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Effect of Vyaghra Pranayama and Kaki mudra Pranayama on Vital Lung capacity and Neuro motor co-ordination among Special children

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Abstract

Introduction: *According to the American association on intellectual and developmental disabilities (AAIDD), Intellectual disability is a developmental condition identified by significant deficits in adaptive behaviour and intellectual functioning, commencing before the age of 22[1]. Nearly 2.5% to 3% of children are considered as children with intellectual difficulties [2]. Special children need guidance from others for daily activities and they lack quick learning, fine motor abilities, grip strength etc., [2].*

Aim: *To study the effect of Vyaghra Pranayama and Kaki mudra Pranayama on Vital lung capacity and Neuro motor co-ordination among special children.*

Materials and Methods: *This experimental study was conducted in a workshop at Vethathri Maharishi College of Yoga, Chennai, Tamilnadu from 1st February 2026 to 10th February 2026. Six special children with different special needs were chosen for the study and the pre_test and post_tests were taken accordingly. The intervention was given for 20 minutes every day for duration of 10 days. Vital lung capacity was measured using balloon diameter testing graph and Neuro motor co-ordination was measured through Auditory and Reaction time testing online tools.*

Results*:The findings indicated that special children who received the intervention showed significant improvement in Vital lung capacity and significant reduced Reaction times. Single group paired t-test was taken accordingly with (p value < 0.05) for Vital lung capacity and (p value < 0.005) for Visual Reaction time.*

Conclusion: *Vyaghra Pranayama and kaki mudra Pranayama were effective in increasing the Vital lung capacity and reducing the Reaction time in Special children.*

Key Words**: Vyaghra pranayama, kaki mudra pranayama, Auditory Reaction time (ART), Visual Reaction time (VRT), Vital lung capacity, Neuro motor co-ordination.**

1. INTRODUCTION

Children with special needs are especially those who are intellectually impaired, commonly exhibit deficits in hand eye co-ordination, fine motor co-ordination, grip strength. Such impairments are commonly observed in around 2.5% to 3% children who are considered as children with intellectual difficulties [2].

Additionally special children are often characterized by slower reaction times (RT), reflecting challenges in neuro-motor coordination and central nervous system processing, [3]. This makes it difficult for them to perform day-to-day activities. Pranayama has been widely accepted as an effective yogic practice for enhancing various parameters like physical, cognitive, and psychomotor abilities in general children. However, despite its proven benefits, there is comparatively limited research highlighting the systematic approach of pranayama practices for special children [2]. In this context, incorporating animal-inspired pranayama practices such as *Vyaghra Pranayama* and *Kaki Mudra Pranayama* may offer a more accessible and engaging approach, enabling better understanding, imitation, and sustained participation among special children.

1.1 Vital Lung Capacity

According to the National Institute of Health, "Vital capacity (VC) refers to the maximal volume of air that can be expired following maximum inspiration [5]. An increase in vital lung capacity signifies improved respiratory health and enhanced physical performance measured through balloon measuring system [4].

1.2 Neuro muscular co-ordination

"Neuro-motor coordination refers to the **integrated functioning of the nervous system and muscular system**, enabling smooth, accurate, and purposeful movement through effective sensory input, neural processing, and motor output" [6]. It is measured through Auditory Reaction Time(ART) and Visual Reaction Time (VRT).

1.3 Vyaghra Pranayama

Vyaghra Pranayama is a breathing practice resembling the stretching of a tiger in which inhalation is co-ordinated with extension of spine and exhalation is co-ordinated with retention of the spine. The benefits are it helps to ease and loosen the hip joints and legs and stretches the abdominal muscles, promotes digestion and stimulates blood circulation [7].

1.4 Kaki Mudra pranayama (Crow's beak pranayama)

Kaki Mudra pranayama is a yogic mudra that includes nasikagra drishti which is to gaze on nasi, the nose tip without blinking the eyes and pursing the lips together like a crow's beak, during inhalation and exhalation, [8].

2. Methodology: The study is experimental in nature with pre and post tests.

2.1 Population

Special children around the age of 18 - 21 who had down syndrome and were slow learners from a special children workshop conducted at Vethathri Maharishi College of Yoga in Tamil Nadu were chosen for the study. Six children were chosen through convenient sampling.

2.2 Tool used for the Study

Balloon diameter testing graph to measure vital lung capacity against the diameter of the balloon blown. Auditory and Visual Reaction Time testing online tool which measures how quickly a participant responds to a stimulus (a sound cue and a visual colour flash) by recording the time between the onset sound and the user's
click or key press providing an estimate of auditory and visual processing with respect to motor response.

A group of 6 special children were chosen for the study to measure the effect of Vyaghra Pranayama and Kaki Mudra Pranayama and the pre- and post-tests were measured accordingly. Vyaghra Pranayama was given for 10 counts, 3 rounds with relaxation of 30 seconds between each round and 5 minutes of relaxation at the end of the practice, with a total intervention time of 10 minutes. Kaki Mudra Pranayama was given for 10 counts, 3 rounds with 15 seconds of relaxation between each round. This was with a total intervention time of 10 minutes.

