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Impact of Plyometric Training and Resistance Training on Hemoglobin Levels

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Abstract: *The design of this investigation was to explore a plyometric training and resistance training on hemoglobin. A total of forty-five male handball athletes aged 18 to 22 years with pursuing their Bachelor's degree in the Kadapa district of Andhra Pradesh were randomly selected for the study, out of the forty-five (45) selected male athletes, Group–I (PTG) underwent Plyometric Training Group, Group–II (RTG) underwent Resistance Training Group, Group–III acted as Control Group (CG), who underwent the two different training programs for 12 weeks. Institutionally informed consent was taken from all the athletes of the present study. The results showed that the hemoglobin improved after training (P<0.05).*

Key Words: *Hemoglobin, Plyometric training, resistance training, Handball.*

1. INTRODUCTION:

Plyometric training is an exercise technique that includes specific exercises that encompass a rapid stretch of a muscle eccentrically followed immediately by a rapid concentric contraction of that muscle for the purpose of facilitating and developing a forceful explosive movement over a short period of time (1-2). Resistance training should be an important component of all fitness programs from more for strength and power athletes to more for individuals who exercise for the health benefits. Of course, athletes in sports requiring strength and power, such as weight lifting; bodybuilding and sprinting must emphasize resistance training. However, many other athletes also benefit from strength training, especially those in sports requiring a high level of muscular endurance (3-5). Hemoglobin refers to a protein, found in red blood cells, that is responsible for carrying oxygen from the lungs to all other tissues of the Body (6).

2. METHOD:

A total of forty-five male handball athletes aged 18 to 22 years with height (158-164 cm) and weight (62-65 kg) studying pursuing their Bachelor's degree in the Kadapa district of Andhra Pradesh were randomly selected for the study, out of the forty-five (45) selected male athletes, Group–I (PTG) underwent Plyometric Training Group, Group–II (RTG) underwent Resistance Training Group, Group–III acted as Control Group (CG), who underwent the two different training programs for 12 weeks. Institutionally informed consent was taken from all the athletes of the present study.

The physical fitness and Hematological variables selected in this study were Speed, Agility, Endurance, Hemoglobin (Hb), Red Blood Cell (RBC), White Blood Cell Count (WBC), and Platelets Count (PC). The data collected from the three groups before and after the experimental period on selected physical fitness and physiological variables were statistically analysed for the significant difference by employing covariance analysis (ANCOVA). For our interpretation, pre and post-test values were compared in the control and resistance groups, control and plyometric groups. The confidence level was fixed at 0.05 for significance as the number of subjects was limited. The selected variables might fluctuate due to various extraneous factors, as mentioned in the limitations. In addition, Scheffe's posthoc test was employed when the F ratio of adjusted post-test means was significant to find out the paired mean difference among the groups of each variable separately.

3. RESULT:

Analysis of Covariance for the Pre-Test, Post-Test, and Adjusted Post-Test Data on Hemoglobin of Plyometric Training, Resistance Training, and Control Groups (7-10) have been analyzed and presented in table 1.

Table 1: Computation of Analysis of Co-variance of Pre Test, Post Test and Adjusted Post Test on Hemoglobin of Different Experimental and Control Groups

Test/Group		PTG	RTG	CG	SOV	SS	df	MS	F Ratio
Pre-Test	$\bar{X}$	13.433	13.720	13.967	B	2.137	2	1.069	1.689
	σ	0.682	0.656	0.560	W	26.571	42	0.633	
Post-Test	$\bar{X}$	13.720	13.900	13.660	B	0.468	2	0.234	0.411
	σ	0.656	0.421	0.630	W	23.900	42	0.569	
Adjusted Post-Test	$\bar{X}$	13.577	13.810	13.813	B	0.350	2	0.175	0.300
					W	23.960	41	0.584	

*Significant at 0.05 level of confidence.
SD: Standard Deviation; SOV: Source of Variance; B: Between; W: Within.
(The Table value for significance at 0.05 level with df 2 and 42 is 3.220 and 2 and 41 is 3.226, respectively)

The table 1 show that the pre test mean values on hemoglobin of plyometric training (PTG), resistance training (RTG) and control groups were 13.433, 13.720 and 13.969 respectively. The obtained F ratio 1.689 for pre test scores was less than the table value of 3.220 for df 2 and 42 required for significance at 0.05 level of confidence on hemoglobin.

The post test mean values on plyometric training (PTG), resistance training (RTG) and control groups were 13.720, 13.900 and 13.660 respectively. The obtained F ratio of 0.411 for post test scores was less than the table value of 3.220 for df 2 and 42 required for significance at 0.05 level of confidence on hemoglobin.

The adjusted post test means on haemoglobin of plyometric training (PTG), resistance training (RTG) and control groups were 13.577, 13.810 and 13.813 respectively. The obtained F ratio of 0.300 for adjusted post test means was less than the table value of 3.226 for df 2 and 41 required for significance at 0.05 level of confidence on explosive power (vertical).

The results of the study indicated that there was a significant difference exists among the adjusted post test means of three groups, i.e. two training groups and a control group, Further, three groups were compared, whenever they obtained 'F' ratio for adjusted post was found to be significant, the Scheffe's test to find out the paired mean differences and it was presented in table 2.

Table 2: Scheffe's Post hoc Analysis for the differences between the Adjusted Post-Test Paired Means on Hemoglobin of Two Training and Control Groups

Adjusted Post-Test Means			Mean Difference	Required CI
PTG	RTG	CG		
13.577	13.810		0.233	0.154*
13.577		13.813	0.237	
	13.810	13.813	0.003	

*Significant at 0.05 level

Table 2 shows that the adjusted post test mean difference on explosive power (vertical) of plyometric training (I), resistance training group (II) and control group (III) are 0.233, 0.237 and 0.003 respectively. The mean difference between PTG and RTG is 0.233 and PTG and CG is 0.237, which are greater than the confidence interval value of 0.154 on hemoglobin at 0.05 level of confidence. Hence, the significance exists between groups I and II and I and III.

