, explosive power and maintain fat free mass resistance training should be progressive in nature, individualized and provide a stimulus to major muscle groups adding resistance training to programme of regular physical activity will help to decrease the risk of chronic diseases while improving quality of life and functionality, allowing people of all ages to improve and maintain their health, fitness and independent life style.

METHODOLOGY

The purpose of the study was to investigate the Aqua resistance and resistance training on arm span and hand span among men basketball players. The selected subjects (N=45) would be classified into three equal groups of fifteen each (n=15) at random, Age ranged between 15 to 17 years. Group-I undergo Resistance training, Group-II Aqua resistance training, and Group III act as control group. Data collection in this study was conducted following the Declaration of Helsinki and received approval from the University Ethics Committee.

Research design:

The study was formulated as a post-test only random group design. The duration of experimental period twelve weeks. After the experimental treatment, all the subjects were tested on anthropometric variables. The resistance and aqua resistance training consisted of 50 min/day, 3 days in a week till twelve weeks from the Hyderabad, Telangana, India. anthropometric variables completed of the both groups at zero time and after twelve weeks of aqua resistance and resistance training intervention group. Arm span measured by measuring tape, unit of measurement in centimeters. Hand span measured by measuring tape, unit of measurement in centimeters. Analysis of Co-variance was applied to determine the training programmes produced significantly different improvements in selected variables after twelve weeks of training. Since, the initial means were not matched, comparisons between actual could not be made, all means were adjusted by regression to a common mean. The significance on difference of pairs of adjusted final group means was tested for significance by applying Scheffe's post hoc test.

RESULTS AND DISCUSSION

Arm Span:

The analysis of paired sample-'t' test on the data obtained for the arm span of the pretest and post-test means of the resistance training group, aqua resistance training group and control group has been analyzed and presented in table-1.

Table – 1

Analysis of covariance of the data on arm span of pre, post and adjusted post test scores resistance training, aqua resistance training and control groups (centimeters)

Test	RTG	ARTG	CG	SOV	SS	Df	MS	F-ratio
Pre Test								
Mean	195.24	198.51	196.67	**B.M**	55.70	2	27.85	2.61
				W.G	448.14	42	10.67	
Post Test								

Mean	203.58	210.46	197.94	B.M	2386.66	2	1193.33	20.11*
				W.G	2492.28	42	59.34	
Adjusted Post Test								
Mean	203.64	210.82	198.01	B.S	2072.26	2	1036.13	19.62*
				W.S	2165.21	41	52.81	

significant at 0.05 level of confidence.
The table values required for significance at 0.05 level of confidence for 2 & 42 and 2 & 41 are 3.22 and 3.23 respectively.

The table-1 shows that the pre-test mean values on resistance training group, aqua resistance training group and control group are 195.24, 198.51 and 196.67 respectively. The obtained 'F' ratio 2.61 for pre-test scores was less than the table value, 3.22 for degrees of freedom 2 and 42 required for significance at 0.05 level of confidence on arm span. The post-test mean values on resistance training group, aqua resistance training group and control group are 203.58, 210.46 and 197.94 respectively. The obtained 'F' ratio 20.11 for post-test scores was greater than the table value 3.22 for degrees of freedom 2 and 42 required for significance at 0.05 level of confidence on arm span. The adjusted post-test means of resistance training group, aqua resistance training group and control group are 203.64, 210.82 and 198.01respectively. The obtained 'F' ratio of 19.62 for adjusted post-test means was greater than the table value of 3.23 for degrees of freedom 2 and 41 required for significance at 0.05 level of confidence on arm span. Since the obtained 'F' ratio value was significant find out the paired mean difference, the Scheffe's test was employed and presented in table-2.

Table – 2
The scheffe's test for the difference between paired means on arm span

RTG	ARTG	CG	MD	CI
203.64	210.82	-	**7.18***	
203.64	-	198.01	**6.83***	6.74
-	210.82	198.01	**12.81***	

*Significant at 0.05 level of confidence.

