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RESEARCH ARTICLE

RELATIVE EFFECT OF RESISTANCE TRAINING AND WATER EXERCISE ON SELECTED PHYSICAL VARIABLES

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ABSTRACT

The purpose of the study was to find out the relative effect of resistance training and water exercise on selected physical variables. For this study 30 male students were selected randomly from Schools in Tirunelveli District at random. All the subjects were informed about the nature of the study and their consent was obtained to co-operate till the end of the experimental period. Their age varied 14 to 17 years. The selected subjects are divided into three groups (N=10) experimental group I (resistance training) experimental group II (water exercise) and control group. Shoulder strength, arm power, abdominal power and balance were selected as dependent variables, resistance training and water exercises were selected as independent variables for this study. Shoulder strength was measured through push up, arm power were tested through medicine ball throw test, abdominal power was tested through sit up and balance was measured through stroke stand test. The study was based on the groups pre test and post test design. The subject chosen for the study were divided into experimental and control groups of ten each at random. The data collected from the three groups were statistically analyzed for significance the analysis of covariance (ANCOVA) was significant, 0.05 levels of significance was fixed. Whenever the obtained F-ratio found to be significant, the Scheffe's test was used as Post hoc test to find out the paired mean difference. It was concluded that, there was significant improvement on selected physical variables such as shoulder strength, arm power, abdominal power, balance due to resistance training and water exercise. It also concluded that, there was significant difference among resistance training, water exercise and control groups in the improvement of selected physical variables such as shoulder strength, arm power, abdominal power and balance.

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INTRODUCTION

The term resistance training refers to a specific method of physical conditioning that involves the use of a wide range of resistive loads and a variety of training modalities (e.g., free weights, weight machines, elastic cords, medicine balls, and body weight) (Faigenbaum, 2003). It is recognized that youth resistance training can be a safe, effective, and beneficial method of conditioning and should be an important component of youth fitness programs, health promotion objectives, and injury prevention. Resistance training may have multiple physiological benefits for youth may provide enjoyment and positive attitude toward lifetime physical activity, and may promote adherence to regular exercise among children and adolescents (Faigenbaum, 2003 and Faigenbaum, Kraemer, Cahill, Chandler, Dziados, Elfrink, Forman, and Roberts, 1996).

Water training introduces new exercise variables such as buoyancy, water resistance, and heat exchange between your body and water that may add to the benefits you get out of exercising in water. Training in water makes a great aerobic workout that helps put your body in the fat burning zone fast helping your burn fat like a fat burning machine. It may be your best bet to getting stronger muscles (Martin Nicholson, 2014). When exercise intensity was matched to cardio respiratory responses, muscle activity was approximately 70% lower during both forward and backward walking in water, compared with land walking, in younger and older participants.

Despite this difference, cardiovascular intensity was similar in both environments. It is thought that in water, the arms moving through the water's resistance may contribute to higher cardio overload. Slower walking speeds (approximately 57% lower)—caused by water's buoyancy and resistance—could also decrease muscle activation in the pool (Mercedes de Onis, Parasmani Dasgupta, Syamal Saha, Debasis Sengupta and Monika Blössner, 2001).

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Purpose of the Study

The purpose of the study was to find out the relative effect of resistance training and water exercise on selected physical variables.

MATERIALS AND METHODS

For this study 30 male students were selected randomly from Schools in Tirunelveli District at random. All the subjects were informed about the nature of the study and their consent was obtained to co-operate till the end of the experimental period. Their age varied 14 to 17 years. The selected subjects is divided in to three groups (N=10) experimental group I (resistance training) experimental group II (water exercise) and control group.

Whenever the obtained F-ratio found to be significant, the Scheffe's test was used as Post hoc test to find out the paired mean difference.

Analysis of Data

RESULTS AND DISCUSSION

The result of study indicates that there was significant improvements on selected physical variables namely shoulder strength, arm power, abdominal power and balance due to the effect of resistance training and water exercise when compared to the control group. It was also conclude that there was significant difference on selected physical variables namely shoulder strength, arm power, abdominal power and balance among resistance training, water exercise and control groups.

