EARLY CHILDHOOD EXPERIENCE AND THE DEVELOPMENTAL COURSE

George E. Davis, MD
for
The ChildTrauma Academy
WHO ARE WE TALKING ABOUT...

AND HOW DID THEY GET THAT WAY?
WHO ARE WE TALKING ABOUT?

- Steven
  - Ready to learn
  - Rested and fed
  - Attentive
  - Responsive to instruction and redirection
  - Absorbent

- Alice
  - Impulsive
  - Irritable
  - Inattentive
  - Disinterested and preoccupied
  - Rude to adults
  - Conflicted with peers
THE TWO CASES OF TRAUMA

I. A child of eight is mauled by a neighbor’s pet. The initial attack is followed by two reconstructive surgeries and six months of rehabilitation. He suffers from nightmares and recurrent intrusive memories, his fear of dogs keeps him from playing outdoors, he is irritable and unhappy and he fights with his siblings. He loses interest in school and friends for nearly six months. Eventually, the parents are able to find specific treatment for trauma, he is briefly on antidepressants, and within eighteen months he is virtually back to his previous self.
II. A child of six comes into state custody after being reported by the school for neglect. The mother is a methamphetamine addict who has had a number of other adults living in the home, the child has been sexually and physically abused, in addition to the extended and pervasive neglect of her basic care. She has some peer related behavior problems, infrequent and unpredictable anger and self-control problems, and does poorly in school. Not many fears, not much obvious depression, and a surprising competence at self-care.
TRAUMA and DEVELOPMENT

THE TWO TYPES OF TRAUMA

I. **TYPE I** SINGLE INCIDENT TRAUMA
   - Responds relatively well to carefully constructed treatment
   - Fits the criteria for DSM IV diagnosis of PTSD

II. **TYPE II** DEVELOPMENTAL TRAUMA
   - Responds less easily to intervention
   - Does not fit well into the DSM IV criteria for PTSD
   - Does not fit well into *any* DSM IV diagnostic criteria
   - Can also be called Reactive Attachment Disorder
TRAUMA and DEVELOPMENT

TWO CASES OF TRAUMA—**PROGNOSIS**

I. Single incident PTSD has a distinct presentation with active, and sometimes extreme symptoms related to the trauma itself. More like a foreign body than an infection. Although single incident trauma may leave permanent tracks, it does not usually spread into the entire personality, and full functional recuperation is possible. A person with childhood PTSD still has a high chance of fully functioning as an adult.
TRIUMA and DEVELOPMENT

■ TWO CASES OF TRIUMA—PROGNOSIS

■ II. In contrast, Developmental Trauma has an indistinct relationship to the trauma itself—fewer nightmares, less active or intrusive memories, and less avoidance of traumatic stimuli. Sometimes the full consequences of early developmental trauma are not fully appreciated until adolescence—the “time bomb” effect. The effects are more pervasive, and cross the boundaries of emotion, cognition, reality testing and personality. (cont.)
II. (cont.) The second child went on to have early behavior problems and marked oppositional attitudes toward caretakers and authorities, overall poor school performance, and unsuccessful and conflicted peer relationships. She initiated drug use in middle school, was sexually active by 14, and eventually served time as a juvenile for repeated probation violations. She went on to a conflicted and violent marriage, had children whose custody was assumed by the state, and repeated the process.
Children like the second fill the case loads of social workers, psychologists, special education teachers, therapists, child psychiatrists and probation officers. They first enter the child protective system, then transition to the psychiatric hospitals and RTCs, and eventually enter the juvenile justice system.
“People with childhood histories of trauma, abuse and neglect make up almost the entire criminal justice population in the U.S.” (van der Kolk, 2004)
TRAUMA and DEVELOPMENT

THE SALIENT FEATURES of DEVELOPMENTAL TRAUMA

- Repetition of Trauma
- More than one Kind of Trauma
- Early Age
- Chronicity and Persistence
- Interpersonal / Intra-familial
TRAUMA and DEVELOPMENT

WHAT IS THE SCOPE OF THE PROBLEM?