The table-2 shows that the mean difference values between resistance training group (RTG) & aqua resistance training group (ARTG), resistance training group (RTG) & control group (CG), aqua resistance training group (ARTG) & control group (CG) are 7.18, 6.83 and 12.81 respectively which are greater than the confidence interval value 6.74 at 0.05 level of confidence. The results of the study showed that there were a significant difference between resistance training group (RTG) & aqua resistance training group (ARTG), resistance training group (RTG) & control group (CG), aqua resistance training group (ARTG) & control group (CG) on arm span.
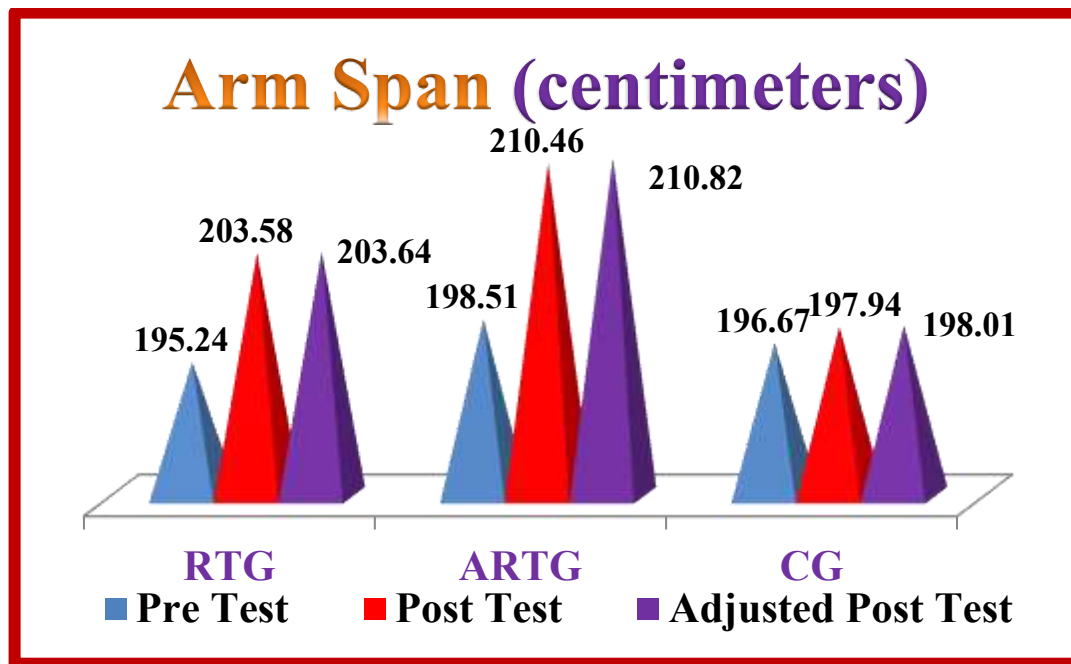
Figure 1: Pre, post and adjusted post-test means values of resistance training group (RTG), aqua resistance training group (ARTG) and control group (CG) on arm span.

Hand Span:

The analysis of paired sample-'t' test on the data obtained for the hand span of the pretest and post-test means of the resistance training group, aqua resistance training group and control group has been analyzed and presented in table-3.

Table – 3

Analysis of covariance of the data on hand span of pre, post and adjusted posttests scores resistance training, aqua resistance training and control groups (centimeters)

Test	RTG	ARTG	CG	SOV	SS	Df	MS	F-ratio
Pre Test								
Mean	26.43	27.05	26.89	**B.M**	23.36	2	11.68	0.57
				W.G	860.58	42	20.49	
Post Test								
Mean	29.97	32.49	26.95	**B.M**	706.66	2	353.33	**37.83***
				W.G	392.28	42	9.34	
Adjusted Post Test								
Mean	30.13	32.54	27.01	**B.S**	832.04	2	416.02	**39.21***
				W.S	435.01	41	10.61	

significant at 0.05 level of confidence.

The table values required for significance at 0.05 level of confidence for 2 & 42 and 2 & 41 are 3.22 and 3.23 respectively.

