



# Stress, Trauma and Post-traumatic Stress Disorders in Children

## An Introduction



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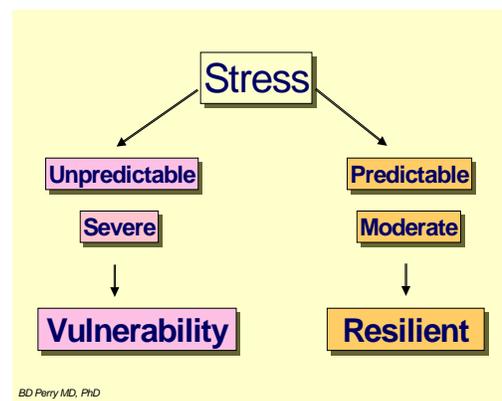
### Introduction

Each year in United States more than five million children experience some extreme traumatic event. These include natural disasters (e.g., tornadoes, floods, hurricanes), motor vehicle accidents, life threatening illness and associated painful medical procedures (e.g., severe burns, cancer), physical abuse, sexual assault, witnessing domestic or community violence, kidnapping and sudden death of a parent. More than 40 % of these children will develop some form of chronic neuropsychiatric problem that can significantly impair their emotional, academic and social functioning. The majority of these neuropsychiatric problems are classified as Anxiety Disorders, with the most common being Post-traumatic Stress Disorder (PTSD).

The purpose of this booklet is to provide an overview of PTSD in children. While targeted for an interdisciplinary audience, portions may be helpful to parents and caregivers living with children suffering with PTSD.

### Stress and Adaptation

Post-traumatic stress disorder and other neuropsychiatric symptoms that are seen following traumatic events are related to the symptoms that are present during the acute response to threat. Indeed, PTSD, a disorder, originates from the maladaptive persistence of *appropriate* and *adaptive* responses present during traumatic stress. The organ mediating the adaptive – and the maladaptive – responses related to traumatic stress is the human brain.



Our brain is designed to sense, process, store, perceive and act on information from the external and internal world to keep us alive. In order to do this, our brain has hundreds of neural systems, all working in a continuous, dynamic process of modulating, regulating, compensating - increasing or decreasing activity to control the body's physiology. Each of our many complex physiological systems has a rhythm of activity that regulates key functions. When blood sugar falls below a certain level, a set of compensatory physiological actions is activated. When tissue oxygen is low from exertion, when an individual is dehydrated, sleepy or threatened by a predator, still other sets of regulating activity will be turned on to respond to the specific need. For each of these systems there are 'basal' or homeostatic patterns of activity within which the majority of environmental challenges can be sustained. When an internal condition (such as dehydration) or an external challenge (an unpredictable and unstable employment situation) persists, this is a stress on the system.

Stress is a commonly used term in both lay and professional language. Unfortunately, there often is not agreement about what stress actually means. For the purposes of this booklet - and using a concept more commonly familiar to biologists - stress is any challenge or condition which forces the our regulating physiological and neurophysiologic systems to move outside of their normal dynamic activity. Stress occurs when homeostasis is disrupted. Traumatic stress is an extreme form of stress.

It is important to understand that stress during development is not necessarily a bad thing. Indeed, the development of stress-response neural systems depends upon exposure to moderate, controllable levels of stress. The opportunity for a toddler to control his or her exploration, to discover and to experience moderated novelty is essential for healthy development. Children given the opportunity for moderate, controlled exposures to stress during childhood - with a consistent, available and safe caregiver to serve as "home-base" can become inoculated against future more severe stressors. The levels of arousal and "stress" associated with novelty and safe exploratory behavior help build a healthy child.

Dramatic, rapid, unpredictable, or threatening changes in the environment, however, will activate 'stress'-response systems. These brain-mediated responses recruit a set of central and peripheral nervous system, neuroendocrine and immune responses that promote adaptive 'survival' functions and, later, a return to equilibrium or homeostatic patterns. Events that disrupt homeostasis are, by definition, stressful. If this stress is severe, unpredictable, prolonged or chronic, the compensatory mechanisms can become over-activated, or fatigued and incapable of restoring the previous state of equilibrium or

### Activity-dependent Neural Differentiation

- Neurons are designed to change in response to patterned repetitive stimulation
- During development, patterns of activity define patterns of synaptic connectivity and, thereby, functional capacity
- In adults, activity can alter pre-existing neural organization - in children, activity literally provides the organizing template for neural systems

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homeostasis. The physiological system re-organizes its 'basal' patterns of equilibrium. An event is 'traumatic' if it overwhelms the organism, dramatically and negatively disrupting homeostasis. In a very real sense, trauma throws the organism 'off balance', and creates a persisting set of compensatory responses which create a new, but less functionally flexible state of equilibrium. This new, trauma-induced homeostasis is more energy consuming and maladaptive than the previous state. By inducing this "expensive" homeostasis and compromising full functional capability, trauma robs the organism. It has survived the traumatic experience, but at a cost.

