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Effect of eight weeks yoga training on balance and hand eye coordination of individuals with intellectual disabilities

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Abstract
Persons with intellectual disabilities seem to have deficits like as balance and hand eye coordination respectively. Now, it is an accepted fact that, all the persons, whether they are disabled or not, have to equal right to live a healthy life with dignity. The purpose of the study was to find out the effect of eight weeks yoga training on balance and hand eye coordination of individuals with intellectual disabilities. Thirty mild intellectual disabled boys (IQ=51-69) who were attending the Special Education at Special Education Unit, Faculty of (NISH) National Institute of Speech & Hearing, Trivandrum, kerala were selected for this study. Their age ranged from 12 to 16 years. The selected subjects were equally divided into two groups. The groups were assigned as Experimental Group: yoga training group (YTG) and Control Group (CG). Pre-test was conducted on balance and hand eye coordination for both groups. The readings were carefully recorded in their respective unit as pre-test score. After pre-test experimental group has under gone eight weeks yoga training for one hour per day 5 days per week, whereas the control group (CG) maintained their daily routine activities and no special training was given during this eight weeks. After eight weeks of training post test was conducted and the readings were carefully recorded as post test score. To analyse the collected data ANCOVA (Analysis of Covariance) was used. The study concluded that the yoga training group showed significant difference on balance and hand eye coordination.

Keywords: yoga training, balance, hand eye coordination, individuals with intellectual disabilities

Introduction
Persons with intellectual disabilities seem to have deficits like as balance and hand eye coordination respectively. Now, it is an accepted fact that, all the persons, whether they are disabled or not, have to equal right to live a healthy life with dignity. Yoga plays a vital role to develop physical, mental, and cognitive functions of normal person; it is proved by various scientific researches.Yoga is useful in combating learning disorders, ADHD, and mental retardation (Bhavani, Madanmohan, & Udupa, 2003) [3]. Telles & Naveen (1997) [7] has proved that the yoga for rehabilitation has diverse applications. Yoga practice has benefited mentally handicapped subjects by improving their mental ability and also the motor co-ordination and social skills. "Yoga is a holistic way of life leading to a state of complete physical, social, mental, and spiritual well-being and harmony with nature" (Taneja 2014) [9].

Nowadays awareness about the problems and uniqueness of the differently abled has included in all the areas of education including research. The government has also initiated many programmes for the betterment of the differently abled population. The child, whether average or mentally retarded must be brought up in a congenial environment where all the materials and conditions for his/her growth can stimulate his effective functioning. There is a need to identify & induce the talent of person with intellectual disability and also make them to mingle with normal children in the society. The person with intellectual disability may look alike in physical appearance but they differ from normal children on physical & mental health and cognitive functioning. In order to know the effect of eight weeks yoga training on balance and hand eye coordination the investigator has selected this research topic.

Methodology
Selection of Subjects
To achieve the purpose of the study, thirty students with mild intellectual disability (n = 30, boys, IQ = 51- 69) who were attending the Special Education Unit were included in this recommendation, as indicated by their diagnosis in their medical record and by their IQ score. Their age ranged from 12 to 16 years. The consent of their parents was obtained.

Selection of Variable
Independent variables
Yoga training

Dependent variables
1. Balance
2. Hand Eye Coordination

Experimental Design
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 two equal groups of fifteen each. The groups were assigned as Experimental Group: Yoga Training Group (YTG) and Control Group (CG). Pre-test was conducted on selected variables such as balance and hand eye coordination for both groups. The readings were carefully

recorded in their respective unit as pre-test score. After pre-test experimental group has under gone eight weeks yoga training one hour per day 5 days per week, whereas the control group (CG) maintained their daily routine activities and no special training was given during this eight weeks. After eight weeks of training post test was conducted and the reading were carefully recorded as post test score.

