

# Efficacy of Selected Mobility Exercises and Participation in Special Games on Psychomotor Abilities, Functional Abilities and Game Performance among Intellectually Disabled Children of Under 14 Age

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**Abstract**—The purpose of the study was to find out the efficacy of selected mobility exercises and participation in special games on psychomotor abilities, functional abilities and skill performance among intellectually disabled children of age group under 14. Thirty male students who were studying in Balar Kalvi Nilayam and YMCA College Special School, Chennai, acted as subjects for the study. They were only mild and moderate in intellectual disability. These students did not undergo any special training or coaching programme apart from their regular routine physical activity classes as a part of the curriculum in the school. They were attached at random, based on age in which 30 belonged to under 14 age group, which was divided into three equal group of ten for each experimental treatment. 10 students (Treatment group I) underwent calisthenics and special games participation, 10 students (Treatment group II) underwent aquatics and special games participation, 10 students (Treatment group III) underwent yoga and special games participation. The subjects were tested on selected criterion variables prior (pre test) and after twelve weeks of training (post test). The pre and post test data collected from three groups on functional abilities (self care, learning, capacity for independent living), psychomotor variables (static balance, eye hand coordination, simple reaction time test) and skill performance (bocce skill, badminton skill, table tennis skill) were statistically examined for significant difference, by applying the analysis ANACOVA. Whenever an 'F' ratio for adjusted test was found to be significant for adjusted post test means, Scheffe's test was followed as a post-hoc test to determine which of the paired mean differences was significant. The result of the study showed that among under 14 age groups there was a significant improvement on selected criterion variables such as, Balance, Coordination, self-care and learning and also in Bocce, Badminton & Table Tennis skill performance, due to mobility exercises and participation in special games. However there were no significant differences among the groups.

**Keywords**—Functional ability, intellectually disabled, Mobility exercises, Psychomotor ability.

## I. INTRODUCTION

**M**OBILITY Exercise is an integral aspect of human life. Our daily lives are sustained and enriched when we are physically active and adapt active healthful life styles that will continue throughout the life span. The emphasis on fitness,

wellness and health promotion through active living is highly sought now days.

Physical Activity is for everybody. Exercise is a key factor in maintaining and improving overall health. In 1996, the Surgeon General of the United States reported that "significant health benefits can be obtained with a moderate amount of physical activity, preferably daily." These benefits are even more important in a disability, since people with disabilities have a tendency to live less active lifestyles. Yet, it is just as important for our body to get exercise. Physical activity and exercise programs of all sorts are indoor and outdoor, sports or recreational, solitary or team. It doesn't matter what we choose, so long as we choose to get a moderate amount of physical activity each day.

Mobility exercise in the context of the study includes calisthenics exercise, Aquatic exercise and Yogasana (Dynamic).

## II. REVIEWS

Ilker Yilmaz et al. (2009) analyzed the effects of Water Exercises and Swimming on Physical Fitness of Children with Mental Retardation. The purpose of this study was to determine the effects of water exercises and swimming on physical fitness of children with mental retardation. Nine trainable and 7 educable male children ( $n = 16$ ) were recruited from a rehabilitation centre. The mean ages of the groups were  $12.22 \pm 0.49$  and  $14.71 \pm 0.52$  years, respectively. Training program was applied for 10-week, two times a week for 40 minute each session. Pre- and post-test measurements were taken for cardiovascular endurance, muscle endurance, speed, static balance, and agility. Results showed that both groups improved significantly ( $p < 0.05$ ) in all dependent variables. Water exercises and swimming appear to be a viable and effective way to improve physical fitness capacity of the children with mental retardation.