Individual adaptive stress responses during a trauma vary. The specific nature of a child's responses to a given traumatic event will depend upon the nature, duration and the pattern of trauma, and characteristics of the child and his or her family and social situation. (e.g., genetic predisposition, age, gender, history of previous stress exposure, presence of attenuating factors such as supportive caregivers).

Whatever the individual response, however, the extreme nature of the external threat is often matched by an extreme and persisting internal activation of the neurophysiological systems mediating the stress. A primary adaptive feature of the threat-response system is single-trial "learning" – the capacity to generalize from a threatening event to other experiences with similar features. Unfortunately, this very adaptive capacity is at the core of the emotional, behavioral and physiological symptoms that develop following a traumatic experience.

Neural systems respond to prolonged, repetitive activation by altering their neurochemical and sometimes, microanatomical (e.g., synaptic sculpting) organization and functioning. These are presumed to be the molecular mechanisms that mediate memory and learning. This is no different for the neural systems mediating the stress response. Following any traumatic event children will experience some persisting emotional, behavioral, cognitive and physiological signs and symptoms related to the, sometimes temporary, shifts in their internal physiological homeostasis. In general, the longer the activation of the stress-response systems (i.e., the more intense and prolonged the traumatic event), the more likely there will be a 'use-dependent' change in these neural systems. In some cases, the stress-response systems do not return to the pre-event homeostasis. In these cases, the signs and symptoms become so severe, persisting and disruptive that they reach the level of a clinical disorder. In a new context and in the absence of any true external threat, the abnormal persistence of a once adaptive response becomes maladaptive.

## Post traumatic Stress Disorders

Post traumatic stress disorder (PTSD) is a clinical syndrome that may develop following extreme traumatic stress (Diagnostic and Statistical Manual, Version IV, American Psychiatric Association referred to as DSM IV). There are six diagnostic criteria for PTSD. The first is an extreme traumatic stress accompanied by intense fear, horror or disorganized behavior. The next three are symptom clusters: 1) persistent re-experiencing of the traumatic event such as repetitive play or recurring intrusive thoughts; 2) avoidance of cues associated with the trauma or emotional numbing; 3) persistent physiological hyper-reactivity or arousal. Finally the last two diagnostic criteria refer to how long and how disabling the symptoms are. Signs and symptoms must be present for more than one month following the traumatic event and cause clinically significant disturbance in functioning. A child is considered to have Acute Stress Disorder (DSM IV) when these criteria are met during the month following a traumatic event. PTSD is further characterized as Acute when present for less than three months, Chronic for more than three months or Delayed Onset when symptoms develop initially six months or more after the trauma.

### Clinical presentation

Children with PTSD may present with a combination of problems. In fact, two children may both meet diagnostic criterion for PTSD but have a very different set of symptoms. This can be somewhat confusing to the non-clinical professionals trying to understand traumatized children. In addition, the signs and symptoms of PTSD can look very similar to other neuropsychiatric disorders in children, including attention deficit hyperactivity disorder (ADHD) and major depression.

Typical signs and symptoms of PTSD include impulsivity, distractibility and attention problems (due to hypervigilance), dysphoria, emotional numbing, social avoidance, dissociation, sleep problems, aggressive (often re-enactment) play, school failure and regressed or delayed development. In most studies examining the development of PTSD following a given traumatic experience, twice as many children suffer from significant post-traumatic signs or symptoms (PTSS) but lack all of the criteria necessary for the diagnosis of PTSD. In these cases, the clinician may identify trauma-related symptoms as being part of another neuropsychiatric syndrome (e.g., hypervigilance is often considered an attention problem and traumatized children will be diagnosed and treated as if they have ADHD).

The misdiagnosis of traumatized children with PTSD is common. Sometimes a clinician may be unaware of ongoing traumatic stressors (e.g., domestic violence or abuse). In other cases, the family brings in a child because of new symptoms such as school failure or social withdrawal but makes no association between the child's symptoms and events in the distant past (e.g., car accident, death of a relative, exposure to violence). Without any relevant trauma history to aid the clinician, PTSD may not be diagnosed and post-traumatic stress symptoms (PTSS) are classified as part of other conditions. Children with

PTSD as a primary diagnosis are often labeled with Attention Deficit Hyperactivity Disorder (ADHD), major depression, oppositional-defiant disorder, conduct disorder, separation anxiety or specific phobia. In some cases, children with PTSD will meet diagnostic criterion for multiple diagnoses. This is especially so when examining co-morbidity (the co-occurrence of multiple DSM IV diagnoses) in children with chronic trauma such as physical or sexual abuse. In some studies, the majority of maltreated children met diagnostic criteria for *three or more* Axis I diagnoses in addition to PTSD.