- Three Million Child Abuse Reports Per Year
- One Million are Substantiated
- The Meaning of Substantiation
- Realistic Figures
ADVERSE CHILDHOOD EXPERIENCES (ACE) STUDY BY CDC AND KAISER

- 17,337 Adult Subjects make up the Total Sample
- 11% Emotionally Abused
- 28% Physically Abused
- 21% Sexually Abused
- 27% Exposed to Drug or Alcohol Abuse
- 19% Exposed to Mental Illness
- 13% Witnessed Violence Toward Their Mothers
- 23% Lost a Parent due to Divorce or Separation
- 63% Experienced at Least One Category of Negative Childhood Experience, and 20% had Three
Definitions of Adverse Childhood Experiences

1. Emotional Abuse
2. Physical Abuse
3. Sexual Abuse
4. Emotional Neglect
5. Physical Neglect
6. Mother Treated Violently
7. Household Substance Abuse
8. Household Mental Illness
9. Parental Separation or Divorce
10. Incarcerated Household Member
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THE LONG TERM EFFECTS OF ADVERSE CHILDHOOD EXPERIENCES

**Childhood Experiences Underlie Chronic Depression**

- Bar graph showing the percentage of women and men with chronic depression based on ACE score.

**ACE Score vs. Injected Drug Use**

- Bar graph showing the percentage of injected drug use based on ACE score.

**Childhood Experiences vs. Adult Alcoholism**

- Bar graph showing the percentage of adult alcoholism based on ACE score.
THE LONG TERM EFFECTS OF ADVERSE CHILDHOOD EXPERIENCES

- Smoking
- Chronic obstructive pulmonary disease
- Hepatitis
- Heart disease
- Diabetes
- Obesity
- Alcoholism
- Fifty or more sexual partners
- Other substance abuse including IV drug use
- Depression and attempted suicide
- Teen pregnancy (including paternity)
- Sexually transmitted diseases
- Poor occupational health and poor job performance
The findings of this study suggest that these experiences – ACEs – are the leading causes of illness, death and poor quality of life in the United States.
THE NORMAL BIOLOGICAL STRESS RESPONSE

WHAT HAPPENS IN THE SINGLE TRAUMATIC EVENT?

- Trauma Induces a Flood of Neurotransmitters (Norepinephrine / Adrenaline)
  - Adaptive Responses of “Readiness”
  - Fight or Flight
  - Increase Heart/Breath Rate
  - Increased Selective Attention
  - Decreased Peripheral Attention
  - Enhanced Selective Memory
THE NORMAL BIOLOGICAL STRESS RESPONSE

THE ACTIVATION of the STRESS RESPONSE SYSTEM
THE RESPONSES TO CHRONIC TRAUMA

- Hyperarousal—A consistently high level of watchfulness and reactivity to situational threat
- Dissociation—A decreased level of arousal and reactivity to immediate or remembered threat
- The different kinds of “attention”
- The effects on school performance
THE RESPONSES TO CHRONIC TRAUMA

Learning
Learning Disabilities
Creativity
Behavior
Social Adequacy

CORTEX
------------------------------------------
LIMBIC
---------------------------------------
DIENCEPHALON
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BRAINSTEM
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THE BIOLOGICAL CONSEQUENCES OF DEVELOPMENTAL TRAUMA

- THE ROLE OF NEUROTRANSMITTERS IN THE DEVELOPING BRAIN
  - Neuron Creation (100 Billion)
  - Neuronal Migration
  - Neuronal Differentiation
  - Synaptic Proliferation (1,000 Trillion)
  - Synaptic Pruning
  - Myelination
**EARLY BRAIN DEVELOPMENT**

- **Synaptic pruning**—begins to sculpt the synapses between neurons depending upon which connections are reinforced by experience. This is called “use dependent development.”
EARLY BRAIN GROWTH AND DEVELOPMENT

EARLY BRAIN GROWTH

- From the last trimester to the 2nd year the size of the brain doubles
- 10% AT BIRTH
- 75% BY 24 MONTHS
- 90% BY FIVE YEARS
- HEAD CIRCUMFERENCE
The brain is undeveloped at birth

The brain organizes from the “bottom up”—brainstem to cortex and from the inside out

Organization and functional capacity of neural systems is sequential

Experiences do not have equal significance throughout development
THE DEVELOPMENTAL EFFECTS OF MALTREATMENT

The CONSEQUENCES of ABUSE and NEGLECT SHARE the CORE FEATURES of OPPOSITIONAL DEFIANCE and CONDUCT DISORDER

- Impulsivity
- Dysregulation of Arousal
- Dysregulated Moods—Labile and Changeable
- Dysregulated Behavior—Explosive and Aggressive
- Poor Interpersonal Relations—Impaired Attachments and Empathy
- Impaired frontal “Executive Functions” like Insight, Introspection, Patience, Prediction and Planning
THE DEVELOPMENTAL EFFECTS OF MALTREATMENT

