THE NEUROPSYCHOLOGICAL AND NEUROENDOCRINE EFFECTS OF CHILDHOOD TRAUMA: IMPLICATIONS FOR TREATMENT

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Up to 70% of children and adolescents will experience at least one traumatic event by age 18 (Finkelhor et al., 2007; 2009)
- Significant minority will experience multiple forms
- 22% will be revictimized in the next 12 months

Increases risk of being victimized as adults

ACE studies
- Abuse, neglect, mentally ill caregiver, parental incarceration
- 63% had experienced an ACE
- Over 20% experienced 3 or more
# Child Trauma Outcomes

**Psychiatric Disorders**
- PTSD
- Depression
- Substance Use Disorders
- Personality Disorders
- ADHD
- ODD/CD
- Suicide Attempts

**Overall functioning**
- Sleep disturbances
- Occupational/School
- Developmental Delays
- Social
- Divorce
- Poor Quality of Life
Increased mortality:

- Prevalent Diseases:
  - Cardiovascular disease
  - Cancer
  - Asthma
  - Metabolic syndrome
  - Autoimmune disorders
  - Type II Diabetes
  - COPD

- Risk Factors for Common Diseases
  - Smoking
  - Obesity
  - Substance use
  - STDs
DOSE-RESPONSE RELATIONSHIP BETWEEN ACE AND DISEASE

ACE Score & Risk for Chronic Disease

- 3.9 x higher risk with ACE of 4 or more
- Lung Disease
- Heart Disease
- Any Cancer
- Diabetes

Disease risk increases with ACE scores, Felitti et al, 1998
Significant Adversity Impairs Development in the First Three Years

Children with Developmental Delays

Number of Risk Factors

Source: Barth et al. (2008)
IMPACT OF CHILD TRAUMA

Most Maltreated Children Have Developmental Problems

- Cognitive Problems: 23 – 65%
- Speech Delays: 14 – 64%
- Health Problems: 22 – 80%
- Motor Delays: 4 – 47%
- Mental Problems: 10 – 61%

KidSTART: www.rchsd.org/programs-services/kidstart
Lower IQ
Lower achievement
Decreased reading ability
Learning Disabilities
Referrals for IEPs
Attention problems
  - ADHD diagnoses
Working memory
Executive functioning
Learning
Memory
THE AGE OF THE BRAIN
STRESS RESPONSE

- Acute Stress
  - HPA axis
  - Heart rate
  - Hormone levels
BEYOND THE HPA AXIS

- **Chronic Stress**
  - Altered HPA axis functioning
    - GC negative feedback
    - Cortisol
    - Cortisol reactivity
  - Immune system
  - Metabolic hormones
  - Steroid Hormones
TRAUMA IMPACTS THE BRAIN

- Smaller brain volumes
- Fewer neural connections
- Decreased myelination
- Increased activity in the brainstem
  - Alterations in autonomic functions
- Decreased activity in the cerebellum and cortex
CHILD TRAUMA & THE BRAIN
Healthy Brain

This PET scan of the brain of a normal child shows regions of high (red) and low (blue and black) activity. At birth, only primitive structures such as the brain stem (center) are fully functional; in regions like the temporal lobes (top), early childhood experiences wire the circuits.

An Abused Brain

This PET scan of the brain of a Romanian Orphan, who was institutionalized shortly after birth, shows the effect of extreme deprivation in infancy. The temporal lobes (top), which regulate emotions and receive input from the senses, are nearly quiescent. Such children suffer emotional and cognitive problems.
CHILD TRAUMA & THE BRAIN

Teicher et al., 2014
The plasticity of the brain allows for hope!

- Importance of early intervention

- Changes will not disappear over time
  - Perhaps continue to worsen if untreated

- Unlikely to be completely resolved
IMPLICATIONS FOR TREATMENT

- Outside of the office
- Team approach
- Working with the systems
- Repetition
- Executive functioning
- Widespread focus
  - Health
  - Risky behaviors
- Engagement in treatment
- Homework, homework, homework
- Caregiver support
IMPORTANCE OF EARLY TREATMENT

The Brain’s Ability to Change in Response to Experiences

Amount of Effort Such Change Requires

AGE

Birth 2 4 6 8 10 20 30 40 50 60 70
We know that therapy is effective in reducing symptoms of PTSD

- Altered brain activation after therapy
  - Farrow et al., 2005: increased brain activity during empathy judgments and during judgments of forgiveness
  - Felminham et al., 2007: symptom improvement correlated with increased activation in the right ACC and decreased activation in the amygdala after exposure-based CBT
DOES THERAPY CHANGE THE BRAIN?

- Peres et al., 2007:
  - CBT group experienced less intense emotions during retrieval of trauma memories, accompanied by increased activity in the left PFC and decreased activity in the left amygdala, left hippocampus, and left thalamus

- Roy et al., 2010:
  - fMRI VRET and PE with combat veterans
  - Normalization of activity in the amygdala and PFC
NEW DIRECTIONS

- What about children?
  - Improved responses?
  - Prevent conditions?
- Other brain changes?
- Importance of early intervention and screening
  - American Academy of Pediatrics recommends PCP to screen for signs of toxic stress
  - Specialized early interventions
- Predicting responses to treatment
  - Imaging
  - Biomarkers