

## Physical Therapy Potential and Dietary Guide in Cerebral Palsy : A Glance



### Medical Science

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**Rajesh K Sharma**

Former Lecturer, Physiotherapy in Medical Conditions, Jammu College of Physiotherapy, Jammu

**Archana Bhat**

Senior Research Fellow, Post Graduate Department of Home Science, University of Jammu.

### ABSTRACT

*Physiotherapy and dietary intervention plays an important role in cerebral palsy. Physiotherapy adds quality years and dietary intervention adds taste and health to children with cerebral palsy. The current paper is an attempt to review available data on physical therapy and diet role in children with cerebral palsy and justify its role in maintaining and achieving overall quality health.*

### INTRODUCTION

Cerebral palsy is defined as a group of permanent disorders of the development of movement and posture, causing activity limitation, that are attributed to non-progressive changes that occurred in the developing fetal or infant brain(1). Cerebral palsy was first described by William Little in the 1840s is primarily related to disorder of movement and posture. Cerebral palsy is a common problem involving 2-2.5 per 1000 live births world wide (2). Simply stated cerebral refers to brain and palsy refers to muscle weakness. The main risk factors for the cerebral palsy included congenital, Genetic, inflammatory, infectious, anoxic, traumatic and metabolic (3). The cerebral palsy is divided into different types depending upon physiological grouping and anatomic grouping. Physiological grouping includes spasticity, dyskinesia, ataxia and mixed types. Whereas anatomic grouping includes diplegia, quadriplegia and hemiplegia (4).

### PHYSIOTHERAPY AND CEREBRAL PALSY

Cerebral palsy is often described as a problem with movement and posture that makes certain activities difficult. Management of children with cerebral palsy requires an interdisciplinary approach from various medical and allied health disciplines (5, 6, 7). The goal of physical therapy is to maximize functional control of the body, increase gross motor function and decrease spasticity in CP children (<http://cerebralpalsy.org/about-cerebral-palsy/treatment/therapy/physical-therapy/>, retrieved on 10-3-15). Physiotherapy uses physical techniques to promote, maintain and restore physical movements, psychological and social well-being(8).

### TECHNIQUES USED IN PHYSIOTHERAPY

- Relaxation techniques
- Progressive pattern movements(Temple Fay)
- Proprioceptive neuromuscular facilitations(Herman Kabat)
- Sensory stimulation(Margaret Rood)
- Hydrotherapy
- Neuro developmental therapy
- Body weight support treadmill therapy

#### Relaxation techniques

Relaxation exercises, involving the successive tensing and relaxing of the major muscle groups of the body usually performed on spastic quadriplegia (9). Some of the procedures used in relaxation are massage, yoga and breathing exercises have proved beneficial.

#### Progressive pattern movements by Temple Fay

Progressive pattern movements were recommended by Temple Fay (10). The rationale being that motion be taught according to its development in evolution. He used spinal and 'amphibian' movement reflexes to reduce the spasticity (11). The pattern consisted of 5 stages (<http://www.physiotherapy-treatment.com/>

[cerebral-palsy-physiotherapy.html](http://cerebral-palsy-physiotherapy.html), retrieved on 20-3-15).

Stage 1: prone lying

Stage 2: Homo lateral stage

Stage 3: contra lateral stage

Stage 4: on hands and knees

Stage 5: Walking Pattern

The progressive pattern movements have proved to be beneficial in improving postural control and balance among patients (12).

#### Proprioceptive neuromuscular facilitations (by Herman Kabat)

PNF, is a set of stretching techniques commonly used by physiotherapists to enhance both active and passive range of motion with the ultimate goal being to optimize motor performance and rehabilitation ([http://en.wikipedia.org/wiki/PNF\\_stretching](http://en.wikipedia.org/wiki/PNF_stretching), retrieved on 18-4-15). PNF techniques have been around since the late 1930s and '40s when a physician and neurologist named Herman Kabat began using proprioceptive techniques on younger individuals with cerebral palsy and other neurological conditions. He found that by stimulating the distal segments, the proprioceptors in the more proximal segments became stimulated. The purpose was to enhance and create movement in areas where the neurological system has been affected. His techniques were based on Sherrington's principles of irradiation, reciprocal innervations and inhibition (13). These principles describe the rhythmic and reflexive actions that lead to coordinated motion ( 14). PNF techniques commonly used are contract-relax, hold-relax and Contract-Relax-Antagonist-Contract (<http://www.stretching-exercises-guide.com/pnf-stretching.html>, retrieved on 10-3-15). PNF is designed to improve overall movements through proper neuromuscular facilitation or inhibition. PNF is utilized to improve the balance of mobility and stability through strengthening and/or stretching movement pattern (15).

#### Sensory stimulation (Margaret Rood)

Margaret Rood combined controlled sensory stimulation and orthogenetic sequences of motor behavior to achieve a coordinated goal oriented muscular response for children with brain damage. Tactile (touch) stimulation is offered by fast brushing, light stroking, quick icing, heavy joint compression. Inhibition techniques are light joint compression and slow rhythmic movements. These methods are used for patients with hypotonia, hypertonia and hyperkinesia (<http://www.aarogya.com/conditions-and-diseases/specialties/occupational-therapy/3968-methods-in-occupational-therapy.html>, retrieved on 2-2-15).