THE THREE FUNDAMENTAL EFFECTS OF EARLY CHILDHOOD MALTREATMENT AND NEGLECT:

- Dysregulation of arousal
- Dysregulation of reward
- Attachment disturbance
Altered Reactivity From Chronic Threat

- A stressful event, when repeated at critical times in development leads to a neurological change
- Repeated incidents influence temperament, the temperament becomes a state, and the state becomes a trait
MANY KINDS OF MEMORY

- Conscious memory—*explicit*
- Unconscious memory—*implicit*
- Neurological memory—*arousal and distress*
SPECIFIC TO GENERAL

- The brain takes associations from a single or specific event and generalizes to other situations.

- The brain can generalize from the single abusive father to all adult males.

- This process of generalization can literally alter the way future experiences are sensed, perceived and processed.
DEVELOPMENTAL TRAUMA

- BASIC REGULATORY FUNCTIONS are NORMALLY ESTABLISHED in INFANCY and EARLY CHILDHOOD
  - By caretakers who soothe, comfort, and consistently attend to the infant
  - Through the protection of the infant from environmental and interactional stressors
  - By the external regulation of the infant who is not initially capable of self-regulation
Brain Development and States of Arousal

- Caregivers of secure children respond quickly to negative emotions that are stressful to the child, helping to reduce the stress hormones in their child’s body.
- The best caretakers also enhance positive emotions through play and social interactions, increasing the positive neurotransmitters that enhance neuronal growth and brain maturation.
THE DEVELOPMENTAL ORIGINS OF THE SOCIAL BRAIN

- The future of the individual and the future of society are both dependent upon characteristics and capacities that are derived from early childhood experiences with primary caretakers.
  - Empathy
  - Self-Soothing and Regulation of Emotional States
  - Caretaking of the Next Generation
THE DEVELOPMENTAL ORIGINS OF THE SOCIAL BRAIN

- Very early infant foundations of empathy are found in initial bonding operations: (Meltzoff and Decety, 2003)
  - Imitation of facial expressions
  - Response to distress calls of other infants
  - Eye contact and response
  - Imitation of vocalizations

- Refinement and advancement of empathic responses develop into early adulthood
THE SOCIAL BRAIN

- NEUROCHEMICAL BASIS OF ATTACHMENT AND BONDING
  - Attachment and nurturing are highly rewarded activities early in life
  - Neurotransmitters initiate and accompany early developing interpersonal interactions
  - Also the reverse: Nurturing and attachment behaviors stimulate the production of particular reward neurotransmitters and proliferate the neurons which produce them
THE SOCIAL BRAIN

ENDORPHINS (opiates)

- Overall decreased pain and increased well being
- The satisfaction of proximity in both mother and infant is mediated by opioid neurotransmitters
- Endorphins promote a sense of safety and comfort for the infant in the presence of the mother
- Administration of opioids decreases affiliation and attachment behaviors in both infant and mother rats
- Opiates decrease caretaking behaviors in parents
- Opiates reduce the pain of separateness and satisfy the craving for satisfying attachments
DOPAMINE (cocaine)

- Dopamine drives the central reward system, including but not limited to social interactions and attachment.
- By rewarding certain actions and responses, dopamine directs the learning of attachment.
- Repeatedly separating rat pups from caregivers decreases dopamine production and increases reactivity to stress. It also increases sensitivity to cocaine as a reward. (Meany, Brake and Gratton, 2002)
- As the one of the end targets for the dopamine reward system, the frontal lobes organize and reinforce both addiction and attachment.
Emotional Neglect and Substance Use

- Lack of early life attachment leads to underdevelopment of ‘reward’ systems
- Therefore, the reinforcing effects of relationships or intimacy is minimal
- External stimulation of these reward systems using dopamine-stimulating (e.g., cocaine) or opioid-like drugs becomes an alternative route to reward
THE SUPPORTIVE RESEARCH
THE BIOLOGICAL CONSEQUENCES OF DEVELOPMENTAL TRAUMA

