



Neurodevelopmental Therapy in children

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Outline

Assessments for neurodevelopmental delay

The neurodevelopmental therapy (NDT) approach for children with neurodevelopmental delay

Occupations of childhood

Other aspects to consider in children with neurodevelopmental delay



Assessments

Infancy

Einspieler et al, 2005; Einspieler et al, 2016;

PRECHTL'S GENERAL MOVEMENT ASSESSMENT

- General movements involve the whole body in a variable sequence of arm, leg, neck, and trunk movements, waxing and waning, and changing in force, direction and speed, rotating around limb axes, with an overall fluid and elegant appearance
- Fidgety movements are small movements of moderate speed with a variable acceleration of the neck, trunk, and limbs in all directions
- General movements have a lack of complexity and variability - being either a "poor repertoire", or "cramped synchronised"
- Strong predictors of cerebral palsy include Cramped synchronised GM in the period until 8 weeks corrected age (rigid; limb and trunk muscles contract and relax almost simultaneously) and the absence of fidgety movements" in the general movements of 3 to 5-month-old infants.

OTHER NEURODEVELOPMENTAL ASSESMENTS

- Hammersmith Infant Neurological Examination (HINE)
- Test of Infant Motor Performance (TIMP)
- Bayley Scales of Infant Development
- Ages and Stages questionnaire



Childhood

NEURODEVELOPMENTAL

- Bayley Scales of Infant Development (BSID)
- Peabody Developmental Motor Scales (PDMS)
- Wits developmental Profile
- Ages and Stages Questionnaire (ASQ)
- Vona du Toit's creative ability assessment
- Movement Assessment Battery for Children (M-ABC)
- Griffiths Mental Development Scales

CEREBRAL PALSY SPECIFIC

- Gross Motor Functional Classification System (GMFCS)
- Manual Ability Classification System (MACS)
- Eating and Drinking Ability Classification System (EDACS)
- Communication Function Classification System (CFCFS)
- Pediatric Evaluation of Disability Inventory (PEDI)
- The Zarit Burden Interview





Neurodevelopmental Therapy Approach

NDT

Theory & Principles make movements possible

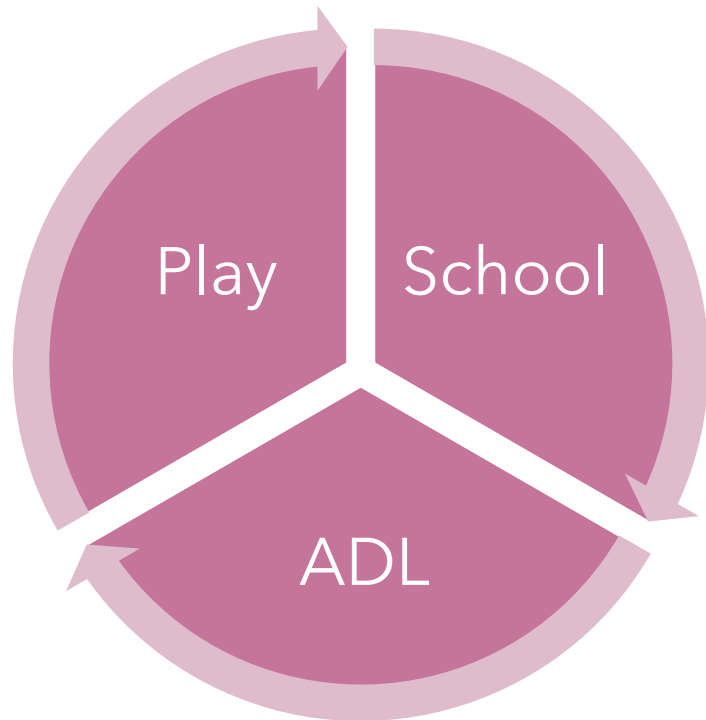
- *“ A whole new way of thinking, observing, interpreting what the patient is doing, then adjusting what we do in the way of techniques - to see and feel what is necessary and possible from them to achieve. We don't teach movements, we make movements possible”* Bertha Bobath (1981)
- Motor learning based on the child's own activity, with active participation, in a function activity that is meaningful to the child.
- Therapist's skilled handling and facilitation allows more effective & efficient movements
- Feedback to Feedforward (Anticipation -Postural preparation for movement & adjusting movement - learning through experience

Meaningful function, strengths based & holistic

- Quality of movements & repetition of movement to improve performance for function - with variability and variety
- Empowering & training caregivers, including carryover into the home and everyday activities
- Child is an active participant - with opportunities for exploration, experiences, trial & error
- Handling based on a thorough understanding of neuro-physiology and neuro-development. Where to touch, how to touch and how to facilitate appropriate movement.

TASK ANALYSIS

- What is the task?