When children are evaluated multiple times over several years, the diagnostic confusion can get worse. The clinical presentation of trauma-related symptoms can evolve. In the typical evaluation process, the evaluating clinical team or clinician rarely has the benefit of complete history about the origin and evolution of symptoms. Histories are frequently based upon one caregiver's recollection and assessment is based upon a single clinical visit (e.g., a school-mandated evaluation). In these cases, the traumatized child may "accumulate" diagnoses. It is not unusual for a child with PTSD related to chronic traumatic exposure (e.g., sexual abuse, domestic violence, physical abuse) to have six, seven or eight diagnoses given over five or six previous evaluations. Unfortunately, there are often six, seven or eight different (and partial) treatment approaches that match these diagnostic impressions. This can be tremendously frustrating to the caregivers, teachers, caseworkers or other professionals trying to help these children.





*Re-enactment in drawing:* Several weeks after living through a shooting, in which bullets came within inches of her head while she was in her bedroom, a child draws a picture of her "home." Note the bullet holes in the wall and the

It is important to remember that DSM IV diagnostic criteria can yield multiple labels in maltreated children but these diagnoses rarely provide useful information about etiology, course, treatment response or prognosis. At present, despite an evolving clinical phenomenology, it is clear that PTSD is not the only, or an inevitable, outcome of traumatic events during childhood. Post-traumatic hyperarousal or dissociative-like symptoms often co-exist with these other Axis I disorders. Furthermore, severe early trauma appears to be an expresser of underlying constitutional or genetic vulnerability and may be a primary etiologic factor in the development of a broad range of disorders later in life. In short, traumatic events can result in a host of clinical syndromes including "pure" PTSD. However, except in discreet, single trauma events, the clinical presentation and evolution of trauma-related symptoms is typically complex.

### Incidence and prevalence

When examining how widespread PTSD is in the adult population, studies find a lifetime incidence of PTSD ranging from 3 to 14%. This incidence is a total population estimate. Similar studies in adolescents find incidence figures between 2 and 5%. These figures refer to total population estimates. When examining a sample of children exposed to trauma, however, these figures skyrocket.

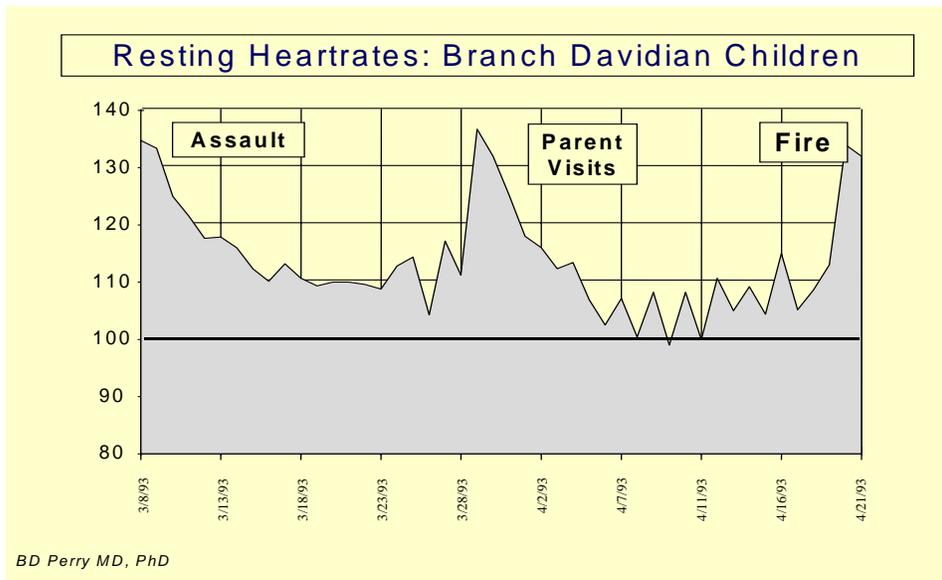
Controlled studies document that between 15 to 90% of children exposed to traumatic events develop PTSD. The percentage varies depending upon the nature of the event. Universally, however, the rates of children developing PTSD following traumatic events are higher than those reported for adults. This is consistent with the growing recognition that children are, if anything, more vulnerable to traumatic experiences than adults.

A brief sampling of recent studies gives some feel for the incidence of PTSD following a traumatic event. Thirty five percent of a sample of adolescents diagnosed with cancer met criteria for lifetime PTSD. Fifteen percent of children surviving cancer had moderate to severe PTSS. Ninety three percent of a sample of children witnessing domestic violence had PTSD [19]; over 80% of the Kuwaiti children exposed to the violence of the Gulf Crisis had PTSS [20]; more than 68% of the children surviving the Branch Davidian Siege at Waco met criteria for PTSD. Seventy three percent of adolescent male rape victims develop PTSD; 34% of a sample of children experiencing sexual or physical abuse and 58% of children experiencing both physical and sexual abuse met criteria for PTSD. In all of these studies, clinically significant symptoms, though not full PTSD, were observed in essentially all of the children or adolescents following the traumatic experiences.

