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Investigation Of Effect Of Training On Orientation And Reaction Ability Of Children With Hearing Impairments

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Abstract:

The purpose of study was to find out effect of exercise training plan on Orientation and Reaction Ability of children with hearing impairments. 40 boys (treatment group) and 40 participants for control group from school for special children's, Gwalior having age group of 11 to 14 years were randomly selected. The subjects have approximately had a similar kind of lifestyle off the ground also in the terms of diet, sleeping time and hours, daily curriculum related activities, as they resided in campus hostels and shared common mess. All the subjects were informed about the objective of the study. It was hypothesized that there will be significant difference in mean scores at different time points at regular intervals of two weeks at which data was collected from the participants in terms of their Orientation and Reaction Ability. The specific coordinative abilities were measured with appropriate test, Orientation Ability- Medicine Ball Run Test, Reaction Ability - Ball Reaction Exercise Test. To maintain the validity and reliability, valid and reliable test items were used. Pre -Data for the study was collected and after that the data was collected at different duration as per training of 0-week, 2-week, 4 week, 6 and 8 weeks repeatedly. To find out the effect of training program. Repeated measure ANOVA was used as statistical technique to find out the significant difference. To test the hypothesis, the level of significance was set at 0.05. It was concluded that training group significantly improved their performance in orientation and reaction ability tests.

Keywords: Rhythmic ability, explosive strength, agility, sprint at given run test, Sargent jump, shuttle run test

Introduction:

Human being is a combination of the body and mind. Both components through their combinations make him more successful. The physical expiration total depends upon mental process and mental process depends upon CNS coordinative. Expression is skillfully interwoven in the mechanism of the whole man and his totality in no case should be made to suffer by separating mental and physical aspects. (Essays, November, 2018)

A high level of physical fitness is attractive and beneficial for productive life. Inactive living propensities and poor physical wellness negatively affect both wellbeing and day by day living. (Uppal, 1999)

Motor development is primarily concerned with making human movements. The term motor is derived from the relationship of a nerve or nerve fiber to the one that connects the Central Nervous System with muscles through their convections the movements results. Effective motor movement can only results if there is harmonious working of the muscular and the nervous system. A comprehensive list of components of motor ability for performance of various physical activities (including sports) include muscular strength, muscular endurance, muscular power, cardiovascular endurance (alternatively also known as cardiopulmonary endurance), agility, speed, balance, flexibility, reaction time, coordinative (eye-foot coordinative, eye-hand coordinative, whole-body coordinative). In addition, traits like simple motor response, reflexes, Sensory input and awareness of space and tempo (characteristic speed and rhythm of movement) are also considered important in motor performance- ability especially during the early years of body development. Speed, like strength and endurance is a conditional ability. It has a complex nature as it depends to a considerable extent on the working of central nervous system, because we can influence the functioning of central nervous system only up to certain extent, therefore, speed performances cannot be improved to a considerable extent as in the case of strength and endurance. Speed is an ability which primarily executes the motor movements at faster rate. Types of movement can be either cyclic or acyclic. It was well defined by Schnabel as “it is the performance prerequisite to do motor actions under given. conditions (movement task, external factors, individual prerequisites) in minimum of time”. From general point of view we can have five types of speed abilities: reactions ability, acceleration ability, locomotion ability, movement speed, and speed endurance.

Generally in games, notwithstanding portability, the coordinative capacities quality, perseverance, speed capacities and sacred conditions are the requirements for developing high athletic performance. Beginning from an abnormal state of coordinative capacities, competitors can learn and improve athletic engine capacities and procedures that are required for the particular game more quickly and with a higher degree of quality. (Hartmann et al., 2002).

There are seven co-ordinative abilities identified. These are:

1) Orientation Ability, (2) Differentiation Ability, (3) Coupling Ability, (4) Adaptation Ability, (5) Rhythm Ability, (6) Balance ability and (7) Reaction Ability.

Physical disability, as per the Department of Social Welfare, Government of India, incorporates disability brought about by inherent irregularity, weaknesses brought about by sicknesses and debilitation from different causes. Accordingly, physical inability isn't really something that is physically forced, perceived or caused or just showed physically or mentally, nor it is an appearance or breakdown.

Types of disability: Human disability condition may broadly be classified into seven categories.

