Medical Aspects of Child Abuse Evaluations

Nisha AbdulCader, M.D., F.A.A.P.
Medical Director, Suspected Abuse Response Team
Pediatrician, Martha's Place Children's Assessment Center
Supervising Physician, Juvenile Service Center

CDC: Cost of Child Abuse Higher than Cost of Diabetes or Stroke

(Fang, Feb 2012)

- 2008 data suggests 579,000 to 2.8 million new cases of child abuse nationally each year
- Using 2008 confirmed case data, study added up lifetime cost in 2010 dollars: health care, productivity loss, child welfare cost, criminal justice cost, and special education cost

CDC: Cost of Child Abuse Higher than Cost of Diabetes or Stroke (Fang, Feb 2012)

- Annual cost is between **$124** and **$585** billion
- Lifetime cost (low end) is **$212,012**
- **Unable to determine: impact of psychosocial abuse, impact of reduced life expectancy, poor quality of life, and future negative parenting behaviors**

ACE Study

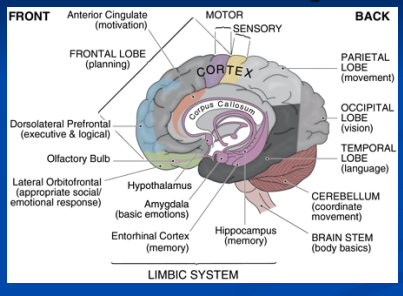
- Adverse Childhood Events Study

Childhood Maltreatment Linked to Reduced Grey Matter Volume

(Edmiston, Dec 2011)

- Exposure to childhood maltreatment is associated with reduced grey matter in adolescents *without psychiatric diagnoses*
- Found significant negative correlation on self-report tool and MR imaging
- Gender differences
- Males: impulse and decision regulation areas
- Females: emotion regulation areas

Childhood Trauma Disrupts Brain Development



ChildTrauma academy

Child Abuse Changes DNA

- **Brain Changes in Abused Suicide Victims (2009)**
- **Increased Frequency of Micronuclei in Adults with a History of Childhood Sexual Abuse (2013)**

Epigenetics "Not Your Parents Genome"

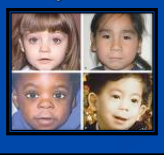
- Changing the expression of genes (DNA)
- NOT changing the sequence
- Environmental Regulation
- Methylation switches on/off
- "genes load the gun…epigenetics pull the trigger"

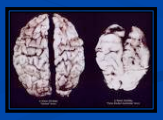
PTSD Effects on Brain

- Evaluating the toxic effects of cortisol on brain function in children (Stanford)

Prenatal Alcohol Exposure

- First trimester
  - Facial features
  - Anatomic brain abnormalities
- Late exposure
  - Functional brain abnormalities
- Newborn signs and symptoms
  - FASD features
  - Low birth weight
  - Hyperactivity, crying, irritability,
  - Feeding issues, tremors, seizures, poor sleeping patterns





Prenatal Alcohol Exposure

- Functional Impact-
  - Cognitive or developmental deficits
  - Executive functioning deficits
  - Motor functioning delays
  - Problems with attention and/or hyperactivity
  - Sensory and language problems
  - Deficits in understanding emotional cues

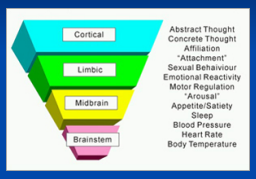
Behavioral Cues in the Substance Exposed Newborn

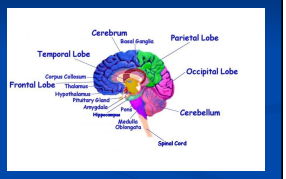
Stimulant vs. Opiate

- Sleepy
- Unresponsive
- "Shut down"
- High cry that is not sustained

- Irritable
- Difficult shutting out stimulation
- Overreact to light, noise, handling, movement
- Stiff
- Difficult to console

Trauma Informed Sequential Neurodevelopment





Brain Develops in a Hierarchical Order from the Bottom Up

- The brain is a historical instrument…its function and structure is to record
- The brain records sensory and personal experiences and forms neural patterns
- Brain development is experience dependent
- Brain development requires healthy 'child-parent' sensory interactions
- Stimulating input of gazing, smelling, tasting, listening, touching, rocking, feeding, bathing, changing, vocalizing, playing all strengthen neural patterns

Brain Development is Sensory Based

- Sensory Registration
- Selective Attention
- Interpretation
- Organization of response
- Execution of Response
- Key Areas include…**Reticular Activating System** and **Vagal Nerve**

Response to Sensory Input based on Experience and Function

- FIGHT

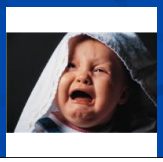
- FLIGHT

- FREEZE

- CAPITULATE

Stress Reaction

- **Positive Stress →Tolerable Stress →*TOXIC STRESS***



Toxic Stress

- Specifically, toxic stress can have these impacts:
- Toxic stress is associated with hypertrophy of the **amygdala** (key role in processing of emotions) and the **orbitofrontal cortex** (key roles in sensory processing and decision making).
- In other instances, prolonged stress responses are associated with decreased synapses and neurons in the **hippocampus** (key role in learning and memory) and the **prefrontal cortex** (key role in forethought and logic).

