Neurodevelopmental Technique (NDT)

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What is NDT?
The NDTA defines NDT as:

“NDT is a holistic and interdisciplinary clinical practice model informed by current and evolving research that emphasizes individualized therapeutic handling based on movement analysis for habilitation and rehabilitation of individuals with neurological pathophysiology. The therapist uses the International Classification of Functioning, Disability, and Health (ICF) model in a problem solving approach to assess activity and participation, thereby to identify and prioritize relevant integrities and impairments as a basis for establishing achievable outcomes with clients and caregivers. An in-depth knowledge of the human movement system, including the understanding of typical and atypical development, and expertise in analyzing postural control, movement, activity, and participation throughout the lifespan, form the basis for examination, evaluation, and intervention. Therapeutic handling, used during evaluation and intervention, consists of a dynamic reciprocal interaction between the client and therapist for activating optimal sensorimotor processing, task performance, and skill acquisition to enable participation in meaningful activities”
NDT

Overview, History, and Background
NDT- Overview

• Problem-solving approach for the assessment & treatment following a lesion of the CNS

• Focuses on the level of activity instead of the impairment
History & Background of NDT (formerly known as “Bobath Approach”)

• 1943: Dr. Karel & Berta Bobath (U.K.)- Based upon their work with patients afflicted with CP & CVA

• Now: Used in management/treatment of people suffered CVA/CNS pathophysiology

• Hands-on: Problem-solving approach identifies and addresses strengths/impairments related to functional abilities

• Incorporates evidence on neuroplasticity, motor learning and motor control
• According to research (Paci), regarding the effectiveness of NDT. Could not prove that NDT is more effective than other approaches, but could not be discounted as an effective treatment approach

• Asserted standardized guidelines for the approach be established

• Need further research to develop outcome measures

NDT

Principles and Management
Cathy Runyan
Recovering Function
Certified NDT Instructor
• Treat the whole person
• Don’t compensate! Expect change and realize potential for improvement (neuroplasticity)
• Facilitate desired movement, redirect undesired movement
• Emphasize motor control- not the function of individual muscles!
• Look to increase midline orientation-work towards symmetrical postures
• Facilitate- have patient move/weight shift through all planes (A-P, lateral, rotational, diagonal)
• Strengthen via function (functional activities, not individual MS)
• Increase balance through functional activities
• Trunk influences extremities, head/neck, swallowing/speech)
• Address range of motion issues-orthopedic
• Allow for use/incorporate hemiplegic UE & LE into functional activities-What are the benefits of weight bearing?
• Observe patient’s movement tendencies, and assist the patient to move out of abnormal tendencies
• Allow for variety of movement and repetition
• Activities should be meaningful to patient (increases motivation)
• 24 hour management (practice->carryover->learning)
• Treat in upright postures
• Use of environment is essential
• allow patient to learn
Facilitation
• Facilitation- Influence movement patterns so patient has a variety of movement

• Four (4) Principles of Facilitation
  – Methods
  – Types of Touch
  – Proximal Key Points of Control
  – Distal Key Point of Control
Methods & Types of Touch

• Methods
  – Activate appropriate muscles
  – Provide direction to the movement pattern

• Types of Touch
  – Light touch- not supportive
  – Use Open Hand- Increase surface area to influence
  – Grade input to patient by changing pressures under your hand
Proximal Key Points of Control

• Input is directly on muscles to be influenced
• More direct influence over movement
• Therapist has more control of movement pattern
• Gets immediate response from the patient
Distal Key Points of Control

• Not directly on the muscles but on an area that will influence the primary muscles
• Patient has more control over movement pattern
• More challenging for the patient
• Increase response time of patient between facilitation and patient response
Normal Trunk Control
Normal Trunk Control Requirements

• Trunk stability allows Upper & Lower Extremity function
• Dissociation of different body parts- mobility of trunk
• Control of midline orientation (efficient variable movement)
• Head/Neck Control
Patient Starting Alignment (Crucial)

- **Pelvis**: Sitting slight anterior pelvic tilt (need activation of abdominals)
- **Spine**: Normal curves or as close to normal for the individual
- **Head/Neck**: Midline over shoulders
- **Shoulder Girdle**: Aligned over pelvis in all places. UE in support. Need scapular stable against thorax.
- **Humerus** = ER with slight flexion and abduction
- **Elbow** = slight flexion ahead of shoulder
- **Forearm** = pronated for weight bearing
- **Hand** = Lower than elbow with palmar arches intact
- **Lower Extremity** = Knees/feet are inline with hip joints
- **Sitting Position**: **Hip flexion** is no greater than 90 degrees
- **Knees** lower than hips
- **Ankle** subtalar neutral
- **Foot** Weight bearing on entire plantar surfaces but not the arches
Lateral Trunk Flexion

• Extremely important to gait & lower extremity function, upper extremity function, sitting without losing balance, swallowing & speech

• Provide Self Experience to Audience

• What muscles make up lateral lumbar and thoracic flexors
  – Erector Spinae
  – Quadratus Lumborum
  – Latissimus Dorsi
  – Internal/External Obliques and Rectus Abdominis
  – Semi Spinalis
  – Deep Posterior spinal Ms.
  – psoas
Demonstration of Lateral Trunk flexion
Is NDT Evidence-Based?

• Stroke Rehab complex intervention

• Not amenable to the type of RCT originally designed to evaluate the effects of a single intervention such as a drug

• RCT is noted to be “Gold Standard”

• Appropriate when the study is looking at a unidimensional, non-individualized, and controllable intervention (efficacy of a prescription drug)

• Stroke Rehab is not unidimensional, non-individualized, or controllable- Use of RCT paradigm is not appropriate.