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Neuro Developmental Therapy - An Overview

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Abstract **Review Article**

Neuro Developmental Therapy (NDT) also known as Bobath concept is an effective approach for neuro-motor disturbances in Cerebral palsy. It aims for normal motor development and prevention of contractures. There are many Handling techniques which concentrate on the sensory stimuli and thereby decrease spasticity, abnormal reflexes and movements. Basic principles of Bobath concept are 1) CNS lesion is the cause of tightness or weakness in muscle in CP, 2) Children with CP have postural and movement disorders, 3) CNS lesion induced atypical movement has potential to recover. NDT primarily considers that normal postural reflex mechanism is fundamental for motor performance. It is an interactive problem-solving approach which can be applied to CNS damage for recovery irrespective of severity or age. NDT incorporates the principle of neuroplasticity. The techniques used include therapeutic handling, facilitation and activation of key control points. Key elements in NDT are Alignment, Handling and Placing. Bobath Concept is a goal-orientated and task-specific approach. It targets for organisation of the internal (proprioceptive) and external (exteroceptive) environment of CNS for efficient functioning .NDT-based therapy helps in regaining functional movements that are based on postural control and alignment. Recently NDT has been tried in various other disorders like Stroke, Injury to brain or spinal cord, Brain tumour, Dementia, Multiple sclerosis, Parkinson's disease, Amyotrophic lateral sclerosis and Infection-related encephalitis .Early diagnosis and early intervention before establishment of abnormal movement pattern can be helpful for the CP children to lead an independent and meaningful functional life.

Keywords: Neurodevelopmental Therapy, Bobath technique, Cerebral Palsy.

INTRODUCTION

Neuro Developmental Therapy (NDT) is an approach for management of disturbances in movement and posture secondary to central nervous system lesions [1]. It was first proposed by a physiotherapist Berta Bobath, and her husband Karel, who was a neuropsychiatrist [2]. Hence this approach was called as Bobath concept [3]. During that time cerebral palsy (CP) was managed with braces, passive stretching and surgery. Later Bobath approach was found effective for neuro-motor disturbances in CP children [4]. Bobath proposed that CNS dysfunction was responsible for motor disorders of CP [5]. According to them, it was the CNS dysfunction which interfered with normal postural control and thereby interfered in normal motor development [6].

Bobath aimed for normal motor development and prevention of contractures. According to Bobath, sensorimotor components are mainly affected in CNS damage. Hence NDT primarily focuses on sensorimotor components of tone of muscle, reflex, abnormal movements, and control of posture, sensation, perception and memory. There are many Handling techniques which concentrate on the sensory stimuli and thereby decrease spasticity, abnormal reflexes and abnormal movements. These Handling techniques also improve tone, equilibrium and movement of muscles. In NDT technique child is a passive recipient of treatment. Sequence of normal development is considered as a framework for treatment.

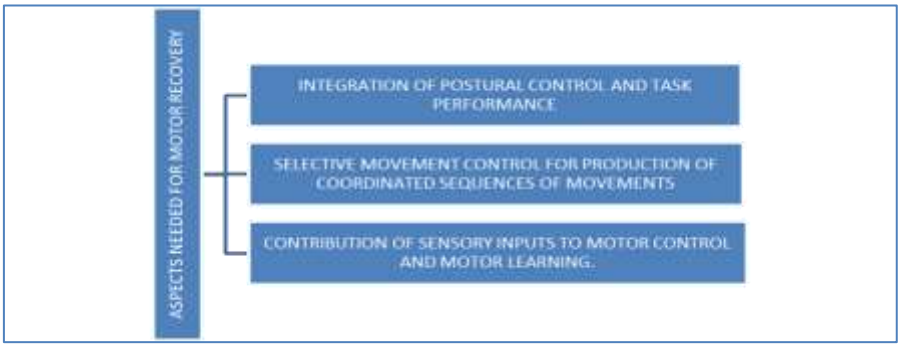
Basic Principles of Bobath Concept

The basic principles of the Bobath concept are 1) CNS lesion is the cause of tightness or weakness in muscle in CP, 2) Children with CP have postural and movement disorders, 3) CNS lesion induced atypical movement has potential to recover.

Principles of NDT

DT primarily considers that normal postural reflex mechanism is fundamental for motor

performance. These normal postural reflex mechanisms include righting reactions, equilibrium reactions, and reciprocal innervation and coordination patterns. In case of CP abnormal tone and tonic reflexes interfere with normal development of righting reactions and equilibrium reactions. NDT is an interactive problem-solving approach. The focus is on reassessment, concentration on individual goals, development of working hypotheses, establishment of treatment plan and relevant objective measures for evaluating these interventions. This is a uniform approach which can be applied to CNS damage for recovery irrespective of the severity or age [7].