Case-Smith (1996) conducted a study on fine motor outcomes in preschool children who receive occupational therapy services. This study examined preschool children's acquisition of fine motor skills and functional performance when occupational therapy services are included as part of the educational program. It also investigated the relationships among fine motor skills and functional performance in self-care, mobility, and social function Method. Twenty-six

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preschool children who received weekly occupational therapy were studied. Measurements of their in-hand manipulation, tool use, eye-hand coordination, grasping strength, and functional performance in self-care, mobility, and social function were taken at the beginning and end of the school year. Results: Raw and scaled scores showed significant improvements in all skill areas; standard scores showed slight improvement in eye-hand coordination and mobility function. Correlations of the motor skill tests with the functional performance scales using year-end data revealed significant correlations for in-hand manipulation, eye-hand coordination, and grasping strength with self-care function and mobility. Conclusions: The results demonstrated the level of change that occurred in fine motor skill and self-care, mobility, and social function during the course of the school year for preschoolers with moderate fine motor delays. The relationships found in the year-end testing imply that performance in underlying fine motor skills as the focus of occupational therapy intervention is associated with self-care and mobility function.[7]

### III. RATIONALE FOR THE SELECTION OF THE STUDY

It is evident from literature that very few studies have been attempted to find out the efficacy of calisthenics, yoga and aquatics along with special game participation to the disabled children. Hence, the investigator was interested in conducting a study to find out the effects of mobility exercises such as calisthenics, aquatics and yoga along with special game participation to the disabled children. The investigator, a Assistant Professor in YMCA College of physical education observes the day today activities of the disabled children studying in YMCA special school, which is situated inside the college campus and adjacent to his residing quarters. This observation initiated him to take up the study.

### IV. METHODOLOGY

To achieve the purpose of the study, thirty male students who were studying in Balar Kalvi Nilayam and YMCA College Special School, Chennai, acted as subjects. They were only mild and moderate in intellectual disability. These students did not undergo any special training or coaching programme apart from their regular routine physical activity classes as a part of the curriculum in the school.

The study was formulated as a true random group design consisting of a pre test and post test. The subjects (n=30) were randomly assigned to three equal groups of ten each.

The groups were assigned as Treatment group I, Treatment group II and Treatment group III respectively. The Treatment group I underwent calisthenics and special games participation, Treatment II underwent aquatics [13] and special games participation and Treatment group III underwent yoga and special games participation.[6] [18] [19] [20]

Psychomotor abilities such as balance,[4] [5] coordination and reaction time are the variables selected for the study. Self-care, learning and capacity for independent living were

selected as variables of functional ability. Skill performance in special games such as bocce, badminton and table tennis [14] were selected as game performance variables for the study. The treatment groups underwent the programme three days a week for a period of twelve weeks with forty five minutes per session. The subjects in all the three groups were tested on selected criterion variables prior (pretest) and after twelve weeks of training (posttest). [3]

The pre and post test data collected from the three groups on functional abilities (self-care, learning, capacity for independent living), psychomotor variables (static balance, eye hand coordination, simple reaction time test) [8] and skill performance ( bocce skill, badminton skill, table tennis skill ) were statistically examined for significant difference, by applying the analysis of covariance (ANACOVA).

Whenever an 'F' ratio for adjusted test was found to be significant for adjusted posttest means, Scheffe's test was followed as a post-hoc test to determine which of the paired mean differences was significant.

't' ratio was computed for finding out significant improvement due to training on psychomotor abilities, functional abilities and skill performance of bocce, badminton, Table tennis.

### V. CRITERION MEASURES

The following variables were selected as the criterion measures in this study

1. Balance was measured by using Stork stand test.[15]
2. Coordination was measured by using The basic motor ability Test.
3. Reaction time was measured by using Electronic reaction time tester.[1] [10]
4. Functional ability was measured by using Functional ability rating scale (FARS).[2]
5. Bocce skill performance was measured by using Bocce skill Test.
6. Badminton skill performance was measured by using Badminton skill Test.
7. Table Tennis skill performance was measured by using Table Tennis skill Test.

### VI. RESULTS AND DISCUSSIONS

The influence of independent variable on each criterion variable was analysed and presented below

Table I, shows the obtained 'F' ratio values of the selected variables such as balance, coordination, reaction time, self-care, learning, capacity for independent living, Skill performance in special games such as bocce, badminton and table tennis as 0.614, 0.176, 0.192, 0.446, 0.467, 0.262, 0.791, 1.177 and 1.595 respectively and these values are lesser than the required table value of 3.37 for significance at 0.05 level. It reveals that there is no significant difference among experimental groups.