Further, the mean difference RTG and CG is 0.003, which is higher than the confidence interval value of 0.154 on hemoglobin at 0.05 level of confidence. Hence, the insignificance exists between groups II and III. The pre, post and adjusted post test mean values of plyometric training and resistance training and control groups on hemoglobin are graphically presented in figure 1.

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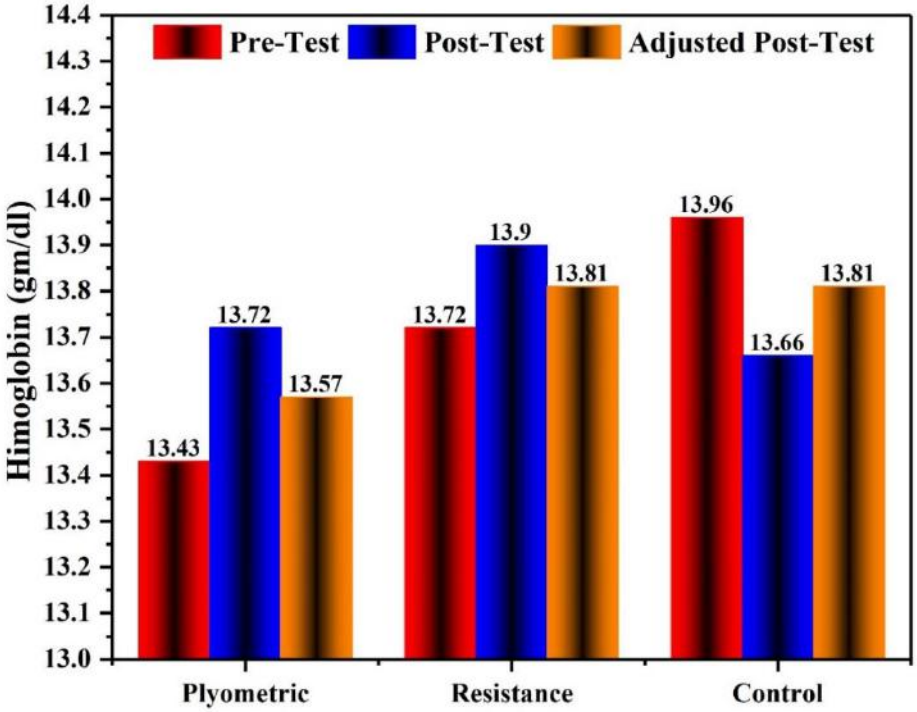

Figure 4.1. The pre-test, post-test, and adjusted post-test mean values of a combination of plyometric training, resistance training, and control groups on Hemoglobin.

4. CONCLUSION:

It was ended out of the outcome of the investigation proved such the plyometric training and resistance training has produced significant improvement on selected haematological variable Hemoglobin among handball players, when compared with other training groups and control group. Hemoglobin is greater in resistance training when compared with plyometric training, while, Hemoglobin is greater in plyometric training group when compared with control group.

REFERENCES:

1. Prentice, W. (1991). Fitness for College and Life, St. Louis: *Mosby Year Book*.
2. Boolani, A., Moghaddam, M., Fuller, D., Mondal, S., Sur, S., Martin, R., Kadry, A., Torad, A.A., Elwan, M.A. and Kakar, R.S. (2022): The Effects of Vision-Deprived Progressive Resistance Training on One-Repetition Maximum Bench Press Performance: An Exploratory Study. *Vision. 2022, 6, 47*.
3. Chimera, N.J., Kathleen A. Swanik, C. Buz Swanik, and Stephen J. Straub, (2004): Effects of Plyometric Training on Muscle-Activation Strategies and Performance in Female Athletes. *Journal of Athletic Training, 39,1*.
4. Francesco, F., Alessio, V., Stefania, C. and Gianpiero, G., (2018): Effects of Plyometric Training Program on Speed and Explosive Strength of Lower Limbs in Young Athletes. *Journal of Physical Education and Sport, 18(4), 2476 – 2482*.
5. Vega, J.M. (1993). The Effect of Two Groups of Plyometric Training in Improving Vertical Jump Ability in Female College Soccer Players. Completed Research in Health, *Physical Ekiucation, Recreation and Dance, 35*.
6. Mark S.N., Ingrid van de V., Niek van E. and Brad, M.J. (2007): Effects of circuit resistance training on fitness attributes and upper-extremity pain in middle-aged men with paraplegia. *Arch Phys Med Rehabil. 88(1),70-5*.
7. Nobuo T., Michael E. R., Mohammod M. I., Tomoko Y., Eiji W. and Akiyoshi O. (2004): Effect of concurrent aerobic and resistance circuit exercise training on fitness in older adults.", *European journal of applied physiology, 93(1-2),173-82*.
8. C Scott B., Jill S., Ed M., Fadia H., Gary A. D. and Gregory R. A. (1985): Time course of molecular responses of human skeletal muscle to acute bouts of resistance exercise. *Journal of applied physiology 98(2), 482-8*.
9. Blazevich A.J., and Jenkins D.G. (2002) "Effect of the movement speed of resistance training exercises on sprint and strength performance in concurrently training elite junior sprinters.", *Journal of sports sciences. 20(12), 981-90.*
10. Deschenes M.R., and Kraemer W.J. (2002): Performance and physiologic adaptations to resistance training. *American journal of physical medicine & rehabilitation. 81, S3-16.*