	<b><i>Event</i></b>	<b><i>Individual</i></b>	<b><i>Family and Social</i></b>
<b><i>Increase Risk</i></b> <i>(Prolong the intensity or duration of the acute stress response)</i>	<ul style="list-style-type: none"> <li>◆ Multiple or repeated event (e.g., domestic violence or physical abuse)</li> <li>◆ Physical injury to child</li> <li>◆ Involves physical injury or death to loved one, particularly mother</li> <li>◆ Dismembered or disfigured bodies seen</li> <li>◆ Destroys home, school or community</li> <li>◆ Disrupts community infrastructure (e.g., earthquake)</li> <li>◆ Perpetrator is family member</li> <li>◆ Long duration (e.g., flood)</li> </ul>	<ul style="list-style-type: none"> <li>◆ Female</li> <li>◆ Age (Younger more vulnerable)</li> <li>◆ Subjective perception of physical harm</li> <li>◆ History of previous exposure to trauma</li> <li>◆ No cultural or religious anchors</li> <li>◆ No shared experience with peers (experiential isolation)</li> <li>◆ Low IQ</li> <li>◆ Pre-existing neuropsychiatric disorder (especially anxiety related)</li> </ul>	<ul style="list-style-type: none"> <li>◆ Trauma directly impacts caregivers</li> <li>◆ Anxiety in primary caregivers</li> <li>◆ Continuing threat and disruption to family</li> <li>◆ Chaotic, overwhelmed family</li> <li>◆ Physical isolation</li> <li>◆ Distant caregiving</li> <li>◆ Absent caregivers</li> </ul>
<b><i>Decrease Risk</i></b> <i>(Decrease intensity or duration of the acute stress response)</i>	<ul style="list-style-type: none"> <li>◆ Single event</li> <li>◆ Perpetrator is stranger</li> <li>◆ No disruption of family or community structure</li> <li>◆ Short duration (e.g., tornado)</li> </ul>	<ul style="list-style-type: none"> <li>◆ Cognitively capable of understanding abstract concepts</li> <li>◆ Healthy coping skills</li> <li>◆ Educated about normative post-traumatic responses</li> <li>◆ Immediate post-traumatic interventions</li> <li>◆ Strong ties to cultural or religious belief system</li> </ul>	<ul style="list-style-type: none"> <li>◆ Intact, nurturing family supports</li> <li>◆ Non-traumatized caregivers</li> <li>◆ Caregivers educated about normative post-traumatic responses</li> <li>◆ Strong family beliefs</li> <li>◆ Mature and attuned parenting skills</li> </ul>

## Vulnerability and resilience

Not all children exposed to traumatic events develop PTSD and those who do, don't all have the same severity of symptoms. A major research focus has been identifying factors (mediating factors) that are associated with increased (vulnerability) or decreased (resilience) risk for developing PTSD following table above. In brief, these factors can be divided into three broad categories: 1) characteristics of the child; 2) characteristics of the event and 3) characteristics of family/social system (see Table above).



**Hyperarousal symptoms following a life-threatening event::** In the three days following the ATF assault on the Branch Davidian's Ranch Apocalypse compound, twenty one children were released. Each of these children was in harm's way during the assault. Following release, a clinical team led by ChildTrauma Program personnel lived and worked with these children for the next six weeks. These children had various PTSD-related symptoms. Re-enactment behaviors and cue-specific increases in anxiety were observed in the presence of cues associated with the assault, including white vans and a helicopter. The physiological hyperarousal was illustrated by the profound increases in resting heart rate observed in all of the children throughout the six weeks of the standoff. Five days after the original raid, the group average resting heart rate was 134 (the group average should have been approximately 80). In the middle of the standoff, many of these children visited with a parent released from the compound. These visits resulted in dramatic changes in the children's behavior (e.g., return of bed-wetting, hiding under beds, aggressive behavior) and in their resting heart rates, indicating that these visits were, in some regard, distressing to the children. During these visits, the children were reminded by their parent that they were 'in the hands of the Babylonians', inducing fear and confusion. When these visits stopped, the children improved. When the children were told about the fire, as one would expect, their distress increased dramatically. It should be noted that the normal resting heart rate for a group of comparison children is approximately 90 beats per minute -- the Davidian children for the entire period of the standoff and beyond never had resting heart rates below 100.

Each of these mediating factors can be related to the degree to which they either prolong or decrease the child's stress-response activation resulting from the traumatic experience. Factors that increase stress-related reactivity (e.g., family chaos) will make children more vulnerable while factors that provide structure, predictability, nurturing and sense of safety will decrease vulnerability. Persistently activated stress-response neurophysiology in the

dependent, fearful child will predispose to those 'use-dependent' changes in the neural systems mediated the stress response which underlie post-traumatic stress symptoms.