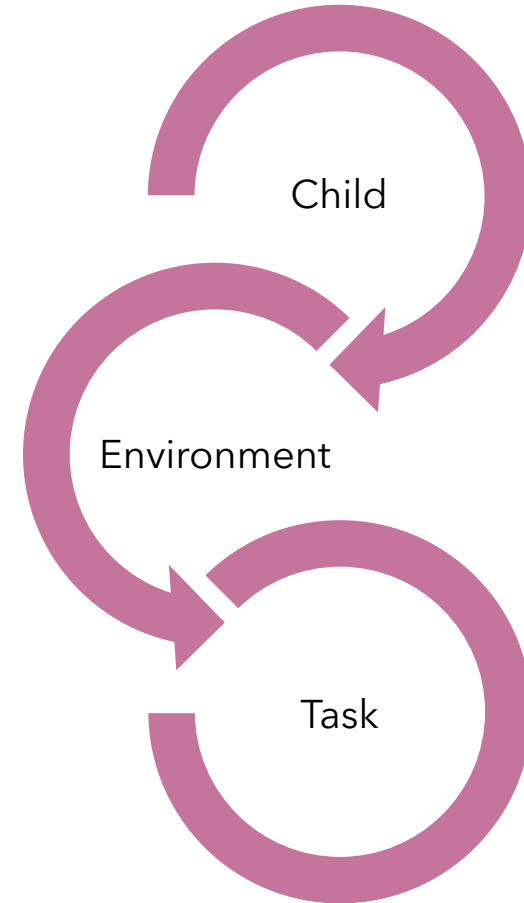
CLINICAL REASONING

- What components are required to execute this task?
- Can the child execute the task?
- How is the child executing the task
- Is something missing or interfering?
- What needs to be changed or adapted?



THERAPY PROCESS

- Enhance the child's movement : anticipation, initiation, adjustment
- Use of a surface (various heights)
- Use of Equipment (balls, bolsters, wedges, blocks, therapist)
- TOY : Placement, affordances, and use
- Getting the "Just right Challenge" with the activity choice, structuring and handling
- Sensory (Vestibular, Tactile, Auditory, Visual)
- Environment



NDT-therapy options and evidence

- “Traditional” / Conventional Bobath NDT approach - with **individual sessions**, by a trained therapist, 60 minutes. **Or** 40 minutes traditional therapy and 20 min **Caregiver training** and **home programmes** using NDT principles and techniques in play. * More effective in improving gross motor skills in children 0-2 years when used together (Behzadi et al, 2014)
- **Intensive NDT** three times weekly, 60 minutes a day, for 3 months, immediately followed by conventional NDT once or twice a week, 30 minutes a day, for another 3 months. *GMFM scores showed significant improvement after intensive NDT, maintained after 3 months of conventional NDT. Compliance also improved. (Lee et al, 2017)

The South African Public Hospital/PHC reality

- Appointments once a month or once in two months (daily as inpatients)
- Waiting periods for assistive devices and orthotics are long.
- Opportunities for direct therapy and interventions in the child's daily context are limited, and home programmes and caregiver education are heavily relied upon.
- Monthly group sessions - homogenous or heterogenous.



Other considerations

Systems approach to managing a child with neurodevelopmental delay



Sensory Systems

- Sensory Integration and Neurodevelopmental treatment can be integrated and benefit the individual. The addition of an SI frame of reference to an NDT intervention can **improve the quality** of not only the **motor control** but the child's **affect, emotional responses** and ability to integrate and synthesize information from his body and his environment to make better **adaptive responses**.
- Many children with neurodevelopmental delays and cp present with sensory reactivity/ modulation difficulties

(Paris et al, 2008)

Considerations for including sensory integration

- 1) Are these interventions compatible and what are the possible conflicts?
- 2) What factors should a therapist take into consideration when utilizing a combined treatment approach?
- 3) Is SI safe to implement with a neurologically involved patient?
- 4) What are possible contraindications?
- 5) What SI treatment strategies should be used with a child with limited mobility, and how should they be adapted?
- This requires specialized training in each of the treatment strategies, and in adapting the SI intervention safely for the child with neurological impairments and limited mobility.

Perception and Cognition

- Visual perceptual impairments (VPI) are present in a high percentage (93%) of participants with CP (tested with the Test of Visual Perceptual Skills-3rd edition)
- All the subtypes of CP were found to present with VPI, with the right spastic unilateral (hemiplegic) group having the fewest number of impairments and the ataxic group having the greatest number of impairments.
- (Basic Processes): Visual Discrimination, Visual Memory, Spatial relationships, Form Constancy
- (Sequencing), Sequential Memory,
- (Complex Processes) Figure-Ground, Visual Closure

(Berwlowitz& Frantzen, 2021)

Psychosocial

"I will take my flip-flops, put them on and walk to church"

THEME 1: Physical wellbeing

Mobility and posture

Comorbidities

Communication and pain

THEME 2: Activity participation

'They should be going to school but they are not'

Need for assistance with daily activities

'He laughs a lot and plays nicely'

Helping with chores

THEME 3: Family and community

Strong relationships between children and caregivers

Attitudes towards children with CP

'No one to help me'

Deriving meaning from church and religion

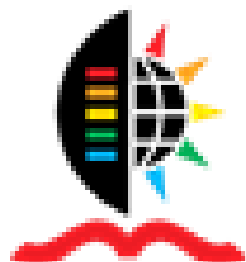
Financial difficulties

Access to services

Thinking about the future

Savage et al, 2020

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