- Mental retardation.
- Emotional disturbances.
- Hearing impairments.
- Visually handicapped.
- Physically / orthopedically handicapped.
- Communication disability and Learning disability.

Hearing Impairment among children in many condition may impact the coordinative abilities and they need special attention to this issue. Pone of the means to the enhancement of co-coordinative abilities among children with hearing impaired is through physical training. It may be noticed that many past researches have undertaken the research problem and have tried to solve the same from various experiments. A number of studies have been conducted in this area focussing upon various age groups, training methods, different tests to check the effect of treatment.

Alesi.M.et al. (2016) investigated the effect of football training program on the various coordinative abilities of deaf and dumb children and found that football group at post-test showed significantly larger gains than the sedentary group on measures of agility, visuo-spatial working memory, attention, planning and inhibition. Findings shed light on the issue to plan structured sport activities as a natural and enjoyable way to improve cognitive skills. Ghonsa, 2014 conducted a study to compare the selected physical fitness components between deaf & dumb and normal school boys of west Bengal. Endurance and agility did not difference significantly deaf and dumps and normal boys but the normal boys performed significantly better strength. The deaf and dump boys were found to be better in terms of explosive leg strength. **C. Sukumaran.et al. (2014) in an study found that the physical exercises significantly improved the performance in terms of balance of intellectually disabled children as compared to their controlled counterparts in the study.**

The purpose of study was to find out effect of exercise training plan on Orientation and Reaction Ability of children with hearing impairments.

Methodology

For the purpose of study 40 boys (treatment group) were selected from the School for Special Children Gwalior. The age ranged from 11 to 14 years. The subjects had almost similar kind of lifestyle. The subjects were similar nature in terms of diet, sleeping time and, daily curriculum-related activities, all the subjects were residents inside the campus.

The data on selected test items were collected from Government school for special children's Gwalior, Before the testing program, the researcher assembled all the subjects together to brief them about the nature, modalities and objectives of the present

investigation and demonstrate them various test so that they could have the mental picture of the various tests in which they are going to perform.pri data for the study was collected and after that the data was collected at different duration as per training 0 weeks, 2 weeks, 4weeks , 6 weeks, 8 weeks, repeatedly. To find out the effect of training program on the special children.

EXRERIMENTAL DESIGN

Time series design was used for the purpose of the study. The design is depicted as follows:

T1 --- 2TD --- T2 --- 4TD --- T3 --- 6TD --- T4---8TD---T5

T1: Test 1 before implementation of training program.

2TD: 2 weeks training program duration.

T2: Test 2 after 2 weeks training program.

4TD: 4 weeks training program duration.

T3: Test 3 after 4 weeks training program.

6TD: 6 weeks training program duration.

T4: Test 4 after 6 weeks training program.

8TD: 8 weeks training program duration.

T5: Test 5 after 8 weeks training program.

The time series design had only one group to experiment. The data was collected before implementation of the training program (T1) and after completion of (T2)2 weeks training program (T3), 4 weeks training program (T4), 6 weeks training program (T5),8 weeks training program.

	Factor 1; Training Duration				
Treatment1	**0 week**	**2 week**	**4 week**	**6 week**	**8 week**
	S1 to S 40	**S1 to S 40**	**S1 to S 40**	**S1 to S 40**	**S1 to S 40**

The training session lasted for 40 minutes per training day (Monday, Wednesday, and Friday) for the experimental group. The training program was scheduled in the afternoon from 2.00 am to 2.40 am for the experimental group.

The details of the training program are as follows:

- The total training program duration was eight weeks.
- Three days a week training session.

- The training session was 30-40 minutes/day for the experimental group.

Procedure for Measuring the Orientation Ability - Medicine balls run test-1

Objective: The test was administered to assess the Orientation ability of the Subjects.

Equipment's required: 5 medicine balls each weighing 3kg, one medicine ball weighing 4 kg Stopwatch, 5 metallic numbered plates, Clapper, Pencils, papers, and clipboard.

Description of the test: All the medicine balls weighing 3kg were prearranged on leveled ground in a semi-circle. The sixth medicine ball weighing 4kg were kept 3m away from these medicine balls. Behind all the medicine balls of 3kg weight, metallic number plates of 1 square foot size, were kept from 1 to 5, before the start of the test the subjects were asked to stand behind the sixth medicine ball facing towards the opposite direction. On the signal, the subject turned and ran towards the particular ball number called by the tester and touched the medicine ball and ran towards the sixth medicine ball following which another number was called immediately. A total of three numbers were called by the tester and the subjects performed accordingly without any break in between. Before the actual test was administered, one practice trial was given to all the subjects.