Table II reveals that for calisthenics group the obtained 't' ratio of balance, learning, Bocce, Badminton and Table

Tennis are 3.214, 2.667, 3.645, 4.364 and 7.965 respectively which are greater than the required table value of 2.26 for significance with df 9 at 0.05 level of confidence. The result of the study showed that there was a significant improvement on selected criterion variables such as, Balance, learning, Bocce, Badminton, Table Tennis skill performance due to calisthenics exercises. However these were no significant differences among the groups.

Table II reveals that for aquatic group the obtained 't' ratio of Balance, Self care, Bocce, Table Tennis 5.127, 2.423, 6.199, and 6.601 respectively which are greater than the required table value of 2.26 for significance with df 9 at 0.05 level of confidence. The result of the study showed that there was a significant improvement on selected criterion variables such as, Balance, self care, Bocce, Table Tennis skill performance due to aquatic exercises. However these were no significant differences among the groups. Table II reveals that for yogasana group, the obtained 't' ratio of Coordination, self care, learning, Bocce and Table and Tennis skill performance are 2.86, 2.785, 2.264, 9.064 and 4.221 respectively are greater than the required table value 2.26 for significance with df 9 at 0.05 level of confidence. The result of the study showed that there was a significant improvement on selected criterion variables such as, Coordination, self care, learning,[16] Bocce, Table Tennis skill performance due to yogasana(dynamic). However there were no significant differences among the groups.

## VII. DISCUSSION ON FINDINGS

The result of the study showed that there was a significant improvement on selected criterion variables such as, Balance, learning, Bocce, Badminton and Table Tennis skill performance of under14 age group due to calisthenics exercises. However, there was no significant difference among the groups

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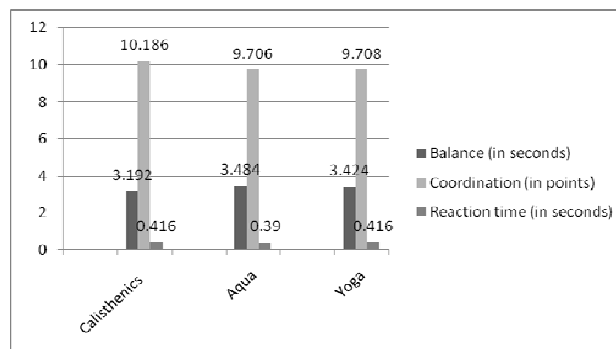


Fig. 1 The adjusted post test values of under 14 age calisthenics treatment group, aquatics treatment group, and yoga treatment group on balance, coordination and reaction time

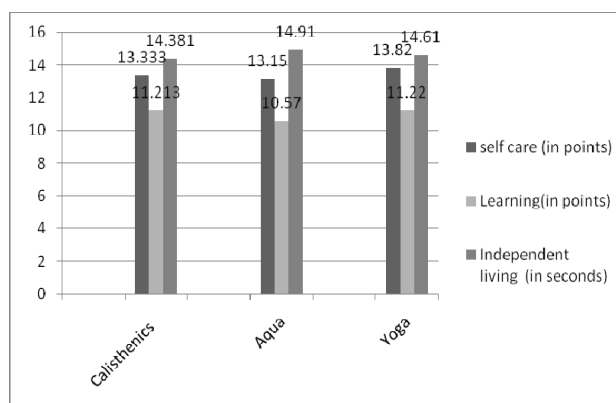


Fig. 2 The adjusted post test values of under 14 age calisthenics treatment group, aquatics treatment group and yoga treatment group on self care, learning and independent living