Table 1. Analysis of covariance (ancova) on selected physical variables of experimental and control groups

| Variables | Adjusted post test Means | | | Source of variance | Sum of squares | df | Mean square | F - ratio |
|-------------------|---------------------------|----------------------|---------------|--------------------|----------------|----|-------------|-----------|
| | Resistance Training Group | Water Exercise Group | Control group | | | | | |
| Shoulder Strength | 6.64 | 7.80 | 9.36 | Between | 13.81 | 2 | 6.90 | 14.57* |
| | 6.64 | 7.80 | 9.36 | Within | 12.32 | 26 | .474 | |
| Arm Power | 1.57 | 1.71 | 1.88 | Between | 0.20 | 2 | 0.10 | 22.10* |
| | 1.57 | 1.71 | 1.88 | Within | 0.12 | 26 | 0.01 | |
| Abdominal Power | 13.47 | 14.80 | 14.23 | Between | 8.79 | 2 | 4.39 | 18.95* |
| | 13.47 | 14.80 | 14.23 | Within | 6.03 | 26 | 0.23 | |
| Balance | 18.21 | 20.16 | 21.73 | Between | 34.684 | 2 | 17.342 | 24.66* |
| | 18.21 | 20.16 | 21.73 | Within | 18.282 | 26 | 0.703 | |

* Significant at 0.05 level. (The table value required for significance at 0.05 level with df 2 and 26 is 3.37).

Table 2. Scheffe's test for the differences between adjusted post test means on selected variables

| Variables | Mean | | | Mean Difference | Confidence Interval |
|-------------------|---------------------------|----------------------|---------------|-----------------|---------------------|
| | Resistance Training Group | Water Exercise Group | Control group | | |
| Shoulder Strength | 6.64 | 7.80 | --- | 1.16* | 0.80 |
| | 6.64 | --- | 9.36 | 2.72* | 0.80 |
| | --- | 7.80 | 9.36 | 1.56* | 0.80 |
| Arm Power | 1.57 | 1.71 | --- | 0.14* | 0.12 |
| | 1.57 | --- | 1.88 | 0.31* | 0.12 |
| | -- | 1.71 | 1.88 | 0.17* | 0.12 |
| Abdominal Power | 13.47 | 14.80 | -- | 1.33* | 0.56 |
| | 13.47 | --- | 14.23 | 0.79* | 0.56 |
| | --- | 14.80 | 14.23 | 0.57* | 0.56 |
| Balance | 18.21 | 20.16 | -- | 1.95* | 0.97 |
| | 18.21 | -- | 21.73 | 3.52* | 0.97 |
| | -- | 20.16 | 21.73 | 1.57* | 0.97 |

*Significant at .05 level.

The physical variables such as shoulder strength, arm power, abdominal power and balance were selected as dependent variables, resistance training and water exercises were selected as independent variables for this study. Shoulder strength was measured through push up, arm power were tested through medicine ball throw test, abdominal power was tested through sit up and balances was measured through stroke stand test. The study was based on the groups pre test and post test design. The subject chosen for the study were divided into experimental and control groups of ten each at random. The data collected from the three groups were statistically analyzed for significance the analysis of covariance (ANCOVA) was significances, 0.05 levels of significances was fixed.

The result of the present study was in accordance with the many of the research findings. Almost every study revealed an increase in muscular strength, power muscular endurance, flexibility and jumping ability due to resistance training and aquatic training compared with other training (Faigenbaum, Westcott, Loud, and Long, 1999). Improvements in the experimental subjects' strength and balance were not surprising. The resistance training system has been found effective for improving the muscular strength and endurance of adults (Falk & Tenenbaum, 1996). The relative effect of resistance and water to be effective for improving the muscular fitness of college age adults (Martin Nicholson, 2014). Also, previous research has shown that resistance training can be

Mean Values On Selected Variables among Experimental and Control Groups

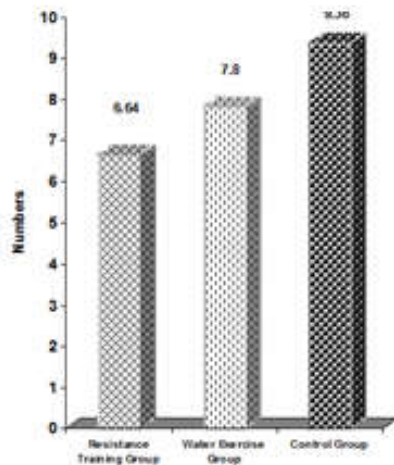


FIGURE I: MEAN VALUES ON SHOULDER STRENGTH AMONG EXPERIMENTAL AND CONTROL GROUPS.