The table-3 shows that the pre-test mean values on resistance training group, aqua resistance training group and control group are 26.43, 27.05 and 26.89 respectively. The obtained 'F' ratio 0.57 for pre-test scores was less than the table value, 3.22 for degrees of freedom 2 and 42 required for significance at 0.05 level of confidence on hand span. The post-test mean values on resistance training group, aqua resistance training group and control group are 29.97, 32.49 and 26.95 respectively. The obtained 'F' ratio 37.83 for post-test scores was greater than the table value 3.22 for degrees of freedom 2 and 42 required for significance at 0.05 level of confidence on hand span. The adjusted post-test means of resistance training group, aqua resistance training group and control group are 30.13, 32.54 and 27.01 respectively. The obtained 'F' ratio of 39.21 for adjusted post-test means was greater than the table value of 3.23 for degrees of freedom 2 and 41 required for significance at 0.05 level of confidence on hand span. The result of the study indicates that there was a significant difference among the adjusted post-test means of resistance training group, aqua resistance training group and control group on hand span.

Since the obtained 'F' ratio value was significant further to find out the paired mean difference, the Scheffe's test was employed and presented in table-4.

Table – 4
The scheffe's test for the difference between paired means on hand span

RTG	ARTG	CG	MD	CI
30.13	32.54	-	**2.41***	
30.13	-	27.01	**3.12***	3.02
-	32.54	27.01	**5.53***	

*Significant at 0.05 level of confidence.

The table-4 shows that the mean difference values between resistance training group (RTG) & aqua resistance training group (ARTG), resistance training group (RTG) & control group (CG), aqua resistance training group (ARTG) & control group (CG) are 2.41, 3.12 and 5.53 respectively which are greater than the confidence interval value 3.02 at 0.05 level of confidence. The results of the study showed that there were a significant difference between resistance training group (RTG) & aqua resistance training group (ARTG), resistance training group (RTG) & control group (CG), aqua resistance training group (ARTG) & control group (CG) on hand span.
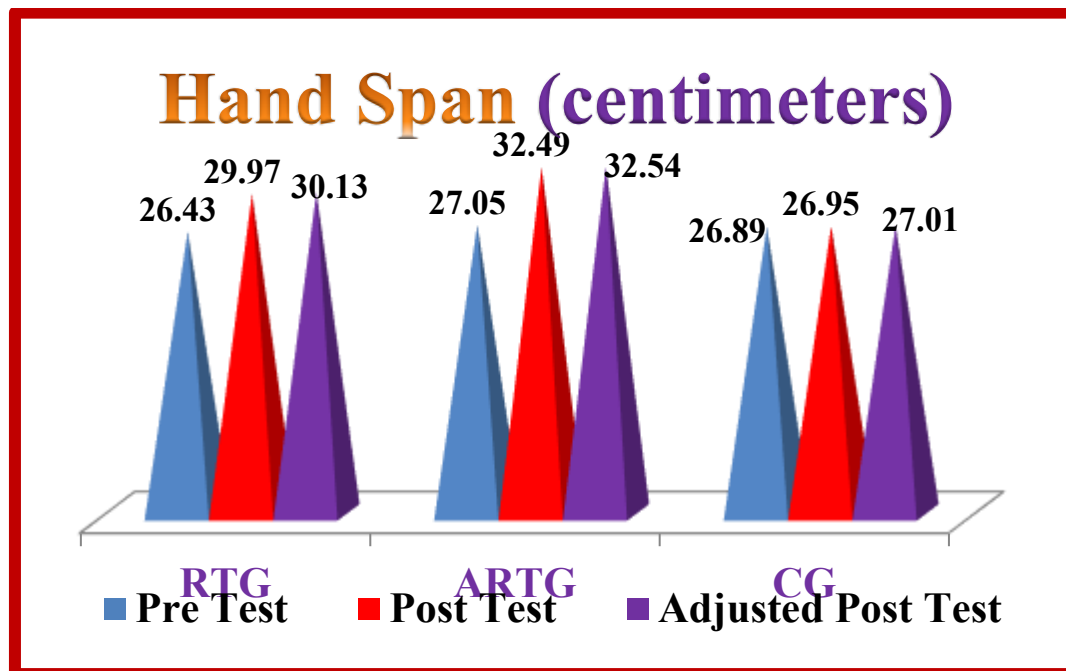
Figure-2: Pre, post and adjusted post-test means values of resistance training group (RTG), aqua resistance training group (ARTG) and control group (CG) on hand span.