Scoring: The time taken to complete the course was noted in seconds. Two trials were given to each subject and the best one was recorded as the score.

Procedure for Measuring the Reaction Ability - Ball reaction ability test-2

Objective: This test was administered to measure the Reaction ability of the Subjects.

Equipments: Two wooden planks (each of 4m length), one inflated volleyball, one supporting stand, Pencils, Papers and Clip Boards.

Description of the Test: Two wooden planks of 4m each were kept inclined by a supporting stand having a height of one meter and twenty centimeters, so that it could be enable volleyball to roll freely from a height of 1.20 m. The lower ends of the wooden planks were kept at a distance of 1.5m away from the starting line, outer sides of one of the planks was marked in centimeters. The Volleyball was held by the tester at the top of the plank. The subjects will be asked to stand behind the starting line, facing opposite to the planks. On clapping, the subjects took a turn and ran towards the planks and stopped the ball with both hands which was dropped on the signal. Each subject was given a practice trial before actual commencement of the Test.

Scoring: The score was distance measured in centimeters from the top of the planks to a point where the subject will stop the ball. Only two trails were given and the best one will be recorded as the score of the subject.

To compare the effects of various training duration of exercise on coordinative abilities, one way repeated measure ANOVA test was used as statistical technique. To describe the characteristics of the data, simple descriptive statistics was used. SPSS version 20 was used to apply the statistical technique and the level of significance was set at 0.05.

TABLE 1 DESCRIPTIVE STATISTICS OF SCORES OF ORIENTATION ABILITY AT SELECTED TIME POINTS

Exp. Treatments	Mean	Std. Deviation	N
Test 1(Zero week)	8.08	.92	38
Test 2Two week)	7.97	.73	38
Test 3(Five week)	7.62	.87	38
Test 4(six week)	7.87	.84	38
Test 5(Eight week)	7.55	.81	38

Table 10 reveals the descriptive statistics for Orientation Ability of all the experimental treatments of five levels of time duration.

The mean and standard deviation of all the experimental treatments of five levels of time duration i.e. Test 1, Test 2, Test 3, Test 4 and Test 5 were 8.08±.92, 7.97±.73, 7.62±.87, 7.87±.84 and 7.55±.81 respectively.

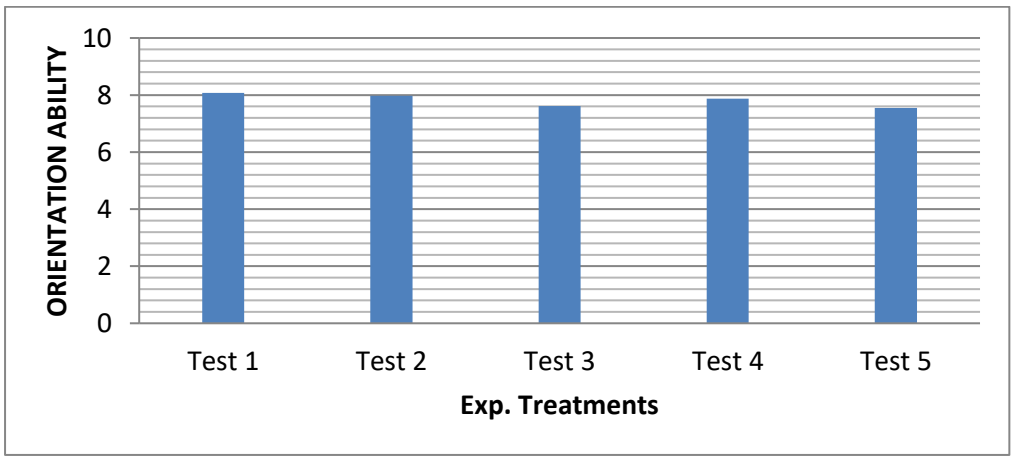

Figure 1: Graphical representation of mean scores of orientation ability at the selected time points

TABLE 2 ANOVA (REPEATED MEASURE) TABLE FOR ORIENTATION ABILITY AMONG DIFFERENT LEVELS OF TIME DURATION

Source (Sphericity Assumed)	Type III Sum of Squares	Df	Mean Square	F	p-value	Partial Eta Squared
Time	**7.982**	**4**	**1.995**	**3.515**	**.009**	**.087**
Error (Time)	**84.013**	**148**	**.568**			

***Significant at 0.05 level**

Table 11 reveals that the obtained p-value .009 is lesser than .05, thus indicating that, the significant difference was found among the various levels of time duration.