There are apparent gender differences in the expression and development of PTSD. Clinical experience and recent studies suggest that females tend to exhibit more internalizing (i.e., anxiety, dysphoria, dissociation, avoidance) and males more externalizing (i.e., impulsivity, aggression, inattention, hyperactivity) post-traumatic symptoms. In epidemiological studies of PTSD in the general adult population, females have higher rates of PTSD than males. While lacking the extensive epidemiological data of these adult studies, a gender difference has been observed in several studies with children and adolescents. There appear to be gender differences in adaptive response in the acute event (females dissociate more than males) that may be related to this observed difference in development and expression of trauma-related symptoms.

## Long-Term Consequences of Childhood Trauma

PTSD is a chronic disorder. Untreated, PTSS and PTSD remit at a very low rate. Indeed the residual emotional, behavioral, cognitive and social sequelae of childhood trauma persist and appear to contribute to a host of neuropsychiatric problems throughout life. Traumatic stress in childhood increases risk for attachment problems, eating disorders, depression, suicidal behavior, anxiety, alcoholism, violent behavior, mood disorders and, of course, PTSD, to name a few.

Traumatic stress impacts other aspects of physical health throughout life, as well. Adults victimized by sexual abuse in childhood are more likely to have difficulty in childbirth, a variety of gastrointestinal and gynecological disorders and other somatic problems such as chronic pain, headaches and fatigue. The Adverse Childhood Experiences study (see Resources) examined exposure to seven categories of adverse events during childhood (e.g., sexual abuse, physical abuse, witnessing domestic violence: events associated with increase risk for PTSD). This study found a graded relationship between the number of adverse events in childhood and the adult health and disease outcomes examined (e.g., heart disease, cancer, chronic lung disease, and various risk behaviors). With four or more adverse childhood events, the risk for various medical conditions increased 4- to 12-fold.

*"Not a day goes by that I don't think that I could have saved him. I was eight. He was a hard man, always on me. Never could please that man. That day at lunch he kept on me, telling my mother how lazy I was. He told me to go to the shop behind the house and bring back the chair he had been working on. I said yes sir... but I went to my room after lunch. I guess he went to the shop himself to get the chair. I heard an explosion. The shop had blown up. I guess it was a gas leak. My mother and I watched the fire melt the shop – he never came out. My mother was screaming – and I just stood and watched. I hate to say this but part of me was happy. I didn't cry for a long time. Later that year I took my first drink. It helped me feel good." - 68-year-old man talking about the guilt and shame associated with the traumatic death of his father. He traces his history of alcoholism to this event*

## Treating Children with PTSD

*Acute prophylactic treatment of traumatic hyperarousal: Dominic is a seven-year-old boy. Five days prior to evaluation, he had been in a car accident in which his mother was killed. Immediately following the accident, he was trapped in the car with his mother's body. She had been significantly disfigured by the accident -including a near decapitation. For the hour that the EMS attempted to cut him out of the car, he was immobilized with only a view of his dead mother's now disfigured face. On evaluation, he had not been able to sleep, his resting heart rate was 136. He was noted to be withdrawn but resistant to the medical treatment necessary for his multiple broken bones.*

*Treatment included psychoeducation for the family and clonidine (a medication that helps decrease the reactivity of the stress-response neural systems). His resting heart rate fell to 90. Sleep normalized and he was able to cooperate with medical treatments. Individual therapy focused on loss and trauma was started on discharge. Six months following the accident, Dominic had a resting heart rate of 100 when tapered off the clonidine. He had continuing, and expected, sadness over the loss of his mother, but did not meet criterion for PTSD.*

To date, few treatment outcome studies in children with PTSS and PTSD have been published. Despite this dearth of objective data, a wealth of clinical experience and subjective treatment approaches has been published. The nature of these reported clinical approaches depends upon the theoretical perspective of the author. At present the mechanism-based conceptual frameworks explaining the development of PTSD fall into four main categories: 1) psychoanalytic; 2) cognitive behavioral; 3)

developmental and 4) neurodevelopmental. Each of these offers certain insights but none provides a complete and unambiguous treatment approach. Therefore, the treatment of children with PTSD varies greatly depending upon the specific clinician's training, perspective and experience. This can be confusing to non-mental health professionals or caregivers trying to help the traumatized child. They may often get conflicting recommendations or information about how traumatic events should be handled. Some may hear that talking about the event is most important; others may recommend not talking about the trauma and focusing on the current set of functional problems the child may have (e.g., the social or academic problems that have resulted from the PTSD symptoms). The best recommendation we can give about this is to try and find a professional team that has experience with traumatized children. And a clinician or clinical team willing to listen to you and learn from the resources you may bring to the situation. In some cases, caregivers or other professionals working routinely with traumatized children may be more familiar with clinical advances in this area than a mental health clinician with limited experience with trauma.