Aims of Bobath Technique

- Change abnormal tone
- Mobilise tight joints
- Activate muscle groups
- Strengthen weak muscles
- Improve quality of posture and movement.
- Increase child's own activity
- Encourage child's problem-solving skills
- Improve functional skills

Theoretical Framework

DT is a functional and neuromuscular re-education technique. It incorporates the principle of neuroplasticity [1]. According to this principle based on practice and experience, NDT helps in facilitating normal postural alignment and movement. It focuses on interacting functional impairment and activities of life [8]. Sensory feedback like contact, visual integration and somatosensory reinforcement are used for functional recovery. Movement of proximal parts of the body can cause improvement in posture and movement in distal parts. Abnormal movements should be decreased initially to develop normal movement patterns.

Intervention Strategies

The techniques used in NDT include therapeutic handling, facilitation and activation of key control points [1]. Therapeutic handling improves quality of movements and includes both facilitation and inhibition. The most important technique in NDT is Facilitation. Sensory information like tactile cues and verbal directions are used to reinforce weak movements and to discourage overactive movements. It is a type of relearning normal movements. Facilitation helps to directly stimulate muscles to contract isometrically, eccentrically or isotonically. It focuses on involving the affected side for functional activities. To be successful in improving motor learning, facilitation should be regulated in time, modality, intensity and withdrawal. Inhibition deals with decreasing abnormal movements and abnormal postures which interfere with normal motor activities. It helps to restore normal alignment of trunk and extremities by lengthening spastic muscles. Key control points are parts of body that are important for facilitation and inhibition [9].

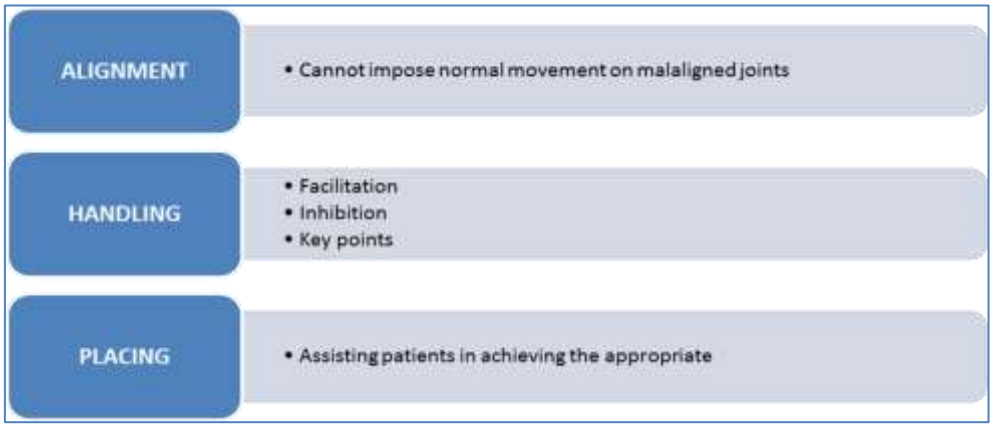
Outline of NDT Approach

Essentials for NDT effectiveness

Therapists who are practising NDT must be well trained in Bobath concepts. They must develop the acumen to differentiate normal movement patterns from abnormal movement patterns. They should effectively retrain the functional activities of the patients understanding their goals, pathology, ability, limitations taking into account their home and environment conditions. Therapists must determine the optimal practice, feedback, and environment accordingly. Finally therapists should have good lumbar spine flexibility and must have stable footwear, for optimal body mechanics during activities.

Key elements to applying NDT

The key elements in NDT are Alignment, Handling and Placing [10].



Clinical Applications of Bobath Concept

Bobath Concept is a goal-orientated and task-specific approach. It targets to in organisation of the internal (proprioceptive) and external (exteroceptive) environment of CNS for efficient functioning [11]. It co-ordinates sensory, perception and adaptive behaviour with motor performance. It helps to overcome weakness due to CNS lesion by activation of cutaneous and muscle receptors thereby prevent development of spasticity. Due to Neuroplasticity, meaningful functional recovery occurs. Hypertonia in CP can be managed at non-neural level by influencing muscle length and range. In hypertonic CP, tone can be reduced by 1) Mobilisation of muscles and stiff joints, 2) Stretching the muscle, 3) Encouraging normal movement pattern, 4) performing efficient and less effortful functional tasks and 5) Weight - bearing.

NDT-based therapy helps in regaining functional movements that are based on postural control and alignment. Some of the functional movements that can be benefitted by NDT include Head control, Rolling, Crawling, Sitting without support, Functional reaching of arm, Quadruped positioning, Kneeling, Standing without support, Side-lying to sitting transfer, Sitting-to-stand transfer, Stand pivot transfer, Ambulation, Jumping and Running [12]. NDT has been proven effective for CP. Recently NDT has been tried in various other disorders like Stroke, Injury to brain or spinal cord injury, Brain tumour, Dementia, Multiple sclerosis, Parkinson's disease, Amyotrophic lateral sclerosis and Infection-related encephalitis [13].

CONCLUSION

Cerebral palsy is a non- progressive disorder. However the sequelae of CP like contractures and spasticity can be devastating and reduce the quality of life. However with approaches like NDT, substantial improvement can be expected. Early diagnosis and early intervention before establishment of abnormal movement pattern can be helpful for the affected person to lead an independent and meaningful functional life.

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