Conclusions

The experimental group 'I' had shown significant improvement in all the selected anthropometric variables after undergoing the resistance training for a period of twelve weeks on Basketball players. The experimental group 'II' had shown significant improvement in all the selected anthropometric variables after undergoing the aqua resistance training for a period of twelve weeks on Basketball players. The experimental group 'I' had shown better result than the experimental group 'II' and control group.

References:

1. Mohmmad Chotemiya and vairavasundaram c (2023) Resistance and Aqua resistance training packages and its impact on selected corporeal variables among men Basketball players. *BioGecko - A Journal for New Zealand Herpetology, 12*(3), 175-182.
2. Mohmmad Chotemiya and vairavasundaram c (2023) Resistance and Aqua resistance training packages and its impact on selected functional variables among men Basketball players. *Corrosion and protection 51*(1), 476-487.
3. Mohmmad Chotemiya and vairavasundaram c (2023) Resistance and Aqua resistance training packages and its impact on selected kinanthropomtric variables among men Basketball players. *Journal of Data Acquisition and Processing Vol. 38* (2), 4199-4206.
4. L Chun (2023) Physical capacity of basketball players in resistance training. *Revista brasileira de medicina do esporte, 2.*
5. Xiong W (2023) Lower extremity resistance training in basketball players. *Revista Brasileira de Medicina do Esporte, 29.*
6. Mohmmad Chotemiya et.al., (2021) Effect of Resistance training on selected corporeal variables among Basketball players. *Indian Journal of Applied Research, Vol. (11)*, No.1, P.1-2.

7. Krčmár, M., Krčmárová, B., Bakaľár, I., & Šimonek, J. (2021). Acute performance enhancement following squats combined with elastic bands on short sprint and vertical jump height in female athletes. *Journal of Strength and Conditioning Research, 35(2)*, 318–324.

8. Mohmmad Chotemiya et.al., (2020) Isolated and Combined effect of Aqua and Resistance training on selected Physiological variables among men Basketball players. *XI'n University of Architecture and technology, Vol. (12)*, No. 7, P. 743-754.

9. Pichardo A et.al., (2021) Effects of Combined Resistance Training and Weightlifting on Injury Risk Factors and Resistance Training Skill of Adolescent Males. *Journal of Strength and Conditioning Research,35(12) 3370-3377.*

10. Matti Munukka (2020) Effects of progressive aquatic resistance training on symptoms and quality of life in women with knee osteoarthritis: A secondary analysis. *Scandinavian Journal of Medicine and Science in Sports, 30(6) 1064-1072.*

11. Arazi, H., Salek, L., Nikfal, E., Izadi, M., Tufano, J. J., Elliott, B. T., & Brughelli, M. (2020). Comparable endocrine and neuromuscular adaptations to variable vs. constant gravitydependent resistance training among young women. *Journal of Translational Medicine, 18(1)*, 239.

12. Katushabe, E. T., & Kramer, M. (2020). Effects of combined power band resistance training on sprint speed, agility, vertical jump height, and strength in collegiate soccer players. *International Journal of Exercise Science, 13(4),* 950–963.

13. John Wiley & Sons. Cormier, P., Freitas, T. T., Rubio-Arias, J., & Alcaraz, P. E. (2020). Complex and contrast training: does strength and power training sequence affect performance-based adaptations in team sports? a systematic review and meta-analysis. *Journal of Strength and Conditioning Research, 34(5),* 1461–1479.

14. Freitas, T. T., Calleja-González, J., Carlos-Vivas, J., Marín-Cascales, E., & Alcaraz, P. E. (2019). Short-term optimal load training vs a modified complex training in semi-professional basketball players. *Journal of Sports Sciences, 37(4),* 434–442.

15. Blazevich, A. J., & Babault, N. (2019). Post-activation potentiation versus post-activation performance enhancement in humans: historical perspective, underlying mechanisms, and current issues. *Frontiers in Physiology, 10*, 1359–1359.