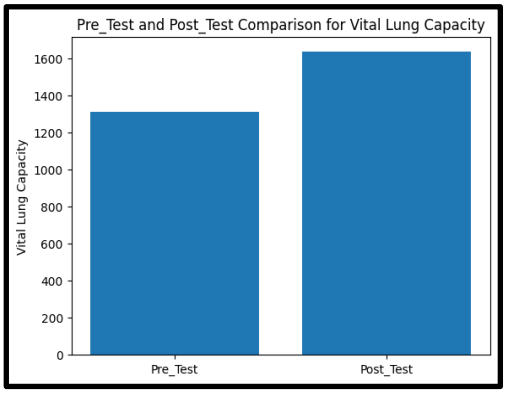
2.3 Hypothesis is as follows

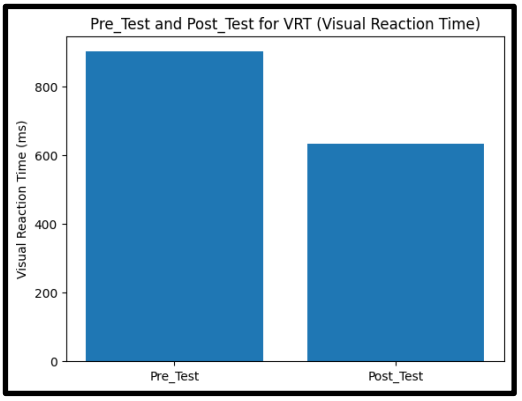
- $\mathbf{H_{11}}$: Vyaghra Pranayama and Kaki Mudra Pranayama will significantly improve Vital Lung Capacity among Special children.
- $\mathbf{H_{12}}$: Vyaghra Pranayama and Kaki Mudra Pranayama will significantly improve Neuro motor co-ordination among Special children.

2.4 Statistic Outputs

Vital Lung capacity		
t-Test: Paired Two Sample for Means		
	Pre_Test	*Post_Test*
Mean	1311.666667	1635
Variance	864016.6667	962350
Observations	6	6
Pearson Correlation	0.9247594213	
Hypothesized Mean Difference	0	
df	5	
t Stat	-2.117722215	
P(T<=t) one-tail	0.04387927081	
t Critical one-tail	2.015048373	
P(T<=t) two-tail	0.08775854161	
t Critical two-tail	2.570581836	

VRT		
t-Test: Paired Two Sample for Means		
	Pre_Test	*Post_Test*
Mean	900.6666667	633.3333333
Variance	35006.66667	21227.86667
Observations	6	6
Pearson Correlation	0.6172350911	
Hypothesized Mean Difference	0	
df	5	
t Stat	4.357537434	
P(T<=t) one-tail	0.003653583962	
t Critical one-tail	2.015048373	
P(T<=t) two-tail	0.007307167924	
t Critical two-tail	2.570581836	





3. Results

Analysis revealed a statistically significant improvement in Vital Lung Capacity post-intervention compared to baseline. Neuro muscular co-ordination, as measured by reduced reaction times VRT, also improved significantly, here p=0.04, less than 0.05, rejects null hypothesis and accepts alternative hypothesis for Vital Lung capacity. For Visual reaction time p=0.003, less than 0.05, reject null hypothesis and accept alternative hypothesis. The paired t-test confirmed that both Vyaghra Pranayama and Kaki mudra pranayama had beneficial effects on Vital Lung capacity and improved the neuromuscular abilities in special children.

2. Discussion

The findings of the study helps in studying the effectiveness of Vyaghra pranayama and kaki mudra Pranayama on Vital Lung capacity and Neuro motor co-ordination among special children. .Previous studies have indicated that Pranayama has a positive impact on children with intellectual impairment, observations were observed across participants with autism, ADHD and Down syndrome in a peg insertion task after the intervention thereby enhancing concentration, grip strength and hand eye co-ordination [2]. Therefore regular pranayama practices would result in better pulmonary health and better fine motor skills like hand eye co-ordination thereby enhancing factors like concentration, reaction time and grip strength.

3. Conclusion

The study concludes that Vyaghra Pranayama and Kaki mudra Pranayama practices significantly improve Vital Lung Capacity and Neuro motor co-ordination among special children. These practices are cost-effective, non-invasive, and feasible for physical and mental health. Future research should focus on randomized controlled trials, long-term outcomes, and integration with school health programs.

- Vyaghra Pranayama and Kaki mudra Pranayama are effective breathing techniques promoting physiological and psychological parameters.
- Vyaghra pranayama helps in spinal flexibility, core strength, strength relief, while Kaki mudra Pranayama cools the body, calms the nervous system, and aids in emotional regulation. Regular practice of these pranayama's supports overall well-being and can be beneficial as complementary tools in managing pulmonary issues and improving the Neuro motor co-ordination in special children for better health and performance in academics.

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