Despite these drawbacks, the nature and severity of specific symptoms (e.g., impulsivity, withdrawal, hypervigilance, dissociation, dysphoria, and aggression) will define treatment approach rather than the diagnosis. A major consideration in treatment is distinguishing between a single discreet traumatic event (e.g., car accident or witnessing an assault) and chronic or pervasive trauma (e.g., chronic abuse). Symptoms following a single event (e.g., motor vehicle accident) tend to be fewer and less treatment-resistant compared to the more complex symptom clusters associated with chronic or pervasive traumatic stress (e.g., a combination of physical and sexual abuse). There are a host of clinical treatments used with traumatized children including family therapy, group therapy, EMDR (eye-movement desensitization and re-programming), music and movement therapies, "play" therapy and art therapy among many others. Four of the major therapeutic approaches used alone or in combination are discussed below.

### Acute post-traumatic interventions: secondary prevention

In the immediate post-traumatic period, several models of intervention have been used to

#### Acute Stress Reaction

- Persistence of original stress response
- Target for aggressive intervention
- 'Use-dependent' neurophysiological changes are the cause of chronic PTSD
- Decreasing the intensity and duration of the acute stress reaction can decrease the development of PTSD symptoms

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diminish the acute distress and improve post-traumatic outcome. One of the most important is psychoeducation. Telling the family and child what the expected signs and symptoms are following a traumatic event can help diminish anxiety, increase sense of competence and provide a baseline from which parents and children can be aware of abnormally intense or prolonged symptoms requiring further clinical attention. Several modifications of a critical incident stress-debriefing paradigm have been reported though efficacy has not yet been determined. In some cases, clinicians have used anti-anxiety agents or clonidine to decrease the level of physiological hyperarousal and distress in the acute post-traumatic

period. While clinically helpful during this period, it is not yet clear that any of these post-acute interventions actually alter the development, course or severity of PTSD (see insert clinical vignette).

### Pharmacotherapy

There are very few published trials with psychotropic medications in childhood PTSD. Despite this, extensive clinical experience would strongly suggest that medications can be very helpful in diminishing the symptoms of PTSD. Empirical clinical judgement and experience guide the selection of specific medication. The primary symptoms in PTSD appear to respond to psychotropic agents proven to be useful for those same symptoms in other neuropsychiatric disorders (e.g., depakote and lithium for aggressive behavior; fluoxetine for depressive symptoms).

Many of the symptoms of PTSD can be traced to the core symptoms of physiological hyperarousal. These symptoms include sleep problems (including difficulties following asleep, early night awakening, nightmares, night terrors), generalized anxiety, behavioral impulsivity or hyper-reactivity of the sympathetic nervous system including tachycardia, hypertension, increased muscle tone, respiratory problems and body temperature dysregulation. Clonidine, an alpha-2 adrenergic partial agonist, which modulates the reactivity of the locus coeruleus and decreases the physiological hyper-reactivity associated with PTSD, has been shown to be an effective agent in children with PTSD. Other agents altering the biogenic amine neurotransmitter systems in the brain (i.e., serotonin, dopamine, and norepinephrine) may also modulate the symptoms of PTSD. In this regard, preliminary reports support the efficacy of propranolol and fluoxetine in children with anxiety and PTSD.

### Individual psychotherapy

The core hyperarousal symptoms result in a cascade of secondary, inter-related problems.

Inability to engage in appropriate intimacy leads to difficulties with peer and adult relationships, inability to perform adequately in school leads to poor self-esteem, resulting in a variety of learned behaviors which both mask and defend against these core deficits driven by their physiological hyper-reactivity. The resulting vicious cycle of poor performance, poor self-esteem, development of maladaptive problem-solving styles, in turn, are difficult to treat as long as the underlying physiological hyper-reactivity impairs the ability to modulate anxiety, concentrate on academic or social learning tasks, and contain behavioral impulsivity. Successful treatment, therefore, often requires 'containing' or modifying this core physiological dysregulation with medications and using other psychotherapeutic interventions to address issues related to self esteem, competence, social skills and mastery of specific fears.

### Cognitive-behavioral therapies

Cognitive-behavioral therapy (CBT) is the most studied and, likely the most effective, therapeutic intervention in adults with single-event related PTSD. The few CBT studies in children and adolescents are very promising and studies demonstrate the efficacy of CBT following a single traumatic event. CBT, unfortunately, is difficult to apply in the same fashion to very young children or to children with chronic pervasive trauma.



**Re-enactment in Drawing:** *Drawing depicting a tank destroying a home and planes dropping bombs. Drawn by a 12-year-old Kosovar boy several weeks following the forced relocation of his family and the witnessing of these combat events.*

From the collection of Dr. Shoib (Psychiatry resident at Baylor College of Medicine and a trainee at the ChildTrauma program in 1998) obtained during clinical work at Kosovar refugee camps in Albania in 1999.

## Resources

There are many other places to learn more about the impact of traumatic events during childhood. A few starting places are listed below.

**Selected Reading:**

**Stress in Children.** Pfefferbaum, B. 7[1]. 1998. Philadelphia, W.B. Saunders Company. Child and Adolescent Psychiatric Clinics of North America. Lewis, M.

This contributed volume summarizes the current state of clinical, research and policy related issues in the area of childhood traumatic stress. Several of the primary theoretical constructs guiding research and treatment are outlined. Excellent summaries of clinical experience and reviews of current clinical research are included.