As the F value 3.515 was found significant, Post-Hoc test was applied and pair-wise mean comparisons of the different levels of time duration were computed and shown in table below:

TABLE 3 POST-HOC TEST FOR PAIRWISE COMPARISONS OF DIFFERENT LEVELS OF TIME DURATIONS FOR ORIENTATION ABILITY

Test 1	Test 2	Test 3	Test 4	Test 5	Mean Difference	p-value
8.08	**7.97**				**.105**	**.467**
8.08		**7.62**			**.463***	**.008**
8.08			**7.87**		**.205**	**.212**
8.08				**7.55**	**.533***	**.010**
	7.97	**7.62**			**.358***	**.020**
	7.97		**7.87**		**.100**	**.485**
	7.97			**7.55**	**.427***	**.022**
		7.62	**7.87**		**-.258**	**.126**
		7.62		**7.55**	**.070**	**.748**
			7.87	**7.55**	**.328**	**.109**

***Significant at 0.05 level**

Table 12 depicts that the obtained p-value (.008, .010, .020 and .022) of various pairs i.e. Test 1 & Test 3, Test 1 & Test 5, Test 2 & Test 3 and Test 2 & Test 5 were lesser than .05, thus indicating that, significant difference was found between them at .05 level of significance.

On the other hand the obtained p-value of all other pair were higher than .05, thus indicating that, no significant difference was found between all other pairs at .05 level of significance.

TABLE 4 DESCRIPTIVE STATISTICS OF SCORES REACTION ABILITY AT SELECTED TIME POINTS.

Exp. Treatments	Mean	Std. Deviation	N
Test 1(Zero week)	2.1383	.46538	38
Test 2(Two week)	2.0807	.41919	38
Test 3(Five week)	2.0104	.38691	38
Test 4(six week)	1.9721	.40395	38
Test 5(eight week)	2.1174	.69622	38

Table 13 reveals the descriptive statistics for Reaction Ability of all the experimental treatments of five levels of time duration.

The mean and standard deviation of all the experimental treatments of five levels of time duration i.e. Test 1, Test 2, Test 3, Test 4 and Test 5 were 2.13±.46, 2.08±.41, 2.01±.38, 1.97±.40 and 2.11±.69 respectively.

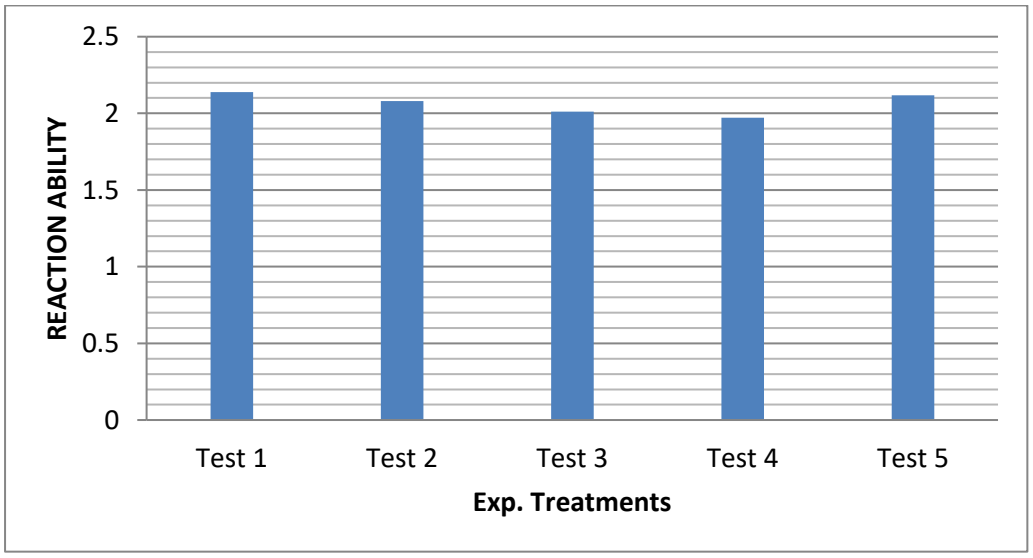

Figure 2: Graphical representation of mean scores of reaction ability at the selected time point.

