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COMPARATIVE STUDY ON EFFECTIVENESS OF SENSORY INTEGRETION (SI) THERAPY & NEURODEVELOPMENTAL THERAPY (NDT) VS CONVENTIONAL EXCERSICE THERAPY FOR CEREBRAL PALSY CHILDREN

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Abstract:

The study conducted at the Occupational Therapy Department of Apex Hospital aimed to compare the effectiveness of Sensory Integration (SI) therapy and Neurodevelopmental Therapy (NDT) versus conventional exercise therapy for children with Cerebral Palsy (CP), specifically those diagnosed with Spastic Diplegia. The study included 50 patients aged between 4 to 10 years with a GMFCS level between 1 to 3 and no associated problems like seizures, mental retardation, learning disabilities, or corrective surgeries. Among them, 35 children received NDT along with SI therapy (experimental group), while 15 children received conventional exercise therapy (control group).

In the experimental group, sensory integration therapy focused on providing various sensory stimuli to improve postural control and overall functioning. This included activities such as swings, trampoline, ladder, slides, and balls, walking on different surfaces, and engaging in tasks like stair climbing. Neurodevelopmental therapy emphasised task-oriented approaches, weight transfer, trunk elongation, core muscle reduction, postural alignment, midline crossing, and functional skills development.

The results after 8 weeks of intervention showed significant improvements in gross motor skills, balance, independence in mobility, and activities of daily living in the experimental group compared to the control group. Children in the experimental group were also reported to be more engaged and active during therapy sessions.

These findings suggest that the combined approach of SI therapy and NDT can lead to better outcomes for children with CP, particularly those with Spastic Diplegia. The emphasis on sensory stimulation, motor learning, and functional skill development appears to be beneficial in improving various aspects of motor function and overall participation in daily activities.

Based on these results, it is recommended that paediatric therapists consider incorporating Sensory Integration therapy and Neurodevelopmental Therapy into their practice for better outcomes in children with Cerebral Palsy.

I.INTRODUCTION

Cerebral Palsy is an umbrella term covering a group of disorders arising from an injury to a immature brain which is non-progressive in nature. It is mostly characterised by motor impairments dominantly, along with abnormalities in cognition, vision, hearing, speech, language, behaviour, perception areas; clinically cerebral palsy is classified as spastic, hypotonic, Athetoid and Ataxic. Again spastic CP is classified into spastic quadriplegia, Spastic Diplegia, Spastic Hemiplegia. In India high incidence of risk is hypoxic child birth, consanguineous marriage, or any disease during the pregnancy. In India the estimated incidence is around 3/1000 live births. Globally 1-4 for every 1000 live birth. In children with Spastic Diplegia Hamstrings, Rectus femoris, Psoas, Gastro Soleus and hip adductors are mostly affected .Scissoring gait and W Sitting quite prevalent. The most globally accepted evidence based indicator go cerebral palsy is Gross Motor Function Classification Scale (GMFCS). It is an age based focuses on gross motor activity indicated till 12 years age. It assesses movement, posture, and equilibrium and independency level in the area of mobility.

Exercise therapy is widely used in treating cerebral palsy children globally. For past few decades OCCUPATIONAL THERAPY is using Neurodevelopmental training (NDT) along with Sensory integration (SI) therapy to treat child with cerebral palsy. It shows both qualitative and quantitative improvement both in gross motor, fine motor, balance and behavioural areas.

2. MATERIAL AND METHODS USED:

50 patients were referred to OCCUPATIONAL THERAPY DEPARTMENT, APEX HOSPITAL. All are diagnosed with Spastic Diplegia aged between 4 years to 10 years. GMFCS were between1 to 3. No other associated problems like seizure, mental retardation, learning disability, or corrective surgeries were present. In experimental group 35 children were treated with neurodevelopment training along with sensory integration therapy .and 15 children in control group received conventional exercise therapy. In Spastic Diplegia Lower Limb is more affected than upper limb.

Treatment provided in OPD basis for 45 minutes each session. 20 minutes sensory integration therapy followed by 20 minutes of Neurodevelopmental training (NDT) followed by 5 minutes parent education regarding home regimes.IN Control Group Stretching Exercises ,Strengthening Exercises ,Passive joint range of motion Exercises and parent education were done. Each child received treatment for 8 weeks. In Experimental group we used the sensory integration tools and equipment like swings, flat swing ,T swing, trampoline, sensory tunnel, slide, ladder, therapeutic brush, sensory grains, walking in different surface, sand walk ,mud walk, carpet walk, grass walk, balance board, ball pool. In NDT we focused on task oriented approach, weight transfer, trunk elongation, core muscle reduction, postural alignment, midline crossing, Swiss ball therapy, quadruped walking ,kneel walking, engaging in kicking ,stair climbing up and down .

2.1Population and Sample

50 Spastic Diplegia Children

3. MECHANISM :

Sensory integration therapy was developed by renowned American occupational therapist MS JEAN AYERS in 1972.SI says our all sensory system auditory, visual, olfactory, gustatory, tactile, proprioceptive, vestibular system must work efficiently to function in optimum level within the environment. As Neural plasticity is the key core of sensory integration therapy usage optimum sensory challenges, different sensory environment, and maximum sensory exposure helps the brain to register, modulate and execute the desired function.

Postural Control is essential to maintain correct posture and balance during walking in human. Children with spastic Diplegia possess increased muscular tone in both lower limb, which impair their postural control. Sensory Integration therapy aims to improve postural control by providing correct amount of sensory, tactile, proprioceptive and vestibular stimulations. Different kind of swings, trampoline, ladder, slides balls, different surfaces provides tactile, vestibular, and proprioceptive challenges to child to register modulate and exhibits the correct desired movement. The child gets more aware of body awareness, body position. As Sensory Integration aims for optimum functioning of Somatosensory, vestibular and visual system together results improvement in postural balance, gait pattern and in activity.

Neurodevelopmental training was developed by Dr KARL BOBATH and BERTA BOBATH in 1940.Neural Plasticity is the key of NDT. Occupational therapist must have depth knowledge regarding motor development, primitive, abnormal reflexes and how to use facilitation and inhibitory techniques to get desired movement and behaviour.NDT uses active participation, task oriented, and postural alignment to inhibit the abnormal reflexes. It focuses to encourage functional skill rather passive movement.

4. RESULT:

The result after 2 months (8 weeks) of intervention, it shows the experimental group received NDT along with SI have significant improvement in gross motor, balance, independency in mobility, indecency in activity of daily living. They are more joyful playful and active towards therapeutic session than control group

So we can suggest all the Pediatric therapist to use Sensory Integration (SI) Therapy and Neurodevelopmental Therapy (NDT) in their practice for better outcome .

5. CONFLICT OF INTEREST:

No conflict of Interest