**Too Scared To Cry.** Terr, L. 1992 Harper Collins, New York

Winner of the Blanche Ittleson Award for her research on childhood trauma, Dr. Terr is without peer in her experience and insight regarding childhood trauma. This book is a classic. She provides hope for all families and clinicians working with traumatized children. This book is highly recommended.

**Diagnostic and Statistical Manual of Mental Disorders: Fourth Edition (DSM IV).** 1994. Washington, DC, American Psychiatric Association.

In the Anxiety Disorders section, the diagnostic criterion and useful information about the etiology, incidence, prevalence, clinical presentation and treatment approach for PTSD can be found. In addition, the diagnostic criterion for co-morbid disorders such as ADHD, conduct disorder, major depression are in other sections.

**Selected Reviews:**

Perry, BD and Azad, I. **Post-traumatic stress disorders in children and adolescents.** *Current Opinions in Pediatrics* 11: 4, 121-132, 1999

Pfefferbaum, B. **Post traumatic stress disorder in children: A review of the past 10 years.** *J.Am.Acad.Child Adolesc.Psychiatry* 36 [11], 1503-1511. 1997.

Terr, L. **Childhood traumas: An outline and overview.** *Am J Psychiatry*, 1991. 148: 10-20.

**Annotated References (1998-1999):**

Ackerman, P. T., Newton, J. E., McPherson, W. B., Jones, J. G., and Dykman, R. A. **Prevalence of post traumatic stress disorder and other psychiatric diagnoses in three groups of abused children (sexual, physical, and both).** *Child Abuse & Neglect* 22[8], 759-774. 1998.

This study examined PTSD and other neuropsychiatric disorders in over 200 maltreated children. This study used excellent structured interviewing methods for diagnostic assessment. While the total sample was small, this study is important because of the rigor used in determining co-morbid diagnoses. Of interest is the demonstration of the symptoms and outcome differences between physical and sexual abuse, the increased risk with both types of abuse and the gender differences in trauma-related outcomes.

Cuffe, S. P, Addy, C. L., Garri son, C. Z., Waller, J. L., Jackson, K. L., McKeown, R. E., and Chilappagari, S. **Prevalence of PTSD in a community sample of older adolescents.** *J.Am.Acad.Child Adolesc.Psychiatry* 37[2], 147-154. 1998.

This study is the second cycle of a longitudinal epidemiological study. In this cycle the authors examined a population sample of 490 adolescents (age 16-22) and used a semi-structured interview to elicit PTSD symptoms and related factors. Of interest was the demonstration of a gender difference in (females 3 % vs males 1 %) in the prevalence of PTSD. Being raped, witnessing a medical emergency and witnessing an accident were associated with increased risk for developing PTSD. In this study, most of the children experiencing a traumatic event developed PTSD.

Felitti, V. J., Anda, R. F., Nordenberg, D., Williamson, D. F., Spitz, A. M., Edwards, V., Koss, M. P., and Marks, J. S. **Relationship of childhood abuse and household dysfunction to many of the leading causes of death in adults: the adverse childhood experiences (ACE) study.** *American Journal of Preventive Medicine* 14[4], 245-258. 1998.

This study was conducted by mailing questionnaires about adverse childhood experiences to 13,494 adults in a large HMO. The response rate was 70.5 %. The responses were studied along with the results of a standard medical evaluation and measures of adult risk behavior, health status and related issues. At least half of the respondents reported at least one and more than one-fourth reported more than two categories of adverse childhood experience. A graded relationship between the number of categories of childhood exposure and the high-risk behaviors and diseases was demonstrated. This study reinforces the observations of many other studies using different methods and drawing on different specific childhood stressors. The relationships between "health" throughout the lifecycle and stress/distress during development are very strong.

Fergusson, D. M and Horwood, L. J. **Exposure to interparental violence in childhood and psychological adjustment in young adulthood.** *Child Abuse & Neglect* 22[5], 339-357. 1998.

This is a report from an 18-year longitudinal study of a birth cohort of 1,265 New Zealand children. Retrospective reports of exposure to interparental violence were obtained as well as a host of measures of mental, social, physical, anti-social and criminal behavior. The adolescents and adults reporting the highest levels of exposure were at the greatest risk for mental health problems, substance abuse and criminal offending. This study is well conceived and the methods are very sound. The value of this study is in demonstrating the multiple adverse sequelae of domestic violence. The pervasive nature of domestic violence and the recurring issues of "how damaging" exposure to interparental violence is will be addressed by studies of this sort. Exposure to domestic violence may be as potentially traumatic and abusive as physical or sexual abuse.

March, J. S., Amaya-Jackson, L., Murray, M. C., and Schultze, A. **Cognitive-behavioral psychotherapy for children and adolescents with posttraumatic stress disorder after a single-incident stressor.** *J.Am.Acad.Child Adolesc.Psychiatry* 37[6], 585-593. 1998.