#### Hydrotherapy

Hydrotherapy, was formerly called hydropathy, is a part of [medi-](#)

[cine](#) ( naturopathy, occupational therapy and physical therapy), involves the use of [water](#) (hydro) for pain relief and treatment. The physical properties of water particularly temperature and pressure, for therapeutic purposes, to stimulate blood circulation and treat the symptoms of certain diseases ([http://en.wikipedia.org/wiki/Hydrotherapy#cite\\_note-ISPAnhydrotherapy2009-1](http://en.wikipedia.org/wiki/Hydrotherapy#cite_note-ISPAnhydrotherapy2009-1), retrieved on 2-3-15). Hydrotherapy, or Aquatic Physiotherapy, can greatly assist children with CP (<http://www.childsplayphysio.com.au/cerebral-palsy/>, retrieved on 2-5-15).

#### Role of hydrotherapy in CP children:

- assist a child with CP in the normalisation of their muscle tone
- stretch tight/shortened/high-tone muscles
- improve balance and coordination
- accelerate the development of gross motor skills.

#### Neuro developmental therapy

The Bobath concept is a broad and ever-evolving approach in neurological [rehabilitation](#) that is applied in patient assessment and treatment in children with [cerebral palsy](#) (15). NDT was developed with the understanding that patients with brain injuries have a limited repertoire of movement patterns. During treatment interventions, repeated experience in movement ensures that a particular pattern is readily accessible for motor performance. The more a patient performs certain movements, the easier these movements becomes (<http://www.kennedykrieger.org/patient-care/diagnoses-disorders/down-syndrome>, retrieved on 12-12-14). Intensive NDT has been practiced by some with 1 hour per day for 5 days for week and reported to be more effective ( 16).

#### Body weight support treadmill therapy

Body Weight-Supported Treadmill Training (BWSTT) is a gait training strategy that involves the unloading of the lower extremities by supporting a percentage of body weight. The strategy utilizes an overhead suspension system to support a percentage of the patient's body weight as the patient walks on a treadmill. Additionally, BWSTT allows therapists to safely initiate gait training earlier in the rehabilitation process (<http://www.gettingbacktolife.com/body-weight-supported-treadmill-training-bwstt>, retrieved on 12-3-15). Depending on the severity of the person's impairment, one or more physiotherapists may be present to assist in maintaining the patient's appropriate posture and moving their legs through as kinematically physiological a gait pattern as possible(17). Intensive body weight-supported treadmill training may be an effective intervention for some children with CP who are ambulatory (18).

#### DIETARY GUIDE IN CEREBRAL PALSY

Most children with cerebral palsy are at risk for secondary undernourishment due to feeding difficulties and oral motor dysfunction. Oral motor dysfunction is the inability to control muscles in the mouth required for proper food intake levels. Children with cerebral palsy can benefit from feeding and nutrition assessments (<http://cerebralspalsy.org/information/nutritional-health/>, retrieved, 14-3-15). Due to characteristic presentation of oral-motor difficulties, CP patients are challenging for dieticians also. The children usually present with malnutrition ( underweight, overweight and short stature), dysphagia, dystonia, presence of drug-nutrient interactions, dumping syndrome, gastro esophageal reflux etc (19). Previous researches indicate that these children have chewing and swallowing problems which leads to nutritional impairment (20, 21 and 22). 1 in 15 children with cerebral palsy are unable to take food through their mouth and need to be fed through a feeding tube. Speech pathologists and occupational therapists can help people with cerebral palsy who have eating and drinking difficulties(<https://www.cerebralspalsy.org.au/services/eating-and-drinking-difficulties/>, retrieved on 12-2-15).The proper nutritional assessment using anthropo-

metric measurements would be helpful to decide about the diet plan of child. The menu plate should be balanced one, consisting proper food composition from all the food groups. For anthropometric measurements ' the centres for disease control (23) growth chart should be used for children. Some practitioners use the 50<sup>th</sup> percentile BMI/age to determine the ideal body weight / appropriate weight for height (24). Skinfold measurements can also be used with proper monitoring for estimation of body fat however a single skinfold measurement is not useful to estimate percentage of body fat in individuals suffering from cerebral palsy (24).

#### Food plate for children with cerebral palsy

Proper positioning for taking meals is very important in cerebral palsy. It is also important to teach the child to eat independently as early as possible. The mode of feeding also depends upon general condition of child and his nutritional status. Textures of food and thickness of fluids may need to be modified, to ensure airway safety, maximise eating efficiency (25). It is better to divide whole meal in small 5-6 meals which are more palatable and comfortable to child. Proper care should be taken while feeding the child to avoid the danger of choking. Drooling should be well treated in children as excessive drooling can cause problem in swallowing (26). As constipation is common in these children, fluid and fiber balance should be maintained in these children along with medications (24).

#### CONCLUSION

Physiotherapy normally starts when the child is diagnosed with cerebral palsy (nearly at 18 months of age). Physiotherapy has proved helpful in reducing contractures, strengthening muscles and increasing range of motion. About nutrition, most children with cerebral palsy are at risk for secondary undernourishment due to complications. A well balanced diet provided in proper positioning is beneficial to prevent malnutrition and related problems in children.

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