

Effect of Physical Therapy and Occupational Therapy in Improving Delayed Head Control, Independent Sitting Balance and Mature Pincer Grasp Milestones in Cerebral Palsy Children

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Abstract: Background: Physical and occupation therapy forms the basics of treatment of cerebral palsy with delayed milestones, the purpose of this study is to see the improvement in gross and fine motor skills in cerebral palsy children using Goal attainment scaling and clinical assessment scale. **Objectives:** To study the effect of physical and occupational therapy in improving the head control, independent sitting balance, mature pincer grasp milestones after intervention. **Study Design:** Prospective interventional study of cerebral palsy children attending Rajah Muthiah Medical college and hospital, PMR department, Chidambaram for delayed head control, independent sitting balance and mature pincer grasp milestones. Children with delayed head control, independent sitting balance and mature pincer grasp will be given occupational and physical therapy, their effectiveness in improving head control is measured using clinical assessment scale, independent sitting posture and mature pincer grasp will be evaluated using goal attainment scaling.

Keywords: Cerebral palsy, head control, goal attainment scaling, mature pincer grasp, physical therapy, occupational therapy, sitting without support.

1. Introduction

Cerebral palsy is a disorder of movement and posture resulting from a non-progressive lesion to an immature brain, occurring in utero near the time of delivery or within the first 3 years of life. CP is the leading cause of childhood disability with an incidence of 2-3 per 1000 births. The motor disorders of cerebral palsy are often accompanied by disturbances of sensation, perception, cognition, communication and behaviour, seizures and by secondary musculoskeletal problems. Parents, families, and children are likely to experience emotional and social difficulties. The severity of the cerebral palsy itself may range from total dependency, extremely limited communication, and immobility to the ability to talk, carry out independent self-care tasks, walk, and run. Mild to severe motor difficulties are usually experienced by children according to their severity. Many children and young people with a diagnosis of cerebral palsy are able to access

mainstream primary, secondary, and further education. Changes in legislation, advances in technology and rehabilitation, increasing positive attitudes towards disability in society have resulted in opportunities for individuals with cerebral palsy.

One of the consequences of CP that requires immediate attention in order to promote the health of children with CP is poor or loss of neck control. Neck control is the ability to keep the head aligned with respect to gravity. It has been reported to be one of the early signs of delayed milestone. The problems with neck control in children with CP can often lead other delayed milestones such as inability to sit, stand and walk. These activities are essential for independence in activities of daily living and eventually quality of life of the child. Consequently, training for head control is a top most priority in children with CP.

A. Types of Cerebral Palsy

1) Spastic (70-80% of cases)

- Quadriplegia (10-15%): All 4 extremities are affected equally along with the trunk.
- Diplegia (30-40%): Lower extremities are affected to a greater degree than the upper extremities.
- Hemiplegia (20-30%): Involvement is observed on 1 side of the body, including an arm and a leg
- Monoplegia (rare): Involvement is noted in 1 limb, either an arm or a leg.

2) Dyskinetic (10-15% of cases)

- Characterized by abnormal movements.

3) Ataxic (<5% of cases)

- Characterized by unsteadiness.

4) Mixed

2. Aims and Objectives

A. Aim

To study the effect of physical and occupational therapy in

improving delayed head control, independent sitting balance and mature pincer grasp milestones in cerebral palsy children.

B. Objective

1. To study the effect of physical and occupational therapy in improving the head control, independent sitting balance milestones after intervention.
2. To study the effect of physical and occupational therapy in improving mature pincer grasp fine motor milestone after intervention.

3. Materials and Methodology

Study design: Prospective interventional study of cerebral palsy children attending Rajah Muthiah Medical college and hospital, PMR department, Chidambaram for delayed head control, independent sitting balance and mature pincer grasp milestones. The effectiveness of physical and occupational therapy in improving head control was studied using Clinical assessment scale and for studying improvement in independence sitting and mature pincer grasp was studied using Goal attainment scaling.

Inclusion Criteria:

1. Cerebral palsy children with delayed head control, independent sitting balance and mature pincer grasp milestones.
2. Age group of 3 month to 5 years.

Exclusion Criteria:

1. Children with seizure disorders.
2. Children with surgical procedure.
3. Children with other disorders that interferes with physical activity.
4. Caregiver not willing to participate in study.