This study tested a group-administered cognitive-behavioral treatment protocol with a single case across time and setting design. The children (n =17) were selected from two elementary and two junior high schools and screened for single-event related PTSD. Neuropsychiatric symptoms were measured using state of the art instruments. Fourteen of the seventeen children completed treatment. Significant improvement was observed, such that 57 % no longer met diagnostic criteria for PTSD. Despite the small numbers, this is one of the few well-designed and controlled treatment outcome studies in the area of childhood PTSD.

Pelcovitz, D., Libov, B. G., Mandel, F., Kaplan, S., Weinblatt, M., and Septimus, A. **Post-traumatic stress disorder and family functioning in adolescent cancer.** *Journal of Traumatic Stress* 11[2], 205-221. 1998.

This study compared 23 adolescents with cancer against 27 physically abused and 23

healthy, non-abused adolescents. Of primary interest was the rate of lifetime PTSD was 35 % in the cancer group compared to only 7 % in the abused group. In the PTSD positive subgroup of children 85 % of the mother's developed PTSD. This study is very important for practicing pediatricians. The rate of PTSD in life-threatening pediatric illness is high for both the child and for caregivers. This had profound implications for creating a multi-dimensional clinical approach for children with cancer.

Perry, B. D. and Pollard, R. **Homeostasis, stress, trauma, and adaptation: A neurodevelopmental view of childhood trauma.** *Child and Adolescent Psychiatric Clinics of North America* 7[1], 33-51. 1998.

This review examines the available neurodevelopmental and neurophysiological studies related to childhood trauma. The authors revise previously stated neurodevelopmental theoretical constructs used to guide clinical research and practice. This synthesis focuses on memory and the neural systems involved in the stress response.

Orr, S. P., Lasko, N. B., Metzger, L. J., Berry, N. J., Ahern, C. E., and Pitman, R. K. **Psychophysiological assessment of women with posttraumatic stress disorder resulting from childhood sexual abuse.** *Journal of Consulting and Clinical Psychology* 66[6], 906-913. 1998.

This investigative team has pioneered study of trauma-related neurophysiological changes using standard psychophysiological methods. In this study, 29 women with chronic PTSD following childhood sexual abuse showed larger physiologic responses (heart rate, skin conductance, EMG) than women experiencing sexual abuse but no PTSD. This responsivity was specific to the conditions involving sexual imagery and was not seen in the stressful, non-abusive related situation. These preliminary studies illustrate some of the physiological hyper-reactivity that may underlie some of the documented long-term medical and physical problems following childhood trauma. Studies such as these are required to elaborate mechanism-related models of trauma-related neuropsychiatric and medical problems.

## Glossary

**Dissociation:** The mental process of disengaging from the stimuli in the external environment and attending to inner stimuli. This is a graded mental process that ranges from normative daydreaming to pathological disturbances that may include exclusive focus on an inner fantasy world, loss of identity, disorientation, perceptual disturbances or even disruptions in identity.

**Dysphoria:** The subjective emotional state of sadness, disquiet, malaise.

**Hyperarousal:** Mental and physical changes caused by alterations in central and peripheral nervous system activation related to perceived or actual threat. This graded response includes increased sensory and perceptual focus on the threat, activation of physiological systems required for survival and corresponding changes in emotional and behavioral functioning.

**Homeostasis:** The tendency for stability in normal physiological states achieved by a system of control mechanisms activated by various feedback systems.

**Hypervigilance:** The state of increased arousal and attention to any cue in the external environment that may potentially be associated with threat. Often results in distractibility and attention problems when present in children with PTSD.

**Post-traumatic Stress Disorder (PTSD):** A neuropsychiatric disorder that may develop following a traumatic event that includes changes in emotional, behavioral and physiological functioning.

**Stress:** Any challenge or condition that forces the regulating physiological and neurophysiological systems to move outside of their normal dynamic activity. Stress occurs when homeostasis is disrupted.

**Trauma:** A psychologically distressing event that is outside the range of usual human experience, often involving a sense of intense fear, terror and helplessness.

## ***The ChildTrauma Academy***

The ChildTrauma Academy\* is a unique collaborative of individuals and organizations working to improve the lives of high-risk children through direct service, research and education.

We recognize the crucial importance of childhood experience in shaping the health of the individual, and, ultimately, society. By creating biologically-informed, child and family respectful practice, programs and policy The ChildTrauma Academy seeks to help maltreated and traumatized children.

A major activity of the CTA is to translate emerging findings about the human brain and child development into practical implications for the ways we nurture, protect, enrich, educate and heal children. The "translational neuroscience" work of the CTA has resulted in a range of innovative programs in therapeutic, child protection and educational systems.

Please visit our website ([www.ChildTrauma.org](http://www.ChildTrauma.org)) to learn more about our work, our educational videos, training materials and other products.

\*The ChildTrauma Academy is a not-for-profit, 501(c)(3) organization.

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