THE PHYSIOLOGICAL RESPONSE TO CHRONIC STRESS IN CHILDREN

18 traumatized prepubertal children with PTSD and 10 children with generalized anxiety but no trauma and 24 healthy children without trauma are compared with regard to their urinary metabolites of cortisol and catecholamines (DeBellis et al, 1999)

- Traumatized children excreted significantly more cortisol
- Traumatized children excreted more catecholamine metabolites
THE BIOLOGICAL CONSEQUENCES OF DEVELOPMENTAL TRAUMA

- **TRAUMA and the MEASUREMENT of BRAIN EFFECTS** (DeBellis, 1999)
  - 44 maltreated children with PTSD and 61 controls are compared with respect to MRI scans
  - Mistreated children with PTSD had 8% smaller cerebral volumes than the children with no trauma
  - Corpus callosum is smaller in abused subjects
THE BIOLOGICAL CONSEQUENCES OF DEVELOPMENTAL TRAUMA

- SMALLER BRAIN SIZE CORRELATES WITH: (DeBellis, 1999)
  - Earlier onset of trauma and PTSD
  - More symptoms of PTSD—intrusive thoughts, avoidance, hyperarousal and dissociation
  - Longer duration of abuse
THE BIOLOGICAL CONSEQUENCES OF DEVELOPMENTAL TRAUMA

- **THE “TIME BOMB” EFFECT** (Teicher, AACAP 2007)
  - Delayed symptoms of drug use—the trauma is early, but the drug and alcohol use begins with a remarkable surge in teens—far above controls
  - Sexual abuse as a child often precedes the major depressive episodes by nine years
  - Physical and sexual abuse in children remarkably raises the chances of later delinquency of all kinds when they reach adolescence
THE BIOLOGICAL CONSEQUENCES OF DEVELOPMENTAL TRAUMA

TRANSGENERATIONAL TRANSMISSION

- As part of a 20 year follow up of a child sexual abuse study (actually poly-abuse is more accurate), the children of these same victims were studied (Putnam, AACAP 2007)
- The children of the victims were reviewed at 6 different time periods
- 96% retention of the sample
- The study revealed the “enormous adversity” suffered by this group and by their mothers
THE BIOLOGICAL CONSEQUENCES OF DEVELOPMENTAL TRAUMA

- RESULTS COMPARED TO CONTROLS
  (Putnam, AACAP 2007)
  - Repeat victimization X 2
  - Self harm X 4
  - Decreased cognitive capacity and performance
  - Decreased social competence
THE BIOLOGICAL CONSEQUENCES OF DEVELOPMENTAL TRAUMA

RESULTS COMPARED TO CONTROLS (Putnam, AACAP 2007)

- Cortisol dysregulation
- Increased FSH/LH ratio (menstrual regulation)
- Increased ANA (autoimmune response)
- Earlier puberty
- Increased body mass index (obesity)
- Decreased vocabulary acquisition
THE BIOLOGICAL CONSEQUENCES OF DEVELOPMENTAL TRAUMA

RESULTS COMPARED TO CONTROLS

(Putnam, AACAP 2007)

- Mean IQ of offspring is 87, compared to control mean of 95 in the controls
- More substance abuse
- More domestic violence
- More viruses
- More school absences
- 12 times more headaches
- 8-12 times greater risk for delinquency in girls
THE BIOLOGICAL CONSEQUENCES OF DEVELOPMENTAL TRAUMA

MALES COMPARED TO FEMALES

- Females may be more sensitive to interpersonal trauma and attachment disturbances.
- Females will exhibit more “internalizing” symptoms such as depression and anxiety.
- Males will exhibit more “externalizing” symptoms such as hyperactivity, aggression and delinquency.
- Males in particular are more violently activated by physical abuse.
POOR PARENTING IS TRAUMATIC (Dettling, Gunnar & Donzella, 1999)

- When care providers were actively and positively involved with the child, cortisol levels remained low and stable.
- When care giving was inconsistent, negative or absent, cortisol rose steeply and remained highly responsive to subsequent stressors.
- Maternal depression specifically caused increased cortisol levels (Essex, Cho & Kalin, 2002).
TRAUMA and DEVELOPMENT

**FOSTER CARE REDUCES STRESS**
(Fisher, Burrasten & Pears, 2005)

- Institutional Care of Infants and Children Causes the Same Increase in Cortisol, and Hypersensitivity of the HPA axis
- Frequent Changes in Caregivers Increased Cortisol
- Children Moved to Foster Families Showed some Moderate Decreases in Cortisol Levels
- Children in Treatment Foster Care Eventually Normalized their Cortisol Levels
THE BUCHAREST EARLY INTERVENTION PROJECT