TABLE 5 ANOVA (REPEATED MEASURE) TABLE FOR REACTION ABILITY AMONG DIFFERENT LEVELS OF TIME DURATION

Source (Greenhouse-Geisser)	Type III Sum of Squares	Df	Mean Square	F	p-value	Partial Eta Squared
Time	**.759**	**2.317**	**.327**	**1.064**	**.357**	**.028**
Error (Time)	**26.371**	**85.745**	**.308**			

***Significant at 0.05 level**

Table 14 reveals that the obtained p-value .357 is higher than .05, thus indicating that, no significant difference was found among the various levels of time duration.

Discussion of Findings

Findings of Orientation Ability

1. It was found from findings of the study that the mean of 0 week (pre-test), 2 week, 4 week, 6 week and 8 week on Orientation Ability were 8.0834, 7.7047, 7.6205, 7.4784, and 6.9511, for Experimental Group. The obtained P value .000 was less than .05. Hence, thus indicating that there was a significant difference at 0.05 level of significance in terms of outcome variable (Orientation ability), and the value of Eta square (.234) also indicating that the 23.4 % variability were shown by different time duration in Orientation ability.
2. The results of the study revealed that there is significant difference in the orientation ability of the participants during the training protocol and there is a significant difference is the orientation ability in last observation as compared to other observation from baseline (**Alesi. M. et. al. , 2016)**.
3. One of the issues faced by the deaf and dumb children in the program is that improvement in orientation program may be attributed to the particular movement patterns designed in accordance with group games, Ball games, Passing, catching and touching etc. These movements helped the participants to move in various directions and get challenges in orientation in relation to other stationery or moving objects.
4. The orientation ability of the participants got improved in the 1^{st} time point to 4^{th} time point, i.e. between 0 weeks to 6^{th} weeks, and in the 2^{nd} time point to 5^{th} time point, i.e. between 2^{nd} weeks to 8^{th} week, and in the 3^{rd} time point to 5^{th} time point, i.e. between 4^{th} weeks and 8^{th} weeks. It may be concluded that the orientation ability may take longer duration of training as it is evident by result.
5. Orientation ability also may require longer duration due to the reason that .the neuro muscular system and reception of signal may require to be in fine tuning at lower levels in body. Further of the orientation ability continues to improve or not.

Findings of Reaction Ability

1. It was found from findings of the study that the mean of 0 weeks (pre-test), 2 weeks, 4 weeks, 6 weeks and 8 weeks on Reaction Ability were 190.3421, 169.9474, 160.5000, 156.3684, and 144.3947, for Experimental Group. The obtained P value .00 was lesser than.05. Hence, thus indicating that there was significant difference at 0.05 level of significance in terms of outcome variable (Reaction ability), and the value of Eta square (.901) also indicating that the 90.1 % variability were shown by different time duration in Reaction ability.
2. The reaction ability was not found to be significantly affected due to the training program **(Alesi. M. et.al., 2016, Kharki .S.et al., 2015)**. The lack of significant difference may be attributed to the less sample size. The lack of training program duration may also be a reason for the insignificant difference in the training program the reaction ability drills were program with limitation i.e. there were many reaction drills based on only visual were used.
3. The lack of drills based on the acoustic signals led to limitation of neurological mechanism of development the reaction ability increases due to decrease in activity of synapse reception of signals in axon etc. The deaf and dumb participants could not be given such type of training.
4. The reaction ability although showed constant improvement among the participants due to physical training, But the change in performance was not found to statistically significant. Reaction ability helps in the effective and timely action when needed.
5. Reaction ability also in the initiation of quick response when needed in the game or normal life situation. The reaction ability is required for successful living because in real life situation there are conditions when one needs to have quick responses and have to take decisions in flight or fight situations. There are kinds of activities which can be performed to improve the reaction ability.
6. It is evident that reaction ability improved at 2nd time point 3rd time point, 4th time point, and 5th time point, as compared to other time points. It may concluded that reaction ability although improves at a greater rate initially but rate of improvement may get slower with the passing of time .It may be investigated that if the rate of improvement can be maintained by adding new exercise or adding other strategies

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