



# New Rehabilitation Approaches for Neurodevelopmental Disorders



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## Abstract

Neurodevelopmental Rehabilitation is based on reeducating the muscle to work in normal and functional pattern. There are various techniques for neuro-rehabilitation such as bobath, roods approach and physical therapy treatment. Neurodevelopmental disorders such as cerebral palsy, autism, rett's syndrome and Down's syndrome where we are basically working to achieve their milestone but still there are various developmental domains which is still not recovered with only these therapies. There are some new noninvasive approaches for rehabilitation such as Transcranial magnetic stimulation, neuro feedback, brahami and brain gym. These new intervention approaches in field of rehabilitation acts as a supplementary treatment in enhancing cognitive and physical level of effected child where the medicine have no such huge role for rehabilitation.

**Keywords:** Neurodevelopmental disorders; Rehabilitation; Brain gym; Neurofeedback

## Introduction

Cerebral palsy (CP), Autism, Down's Syndromes are the few disorders seen in children. These disorders come under neurodevelopmental disorder which basically seen in children due to insult in the brain at the time of delivery, during pregnancy or after 2 years of birth [1] or any lesion inside the developing brain. In India the ration of CP is 1:300 at every birth according to rehabilitation council of India (RCI) censuses 2001. Children suffering from this disorder have generally spasticity, poor understanding, drooling of saliva, nystagmus, poor social skill and poor cognitive ability. Similarly in autism these children have poor eye contact, poor socialization, poor communication and poor cognitive ability so there are many neurodevelopment disorders (NDD) where we need to work for their physical as well as cognitive enhancement. If we talk about physical issue seen in these NDD patients we have lots of intervention already available such as medical intervention, surgical intervention, physical therapy, special education, speech therapy but research in any field either medical, educational, industrial or social if proven become boon to the society. In this era there are some new technique which helps to enhance cognition and improve physical activities in NDD children such as Repetitive Transcranial Magnetic Stimulation (RTMS) [2], Neurofeedback [3] (NFB), brain gym and Brahmī [4] (Barcopa).

## Repetitive Transcranial Magnetic Stimulation (RTMS)

Repetitive Transcranial Magnetic Stimulation (RTMS) is a magnetic method used to stimulate small regions of the brain.

During a TMS procedure, a magnetic field generator, or "coil", is placed near the head of the person receiving the treatment. The coil produces small electric currents in the region of the brain just under the coil via electromagnetic induction. The coil is connected to a pulse generator, or stimulator, that delivers electric current to the coil. The coil produces small electric currents in the region of the brain just under the coil via electromagnetic induction. The coil is connected to a pulse generate or that delivers electric current to the coil. TMS is working on phenomena generating positive and negative ions inside the neurons which help in neuro-plasticity. In these days TMS is frequency used by the researchers in development of new treatment especially in field of rehabilitation.

## Neurofeedback (NFB) Brain Training

Neurofeedback (NFB) has been employed in research and clinical setting for the investigation and treatment of a growing number of psychological illnesses. This technique involves detection of electro-cephalographic (EEG) information from the surface of the scalp of a subject that separating its frequency decomposition into its component waveform (alpha, beta, theta, gamma and delta) and making these components visible usually as polygraphic traces on a computer screen. Neuro feedback is being considered as a promising new method for restoring brain function in mental disorders. It takes into account behavioral, cognitive, and subjective aspects as well as brain activity. Though based in technology, neuro feedback is a 100% non-invasive, drug-free, brain training system that helps the central nervous system (CNS) make the best use of

your brain's natural resources. It is extremely powerful and effective. The applications of neuro feedback to enhance performance extend to the arts in fields such as music, dance, and acting. A study with conservatoire musicians found that alpha-theta training benefitted the three music domains of musicality, communication, and technique. Now in these days NFB is used in various hospital setups for dealing autism, managing stress and as a one of the relaxation technique for adult's patients also.

### Brain Gym

In 1970 first time Paul and Gail Dennison's started research on brain gym exercises for learning disabled for children and adults. They called their field of study as educational kinesiology. In their study they developed knowledge of the relationship of movement to perception, and the impact of these on fine motor and academic skills [5]. Now a days brain gym is a commercial program that claims that any learning challenges can be overcome by finding the right movements, the use of which will create new pathways in the brain. They claim that the repetition of the 26 Brain Gym movements "activates the brain for optimal storage and retrieval of information. All brain gym activities based on performance based learning which helps in neuro-plasticity.

### Brahmi

Brahmi is a medical herb/plant its scientific name is Bacopa monnieri [6] it's a perennial, creeping herb with numerous branches that grows in wetlands and marshy places. Brahmi is native to India but has spread throughout the tropics. Brahmi has great value in ayurvedic medicine mainly used as brain and mental tonic to treat Alzheimer disease [7], memory loss, insanity, insomnia and other mental illness. Brahmi is an edible plant that can grow to about 6 inches in height while Brahmi branches creeps horizontally covering the ground. Brahmi has small oval shaped leaves that are succulent and relatively thick. Brahmi is a popular brain tonic. It is used to promote overall mental health while rejuvenating the optimal function of the brain.

Brahmi is believed to provide the following health benefits.

- Improves mental cognition.
- Improves the retention of memory.
- Improves concentration.

- Insanity cure.
- Convulsions treatment.
- Senility cure.
- Prevents Epilepsy attacks.
- Sedative effect that does not dull the senses.
- Alzheimer Disease treatment.

In many studies we found this herb as neuro-repair and rejuvenating the optimal function of the brain in autistic children. It also helps in desensitized the hyper-activities.

### Conclusion

These new intervention approaches in field of rehabilitation acts as a supplementary treatment in enhancing cognitive and physical level of effected child where the medicine have no such huge role for rehabilitation. Beside that there are various rehabilitation approaches such as physical therapy, play therapy and occupational therapy but with the use of these new intervention such as TMS, NFB, Brain gym or brahmi we can achieve better result and improved rate of progress with the application with these approaches.

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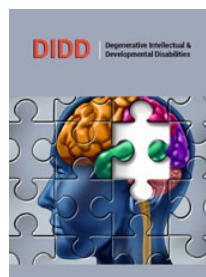
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