- Charles Zeanah and Anna Smyke (Tulane University)
- Nathan Fox (University of Maryland)
- Sebastian Koga (University of Virginia)
- Dana Johnson (University of Minnesota)
- Peter Marshall (Temple University)
- Charles Nelson (Harvard University)
The Bucharest Early Intervention Project (BEIP) is the first ever randomized trial of foster care as an intervention for the negative developmental effects of social deprivation in young children in alternative care (Zeanah, Nelson, Fox, Smyke, Marshall, Parker and Koga, 2003 Development and Psychopathology, 15, pp 885-907)
THE BUCHAREST EARLY INTERVENTION PROJECT

THE DESIGN OF THE STUDY

- 136 institutionalized children between 6 and 31 months initially assessed at baseline
  - 68 randomly assigned to remain in institution (IG)
  - 68 randomly assigned to foster care (FG)
- 72 never institutionalized children matched by age and gender as controls (NIG)
THE BUCHAREST EARLY INTERVENTION PROJECT

CHILDREN ASSESSED AT:
- Baseline (mean age = 22 months)
- 9 months
- 30 months
- 42 months
- 54 months
- 8 year follow up in planning
THE BUCHAREST EARLY INTERVENTION PROJECT

- DOMAINS OF ASSESSMENT:
  - Physical Development
  - Language
  - Social-Emotional Development
  - Cognition
  - Temperament
  - Attachment
  - Brain Function
  - Mental Health Status
THE BUCHAREST EARLY INTERVENTION PROJECT

THE HYPOTHESES:

- The deficits and delays that result from institutional care originate in compromised brain development
  - For the brain to wire correctly, it needs input
  - Lack of input results in under-wiring and mis-wiring of crucial brain circuits
  - The lack of social / interpersonal stimulation that occurs in institutional care or bad care results in poor brain development
  - Poor brain development is the cause of the social, intellectual, physical and attachment deficits seen in institutionalized children
THE BUCHAREST EARLY INTERVENTION PROJECT

- HYPOTHESES (cont):
  - Some domains of development are more experience-dependent than others
  - The different domains have different sensitive periods
  - The benefits of foster care will vary by domain and by duration and by the timing of foster care
THE BUCHAREST EARLY INTERVENTION PROJECT

RESULTS:

- The IQ of children raised in institutions is lower than that of those raised in birth homes or foster care.
- Children transferred to foster care show marked gains in IQ.
- The age of entry into foster care matters.
- Children placed in FC before 24 months display better improvement than those entering later.
THE BUCHAREST EARLY INTERVENTION PROJECT

RESULTS:

- Institutionalized children show less positive affect and attention to emotionally designed tasks
- Transfer to foster care improves these responses and overall emotional responsiveness
THE BUCHAREST EARLY INTERVENTION PROJECT

RESULTS:

- Institutionalized children show lower levels of brain activity across the board as measured by EEG
- Institutionalized children exhibit impaired physical growth and development
- Improvement is enhanced both by placement before 24 mo and by duration of placement
Common Mistaken Diagnoses

- Dysregulation of Mood looks like *Bipolar Affective Disorder*
- Dysregulation of Attention looks like *ADHD*
- Dysregulation of Behavior and Impulse looks like *Delinquency*
- Low Interpersonal Sensitivity and Empathy looks like *Psychopathy* and *Sociopathy*
- Dysregulation of Reward Circuits appears as *Drug Addiction*
Commonly Applied Interventions

- Medication
- Verbal / Insight Therapies
- Cognitive / Behavioral--Contingent
- Coercive Interventions
- Correctional Interventions
- Hospitalization
Assessment and Treatment with the Neurosequential Model of Therapeutics: NMT Brain Metric and Developmentally Informed Interventions
The NMT Metrics are tools which provide a semi-structured assessment of important developmental experiences, both good and bad, and a representational schemata of current brain organization and functioning.

This information can aid the clinician, the teachers and the caregivers in the ongoing therapeutic process.

The results from the NMT Metrics are not viewed as a stand-alone psychological, neuropsychological, psychiatric or psychoeducational evaluation.

The NMT metric is intended to provide broad direction for the selection of developmentally appropriate enrichment, therapeutic and educational activities.