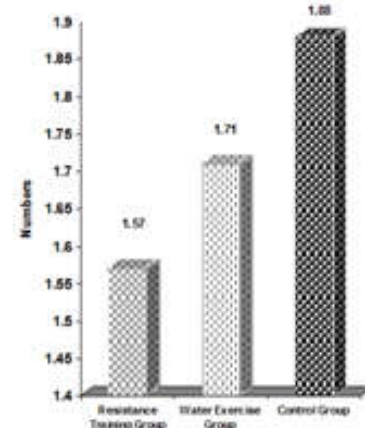


FIGURE II: MEAN VALUES ON ARM POWER AMONG EXPERIMENTAL AND CONTROL GROUPS.

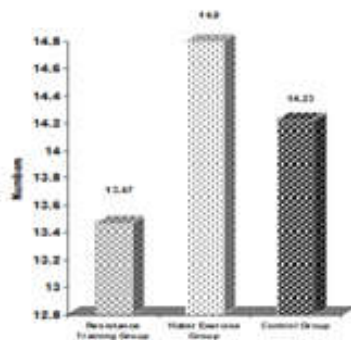


FIGURE III: MEAN VALUES ON ABDOMINAL POWER AMONG EXPERIMENTAL AND CONTROL GROUPS.

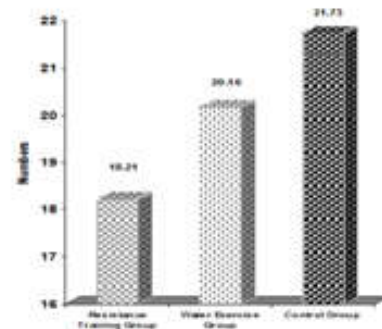


FIGURE IV: MEAN VALUES ON BALANCE AMONG EXPERIMENTAL AND CONTROL GROUPS.

effective for increasing the strength of children and adolescents (Faigenbaum, 2003 and Faigenbaum, Kraemer, Cahill, Chandler, Dziados, Elfrink, Forman and Roberts, 1996). The greater gains experienced by the experimental subjects of the present study are likely due to the increased demands of the added resistance training. Similar to adults, previous research has suggested that children and adolescents may have a training threshold to overcome to improve abdominal power (Myung Dong Choi and Robert Hickner, 2007). The aquatic training group showed significant improvement in all the selected physical fitness variables. Aquatic-based exercise intervention, the resistive properties of water provided a resistive stimulus regardless of whether specific resistance training exercises are prescribed. An aquatic-based exercise demonstrated positive alterations in lower body strength (Evans, Cureton, and Purvis, 1978). Likely, the Control subjects that participated in regular classes did not receive adequate stimuli to reach these threshold levels; whereas the added resistance program was sufficient to surpass the threshold necessary for strength gains in the experimental subjects. A possible explanation for the slight strength increase observed in the Control group may be due to an exercise learning effect. All subjects may have shown some improvements due to learning and thus better execution of the Fitnessgram testing protocols across the tests.

However, any learning effects were likely to have occurred similarly for all three groups; therefore, the significantly greater improvements of the experimental groups are probably due to genuine physical and musculoskeletal adaptations (Gappmaier, Lake, Nelson and Fisher, 2006). It is inferred from the literature and from the result of the present study. That systematically designed training develops dependent variables are very importance quilts for better performance in almost all sports and games. Hence it is concluded that systematically designed resistance and water exercise may be given due recognition and implemented properly in the training programs of all the discipline in order to achieve maximum performance.

Conclusion

From the result of the study the following conclusion were drawn

- There was significant improvement on selected physical variables such as shoulder strength, arm power, abdominal power and balance due to resistance training and water exercise.
- There was significant difference among resistance training, water exercise and control groups on the improvement of

selected physical variables such as shoulder strength, arm power, abdominal power and balance.

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