4. Results

After approval of Institutional Human Ethics committee, a prospective study to be conducted among cerebral palsy children attending physical medicine and rehabilitation

outpatient department at Rajah Muthiah medical college and hospital during the study period from November 2020 to September 2022, 25 children with delayed head control were selected and therapy was initiated. An informed consent and detailed history were obtained from caregivers of all the children, clinical assessment scale for head control in prone position was used to study the progress in head control. The average age of study population 12.76 months (± 2.89) with majority population (52%) above 12 months. The total no of male child is 60% and female child is 40% among the study population 72% children had, consanguineous parents, 60% had normal delivery, 12% mother had GDM during pregnancy, 36% mother had thyroid, 8% mother had PIH, 16% child had premature birth, 44% child had low birth weight.

The head control was studied using clinical assessment scale. of the 25 children 8 children had best possible outcome, 11 had good outcome, 4 children had fair and 2 children had poor outcome.

Table 2

Status	Frequency	Percent
Poor	2	8.0
Fair	4	16.0
Good	11	44.0
Best	8	32.0
Total	25	100.0

The table 3 shows result of head control using paired t test.

Table 3

Head Control	N	MEAN	SD	t- value	p-value
Before treatment	25	0.8	0.7	19.0526	0.001
At 3 months of treatment	25	3	0.9		

The table 4 shows sitting without support using paired t test.

Table 4

Sitting independent	N	MEAN	SD	t- value	p-value
Before treatment	19	-2	0	12.6904	0.001
At 4 months of treatment	19	0.05	0.7		

Table 1

Demographic characteristics and clinical findings	Frequency (n)	Percent (%)	
Gender	Male	15	60
	Female	10	40
Age	8 -11 months	8	32.0
	12-14 months	10	40.0
	15-18 months	7	28.0
Consanguinity	No	18	72.0
	Yes	7	28.0
Mode of Delivery	Normal Delivery	15	60.0
	LSCS	9	36.0
	Forceps	1	4.0
GDM	No	22	88.0
	Yes	3	12.0
Thyroid	No	16	64.0
	Yes	9	36.0
PIH	No	23	92.0
	Yes	2	8.0
Premature Birth	No	21	84.0
	Yes	4	16.0
Low Birth Weight	No	14	56.0
	Yes	11	44.0
Cry After Birth	No	17	68.0
	Yes	8	32.0

The table 5 shows mature pincer grasp using paired t test.

Table 5

Mature Pincer grasp	N	MEAN	SD	t- value	p-value
Before treatment	19	-2	0	16.731	0.001
At 5-month treatment	19	-0.3	0.5		

5. Discussion

The purpose of his study was to study the effect of physical and occupation therapy in improving head control, independent sitting and mature pincer grasp and result shows that score before and after physical and occupation therapy were found to be significant.

In present study 25 children with cerebral palsy were treated for their impaired head control by using physical and occupational therapy and its effects were measured by Clinical rating scale for head control. In this study head control in prone position was used for studying the progress of Cerebral palsy children.

The head control was studied using clinical assessment scale. of the 25 children 8 children had best possible outcome, 11 had good outcome, 4 children had fair and 2 children had poor outcome.

The mean and standard deviation at start of the treatment was 0.8 and 0.7 respectively. the mean and standard deviation after treatment was 3 and 0.9 respectively, paired t-test was done and t value for head control was 19.0526 and p value was 0.001.

Among the 25 CP child 19 had developed good head control after three months, these children where further treated with physical and occupational therapy for improving their independent sitting posture and mature pincer grasp.

All 19 children were assessed for independent sitting balance after four months and mature pincer grasp after five months, the progress was assessed using Goal attainment scale.

The mean and standard deviation at start of treatment for independent sitting balance was -2 and 0 respectively. The mean and standard deviation after four months was 0.05 and 0.7 respectively. Paired t test was done and t-value was 12.6904 and p-value 0.001

The mean and standard deviation at start of treatment for mature pincer grasp is -2 and 0 respectively. the mean and standard deviation after five months of treatment is -0.3 and 0.5 respectively.

Since the p-value is <0.05 in all the parameters there is significant improvement I head control, mature pincer grasps

and sitting with support using physical and occupational therapy.

6. Conclusion

The study concluded that in Cerebral Palsy children with delayed milestones physical and occupational therapy had proven to improve head control.

It also increases other gross and fine motor skills like independent sitting and mature pincer grasp.

Early diagnosis and starting treatment as early as possible help in better outcome.

7. Limitations

This study is done in Chidambaram, Tamil Nadu among patients attending daily outpatient department and convenient sampling technique was followed. Therefore, generalizability of the study result is to be carried out with care

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