How does the Brain Heal?
Introduction to Neurosequential Model of Therapeutic (NMT)

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Facilitator: Helena Kreca & Lindsay Matkovich
Child and Youth Coordinator & Child and Youth Case Manager

Discovery House
What is Neurosequential Model of Therapeutics (NMT)?

• (NMT) is not a specific therapeutic technique or intervention: it is an approach to clinical work that is informed by neuroscience.

• The primary assumption of (NMT) is that the human brain is the organ that mediates all emotional, behavioral, social, motor, and neuro-physiological functioning.
What is Neurosequential Model of Therapeutics (NMT)?

• NMT’s – Three central elements of the model:
  1. Developmental history
  2. Current assessment of functioning
  3. Recommendation for intervention

• Plasticity (works for and against us) - The acute adaptive states, when they persist, can become maladaptive traits. Different parts of the brain at different critical times have plasticity.

• Resiliency is not diplomatic immunity. Children and their brains are not resilient they are malleable.
Why NMT From Childhood to Adulthood?

• Childhood trauma and maltreatment results in enduring emotional, behavioral, cognitive, social, physical problems and in lost potential.

• Traumatic and neglectful experiences during childhood cause abnormal organization and function of important neural systems in the brain, compromising the functional capacities mediated by these systems in adulthood.
Why NMT From Childhood to Adulthood?

• The therapeutic interventions seek to change a person by changing the person’s brain.

• The therapist or teacher is a brain “carpenter” in a process of change assisting the client or student “master carpenter” to reorganize, redevelop her/his brain allowing the brain to learn and function at its optimal potential.

• A client with an optimally functioning brain is set up to successfully implement and maintain desired life-style changes.
NMT and Clinical Implementation

- To successfully implement NMT in clinical services we need to understand the key principles of neurodevelopment and neurobiology

1. **Principle** – The brain is organized in a hierarchical fashion (all incoming sensory input first enters the lower parts of the brain)

   **Clinical Implication** – Pre-cortical association (anything that develops before your neocortex develops, i.e. brain stem, diencephalon, limbic brain) can profoundly interfere with therapeutic work

   - Look at the house’s basement and main floor, it will influence the building of 1, 2, 3 floor. The no-verbal memories of basement or main floor will profoundly interfere with therapeutic work.

   - Extreme anxiety, hyper vigilance and persistently activated threat response system will undermine and prevent socio-emotional and academic learning opportunities.
2. **Principle** – Brain develops and heals “use-dependant”, the “states” become the “traits”

- A child who lived and was abused by an physically abusive alcoholic father, very likely will as an adult recognize and react to any alcoholic male as a life threatening threat. (“volatile client”)

- Neural stimulation or lack of stimulation will result in cellular modification
- The whole brain can be shaped and altered by repetitive activities for good and for bad

**Clinical Implication** – Parts of the brain cannot be changed or developed if they are not activated – (maladaptive behavior develops because of experience and also development of adaptive functions can not take place).

- The threat response and trauma symptoms originate in brainstem and send projections that influence and over time modify function of diencephalic, limbic and cortical functioning.
NMT and Clinical Implementation (cont...)

**Clinical Implication** - Everything that develops before the age of 3 and 4, is less plastic after the age of 6 and it will influence the development and functioning of the rest of the brain for the rest of the life

– Brain heals from the brain stem up. (can't skip steps, insight oriented therapy)

- Neglected children and adults can change and heal. The process is long and it requires patience, repetition and an understanding of brain development.

- Any clinical effort to treat symptoms related to higher parts of the brain without first regulating the brain stem will be insufficient or unsuccessful
3. **Principle** – The brain develops most rapidly and is most vulnerable in early life, by age 4 a child’s brain is 90% adult size.

**Clinical Implication** – The organizing experience of early childhood has the most powerful and enduring effects on brain organization and functioning.

- Three years of neglect can cause a lifetime of dysfunction and lost potential

- The brain stem can be “quieted” by EMDR, dancing, drumming, music, patterned massage (oxytocin), relaxation, deep breathing, yoga, let's do 5,4,3,2,1.

