

The Biological Effects of Childhood Trauma

Michael D. De Bellis, MD, MPH*, Abigail Zisk, AB

KEYWORDS

- Childhood trauma • Developmental traumatology • Developmental psychopathology
- Posttraumatic stress symptoms • Stress • Biological stress systems
- Brain development • Genes

KEY POINTS

- Trauma in childhood is a grave psychosocial, medical, and public policy problem that has serious consequences for its victims and for society.
- Chronic interpersonal violence in children is common worldwide.
- Developmental traumatology, the systemic investigation of the psychiatric and psychobiological effects of chronic overwhelming stress on the developing child, provides a framework and principles when empirically examining the neurobiological effects of pediatric trauma.
- Despite the widespread prevalence of childhood trauma, less is known about trauma's biological effects in children than in adults with child trauma histories and even less is known about how these pediatric mechanisms underlie trauma's short-term and long-term medical and mental health consequences.

INTRODUCTION

Trauma in childhood has serious consequences for its victims and for society. For the purposes of this critical review, childhood trauma is defined according to the *Diagnostic and Statistical Manual of Mental Disorders (Fourth Edition) (DSM-IV)* and the *Diagnostic and Statistical Manual of Mental Disorders (Fifth Edition) (DSM-V)* as exposure to actual or threatened death, serious injury, or sexual violence.^{1,2} This includes experiences of direct trauma exposure, witnessing trauma, or learning about trauma that happened to a close friend or relative. In children, motor vehicle accidents, bullying, terrorism, exposure to war, child maltreatment (physical, sexual, and emotional abuse; neglect) and exposure to domestic and community violence are common types of childhood traumas that result in

Healthy Childhood Brain Development and Developmental Traumatology Research Program, Department of Psychiatry and Behavioral Sciences, Duke University Medical Center, Box 104360, Durham, NC 27710, USA

* Corresponding author.

E-mail address: michael.debellis@duke.edu

Child Adolesc Psychiatric Clin N Am 23 (2014) 185–222

<http://dx.doi.org/10.1016/j.chc.2014.01.002>

childpsych.theclinics.com

1056-4993/14\$ – see front matter © 2014 Elsevier Inc. All rights reserved.

Abbreviations	
ACTH	Adrenocorticotrophic hormone (also called "corticotropin")
AVP	Arginine vasopressin
BDNF	Brain-derived neurotrophic factor
CRF	Corticotropin-releasing factor
CRH	Corticotropin-releasing hormone
CSF	Cerebrospinal fluid
HPA	Hypothalamic-pituitary axis
LC	Locus coeruleus
LHPA	Limbic-hypothalamic-pituitary-adrenal
PFC	Prefrontal cortex
PTSD	Posttraumatic stress disorder
PTSS	Posttraumatic stress symptoms
SNPs	Single nucleotide polymorphisms
SNS	Sympathetic nervous system

distress, posttraumatic stress disorder (PTSD), and posttraumatic stress symptoms (PTSS). Childhood traumas, in particular those that are interpersonal, intentional, and chronic, are associated with greater rates of PTSD,³ PTSS,^{4,5} depression⁶ and anxiety,⁷ and antisocial behaviors⁸ and greater risk for alcohol and substance use disorders.^{9–12}

The traditional categorical clusters of symptoms that form the diagnosis of PTSD are each associated with differences in biological stress symptoms and brain structure and function and are thought to individually contribute to delays in or deficits of multi-system developmental achievements in behavioral, cognitive, and emotional regulation in traumatized children and lead to PTSS and comorbidity.¹³ Thus, this article examines PTSD as a dimensional diagnosis encompassing a range of pathologic reactions to severe stress rather than as a dichotomous variable.

Developmental traumatology, the systemic investigation of the psychiatric and psychobiological effects of chronic overwhelming stress on the developing child, provides the framework used in this critical review of the biological effects of pediatric trauma.¹³ This field builds on foundations of developmental psychopathology, developmental neuroscience, and stress and trauma research. The *DSM-IV* (Text Revision) diagnosis of PTSD is made when criterion A, a type A trauma, is experienced and when 3 clusters of categorical symptoms are present for more than 1 month after traumatic event(s). These 3 clusters are criterion B: intrusive re-experiencing of the trauma(s); criterion C: persistent avoidance of stimuli associated with the trauma(s); and criterion D: persistent symptoms of increased physiologic arousal.¹ These criteria are complex and each criterion is thought to be associated with dysregulation of at least 1 major biological stress system as well as several different brain circuits. This makes both the psychotherapeutic and the psychopharmacologic treatment of individuals with early trauma complex and challenging.

Criterion symptoms have an experimental basis in classical and operant conditioning theory, where animals learn to generalized behaviors based on previous experiences, or reinforcements,¹⁴ and in animal models of learned helplessness, where animals under conditions of uncontrollable shock do not learn escape behaviors and have exaggerated fear responses as well as social isolation and poor health.¹⁵ For example, cluster B re-experiencing and intrusive symptoms can best be conceptualized as a classically conditioned response that is mediated by the serotonin system and is similar in some ways to the recurrent intrusive thoughts experienced in obsessive-compulsive disorder, where serotonin and norepinephrine transmitter

Download English Version:

<https://daneshyari.com/en/article/4150674>

Download Persian Version:

<https://daneshyari.com/article/4150674>

[Daneshyari.com](https://daneshyari.com)