Table 1: Criterion Measures

S1.No	Variables	Test Items	Unit of Measurements
1	Balance	Stork stand	Seconds
2	Hand Eye Coordination	Mirror tracing board	Number of errors

List of Asana and Pranayama

Surya Namaskar, Tadasana, Trikonasana, Eerabhadrasana, Bhujangasana, Padahasthasana Paschimottasana, Padmasana, Pavanamu khtasana, Vrkshaasana, Shalbhasana, Vajrasana, Dhanurasana, Vipareetakarani mudra, Sarvangasana, Halasana, Naukasana, Shavasana Makarasana, bhastrika pranayama, Nadhi sudhii, Nadhi Sodhana, kaplbhathi, meditation.

Level of Significance

The probability level, below which we reject the hypothesis, is termed as the level of significance. The F-ratio obtained by analysis of covariance need for significance is at the 0.05 level.

Computation of Analysis of Covariance

The following tables illustrate the statistical result of the effect of eight weeks yoga training on selected variables of individuals with intellectual disabilities.

Table 2: Computation of analysis of covariance of experimental group and control group on balance

Test	Adapted Physical Activities Group	Control group	Source of variance	Sum of square	DF	Mean square	F-ratio
Pre-test	6.66	6.60	BG	0.033	1	0.033	0.04
			WG	22.93	28	0.819	
Post-test	7.80	6.66	BG	9.63	1	9.63	10.48*
			WG	25.73	28	0.91	
Adjusted Post-test	7.77	6.69	BG	8.65	1	8.65	28.19*
			WG	8.29	27	0.307	

BG-Between group means *Significant
WG-within Group Means (Table value for 0.05 Level for DF 1 & 28 = 4.196)
DF- Degrees of Freedom (Table value for 0.05 Level for DF1 & 27 = 4.210)

Results on Balance

An examination of table II indicates that the results of ANCOVA for pre-test scores of the yoga training group and control group. The obtained F-ratio for the pre-test is 0.04 (P>0.05) indicating that the random sampling is successful and the table F-ratio is 4.196. Hence the pre-test mean F-ratio is insignificant at 0.05 level of confidence for the degree of freedom 1 and 28.The obtained F-ratio for the post-test is 10.48 (P>0.05) and the table F-ratio is 4.196. Hence the post-test mean F-ratio is significant at 0.05 level of confidence for the degree of freedom 1 and 28.

The adjusted post-test means of yoga training group and control group are 7.77 and 6.69 respectively. The obtained F-ratio for the adjusted post-test means is 28.19 (P<0.05) and the table F-ratio is 4.210. Hence the adjusted post-test mean balance F-ratio is significant at 0.05 level of confidence for the degree of freedom 1 and 27.

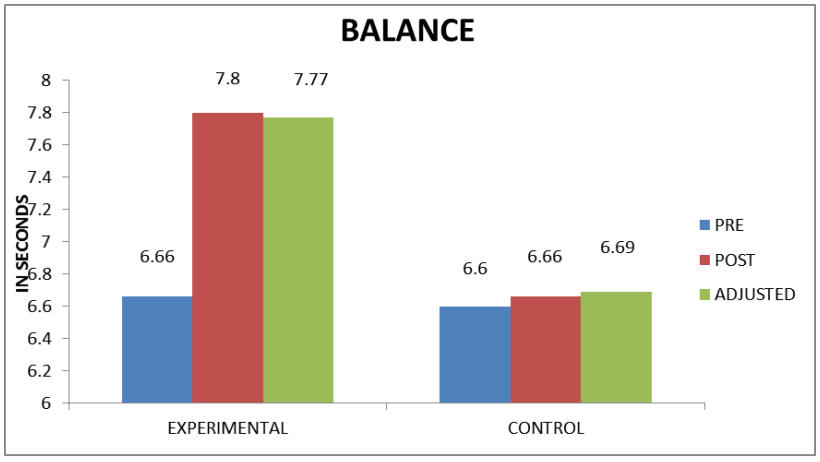

Fig 1: Bar diagram showing the mean values of pre-test, post-test and adjusted post test on balance of yoga training group and control group

Table 3: Computation of analysis of covariance of experimental group and control group on hand eye coordination