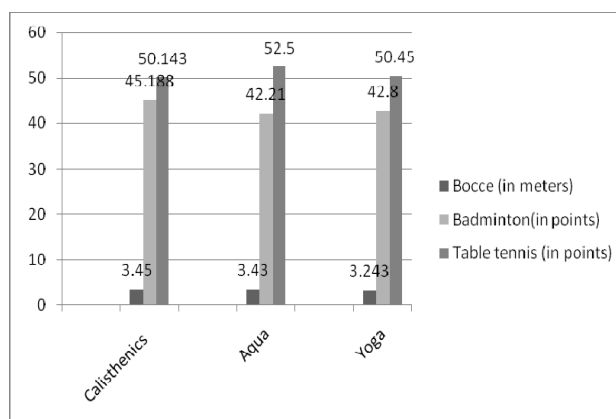


Fig. 3 The adjusted post test values of under 14 age calisthenics treatment group, aquatics treatment group and yoga treatment group on Bocce, Badminton, Table tennis skill performance

TABLE I  
ANALYSIS OF COVARIANCE FOR PRE AND POST TESTS DATA ON PSYCHOMOTOR ABILITIES, FUNCTIONAL ABILITIES AND GAME PERFORMANCE AMONG  
EXPERIMENTAL GROUPS OF UNDER-14 YEARS CATEGORY

Test	variables	calisthenics	aqua	Yoga	source of variance	sum of squares	df	Mean squares	F' Ratio
Adjusted Posttest mean	Balance	3.192	3.484	3.424	Between	0.462	2	0.231	0.614
					within	9.785	26	0.376	
Adjusted Posttest Mean	Coordination	10.186	9.706	9.708	Between	1.461	2	0.731	0.176
					within	108.025	26	4.155	
Adjusted Posttest Mean	Reaction time	0.416	0.39	0.416	Between	0.005	2	0.002	0.192
					within	0.315	26	0.012	
Adjusted Posttest Mean	Self-care	13.333	13.15	13.82	Between	2.351	2	1.175	0.446
					within	68.55	26	2.637	
Adjusted Posttest Mean	Learning	11.213	10.57	11.22	Between	2.661	2	1.33	0.467
					within	74.056	26	2.848	
Adjusted Posttest Mean	Independent living	14.381	14.91	14.61	Between	1.362	2	0.681	0.262
					within	67.563	26	2.599	
Adjusted Posttest Mean	Bocce	3.45	3.43	3.243	Between	0.249	2	0.125	0.791
					within	4.102	26	0.158	
Adjusted Posttest Mean	Badminton	45.188	42.21	42.8	Between	48.936	2	24.468	1.177
					within	540.707	26	20.796	
Adjusted Post test Mean	Table Tennis	50.143	52.5	50.45	Between	29.022	2	14.511	
					within	236.526	26	9.097	1.595

\* Significant at 0.05 level.

TABLE II  
COMPUTATION OF MEAN GAINS ('T' RATIO) FOR PSYCHOMOTOR ABILITIES, FUNCTIONAL ABILITIES AND SKILL PERFORMANCE OF CALISTHENICS,  
AQUATICS AND YOGASANA TREATMENT GROUPS OF UNDER 14 AGE

Variables	Treatment group-I	Treatment group-II	Treatment group-III
	Calisthenics T' test	Aquatics T' test	Yogasana T' test
Balance	3.214*	5.127*	1.38
Coordination	1.835	1.316	2.86*
Reaction time	0.509	1.21	2.079
Self care	0.859	2.423*	2.785*
Learning	2.667*	0.688	2.264*
Independent living	1.113	1.406	0.921
Bocce	3.645*	6.199*	9.064*
Badminton	4.364*	1.382	2.054
Table Tennis	7.965*	6.601*	4.221*

\* Significant at 0.05 level.

### VIII. CONCLUSION

Based on the results of the study, the following conclusions were drawn.

There was significant improvement on selected criterion variables such as, Balance, Learning, Bocce, Badminton and Table Tennis skill performance of under14 age group due to calisthenics exercises. However there were no significant differences among the groups.

There was a significant improvement on selected criterion variables such as, Balance, self care, Bocce and Table Tennis skill performance of under14 age group due to aquatics exercises. However there were no significant differences among the groups.

There was a significant improvement on selected criterion variables such as, Coordination, self care, learning, Bocce, Table Tennis skill performance of under14 age group due to yogasana(dynamic). However there were no significant differences among the groups.

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