- Start with therapy earlier rather than later
4. **Principle** – Neural systems can be changed but some systems are easier to change than others

   The brain can change: The degree of brain plasticity is related to two main factors
   1. The stage of development
   2. The area or system of the brain (i.e. **cortex** – significant plasticity remains through life, **brain stem** – once the brain has organized - after age 3 plasticity is low)

   **Clinical Implication** – The number of repetitions required to change brainstem neural organization is far greater than the number required to change the cortical neural organization. It is easier to change beliefs than feelings.
NMT and Clinical Implementation (cont...)

5. **Principle** – The human brain by evolutionary design will thrive and fully develop in families of 40-50 members. This is very different from the world than we now live in. Historically for most of human development the ratio was 4 relatives : 1 child.

We live in a time of relational poverty (6 hours of TV time, 1 caregiver 8 children, 1 teacher 30 students).

The more isolated physically and socially a family becomes, the more vulnerable a child becomes.

**Clinical Implication** – Some children have so few relational experiences that they never fully develop their capacity to be socially appropriate, empathic, self-regulating, and humane.
Clinical Implication – foster a rich and multilayered support system in order to counter effect the relational poverty (teachers, coaches, foster parents, siblings, extended family, neighbors, ministers, support groups)

“Children with relational stability and multiple positive, healthy adults invested in their lives improve; children with multiple transitions, chaotic and unpredictable family relationships and relational poverty do not improve even when provided with best ‘evidence based’ therapies.” – Dr. Bruce D. Perry
The Central Clinical Implication of (NMT) Model and Approach

1. **Assessment** – Determining developmental age

   - (17 years old boy in juvenile justice system may only have the relational skills of a 3-year old – group therapy insight oriented is a NO, NO.)

   - age – (chronological, emotional, social, cognitive, physical, moral, spiritual)

2. **Intervention** needs to be - **relevant** – developmental age

   - relational – provide a sense of safety and predictability

   - repetitive – sufficient number of repetition and duration to produce actual change in the target neural system

   - reward – pleasure is gained from the intervention activity
The Central Clinical Implication of (NMT) Model and Approach

Successful treatment with traumatized clients must first regulate the brain stem’s hyper-vigilance and deregulated stress response system.
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Adverse Childhood Experience Study, (ACE)

• The (ACE) study began in 2003 as a collaboration between the Department of Preventative Medicine at Kaiser Permanente and Centre for Disease Control in Atlanta.

• The (ACE) study documents the conversion of childhood trauma into organic disease across the life span.

• 17,461 mostly college educated middle aged Americans were randomly chosen for this study.
Adverse Childhood Experience Study, (ACE)

• The (ACE) study looked at 8 categories of childhood abuse and household dysfunction:
  
  • Mother was a victim of DV
  • Recurrent physical abuse
  • Recurrent emotional abuse
  • Contact sexual abuse
  • Alcohol or drug abuser in the household
  • An incarcerated household member
  • Someone is chronically depressed, mentally ill or suicidal
  • One or no parents
  • Emotional and physical neglect
Adverse Childhood Experience Study, (ACE)

- No ACE’s is a score of 0. Exposure to 4 of ACE categories is a score of 4.
- Results of ACE study:
  - Exposure to 1 category indicated 80% likelihood of being exposed to more
  - A male child with a score of 4 has 4,600% increase in the likelihood of becoming IV drug user
  - A person with a score 4 or more is 460% more likely to suffer depression
  - A person with a score 4 has 1,220% increase in the likelihood they will attempt suicide
  - Persons with heart disease, fractures, obesity, unplanned pregnancies, STD’s and alcoholism had higher ACE scores than persons without these conditions
  - Higher ACE scores were also associated with worsened occupational health and safety (accidents on the job) and problems with job performance
Adverse Childhood Experience Study, (ACE)

• ACE conclusion:
  • Adverse childhood experiences are surprisingly common, concealed, and unrecognized.
  • ACE’s still have a profound effect 50 years later.
  • ACE’s 50 years later are transformed from psychosocial experiences into organic disease, social malfunction, mental illness.
  • ACE’s are the main determinant of the health and social well-being of the nation.
QUESTIONS?