Test	Experimental Group	Control Group	Source of Variance	Sum of Squares	DF	Mean Squares	F-ratio
Pre-Test Means	47.27	47.93	BG	3.33	1	3.33	0.11
			WG	837.87	28	29.92	
Post-Test Means	42.80	47.60	BG	172.80	1	172.80	6.171*
			WG	784.00	28	28.00	
Adjusted Post-Test Means	43.11	47.29	BG	130.71	1	130.71	53.14*
			WG	66.41	27	2.46	

BG-Between group means *Significant
WG- within Group Means (Table value for 0.05 Level for df 1 & 28 = 4.196)
df- Degrees of Freedom (Table value for 0.05 Level for df 1 & 27 = 4.210)

Results on Hand Eye Coordination

An examination of table III indicates that the results of ANCOVA for pre-test scores of the yoga training group and control group. The obtained F-ratio for the pre-test is 0.11 (P>0.05) indicating that the random sampling is successful and the table F-ratio is 4.19. Hence the pre-test mean F-ratio is insignificant at 0.05 level of confidence for the degree of freedom 1 and 28.The obtained F-ratio for the post-test is 6.171(P>0.05) and the table F-ratio is 4.19. Hence the post-test mean F-ratio is significant at 0.05 level of confidence for the degree of freedom 1 and 28.

The adjusted post-test means of experimental and control group are 43.11 and 47.29 respectively. The obtained F-ratio for the adjusted post-test means is 53.14 (P<0.05) and the table F-ratio is 4.21. Hence the adjusted post-test mean balance F-ratio is significant at 0.05 level of confidence for the degree of freedom 1 and 27.

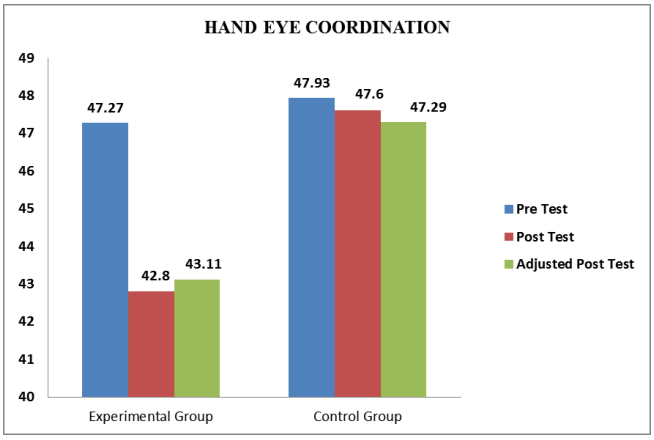

Fig 2: Bar diagram showing the mean values of pre-test, post-test and adjusted post-test on hand eye coordination of experimental group and control group

Discussion on Findings

The purpose of the present investigation was to find out the effect of eight weeks yoga training programme on balance and hand eye co-ordination of individuals with intellectual disabilities.

Balance

In the present study, the results validate that eight weeks yoga training group (YTG) showed significant improvement on balance from baseline to post treatment. When comparing the overall result of the study, the yoga training group (YTG) showed significant improvement on balance than the control group. The present study also confirms that the yoga training was the superior training model to develop balance among individuals with intellectual disabilities.

Hand Eye Coordination

In the present study, the results validate that eight weeks yoga training group (YTG) showed significant improvement on hand eye coordination from baseline to post treatment. When comparing the overall result of the study, the yoga training group (YTG) showed significant improvement on hand eye coordination than the control group. The present study also confirms that the yoga training is the superior training model to develop hand eye coordination among individuals with intellectual disabilities.

Conclusions

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

1. Within the limitations and on the basis of the findings of the study, it was very clear that eight weeks of yoga training produced significant changes on balance and hand eye coordination of individuals with intellectual disabilities.
2. It was also concluded that the control group did not show any significant difference on balance and hand eye coordinationof individuals with intellectual disabilities.
3. Further, it was inferred that yoga training programme appears to be a safe and practical intervention tool for improving balance and hand eye coordination of individuals with intellectual disabilities.

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