Child Maltreatment Overview 2010

US Department of Health and Human Services NCANDS

- 5.9 million children allegedly abused or neglected
- 2 million screened in for investigation
- 695,000 unique victims
- Victims in the age group of *birth to 1 year had the highest rate* at 20.6 per 1,000 population.
- Boys accounting for 48.5 percent and girls accounting for 51.2 percent.
- Eighty-eight percent of victims were comprised of three races or ethnicities—African-American 21.9%), Hispanic (21.4%), and White (44.8%).

Toxic Stress

- Distal cause of death
- 5 Lifestyle Issues
  - Overeating
  - Inactivity
  - Alcoholism
  - Promiscuity
  - Tobacco Use
- Global burden of disease
  - 90% of disease is non-communicable

Toxic Stress

- The interplay of adverse events in a child's physical and social environment, significant events in life, and the connections and relationships with others has a significant impact on brain development and has extensive implications for lifelong health, learning, and behavior.
- The result may be an adult who is less productive, less able to cope, and less healthy.
- On a population level this can result in a less stable future workforce and a less harmonious community.

Child Maltreatment Overview 2010

US Department of Health and Human Services NCANDS

- More than 75 percent (78.3%) suffered neglect
- More than 15 percent (17.6%) suffered physical abuse
- Less than 10 percent (9.2%) suffered sexual abuse

Child Maltreatment Fatalities 2010

US Department of Health and Human Services NCANDS

- National estimate of 1,560 children died from abuse and neglect.
- Nearly 80 percent of all child fatalities were younger than 4 years old.
- Boys had a higher child fatality rate than girls at 2.51 boys per 100,000. Girls died of abuse and neglect at a rate of 1.73 per 100,000.
- More than 30 percent (32.6%) of child fatalities were attributed exclusively to neglect.
- More than 40 percent (40.8%) of child fatalities were caused by multiple maltreatment types.

Child Abuse must be Suspected for Evaluation…

Reliant on mandated reporters to be well trained and programs that support children to disclose safely

Multidisciplinary Response

- CWS and/or Law Enforcement
- **Medical**
- Mental Health
- Legal

SART Program
(Suspected Abuse Response Team)

Child Focused Services

- **SART- Suspected Sexual Assault**
- **DEC- Drug Endangered Child**
- **SCAN- Suspected Child Abuse**
- **Coroner's Support**
- *Part of Multi-Agency, Multidisciplinary Response*

Components of Medical Evaluation

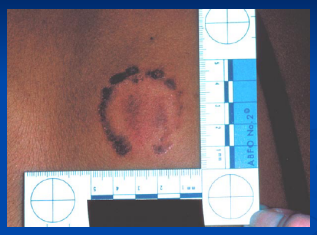
Requires Specialized Training and Expertise

- *Identify, document, and interpret physical findings*
- Treat medical problems, refer as needed
- Provide counseling referral
- Answer questions
- Provide expert witness testimony (up to date on literature and studies)

Medical Evaluation: SCAN

- Physical exam
  - Complete exam
    - Vital signs
    - Growth chart
    - Dental
  - Document and evaluate any injuries
    - Location, size, type
    - Tenderness. Loss of function
    - Pattern (bruise, bite, burn)
- Laboratory Studies
  - Blood Studies
  - Urinalysis/Urine toxicology
- Imaging studies
  - Skeletal survey
    - Under two years of age
  - CT/MRI

Photo Documentation



Sexual Abuse:
Medical Exam Considerations

- Majority of children with a history of sexual abuse will have a normal physical exam
- Injuries heal often without abnormalities
- Many physical findings are normal variants
- Many conditions mimic abuse
- Genital injuries in boys more often related to physical abuse
- Increasing information and studies for most current interpretation

Genital Exam of Child

- Acute vs. Non-Acute evaluations
- Not invasive, not painful
- No stirrups/speculum/Pap smear
- Flexibility of exam order and location
- Supportive caregiver
- Findings discussed after exam

Drug Endangered Children

- Toxic exposure from processing
- Toxic exposure from use
- Sales and use environment
  - High level of violence
  - Neglect
  - Physical abuse
  - Sexual abuse
  - Unsanitary conditions
  - Lack of medical and dental care

Methamphetamines

- Processing is high risk for toxic exposures, burns, explosions, and fires
- Children are at increased risk of abuse

Effect on Development

- 27% with developmental delay
- Speech/language most common delay
- Most common age: 4-6 years
- Some with severe delay with autistic features

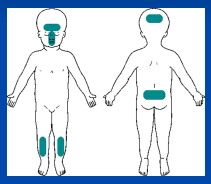
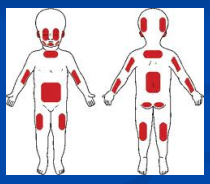
Evaluation of Injuries

- Historical Information
- Pain
- Tenderness
- Skin Findings
- Re-creation of Event

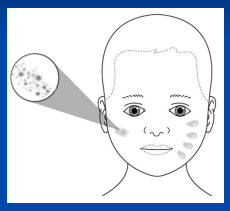
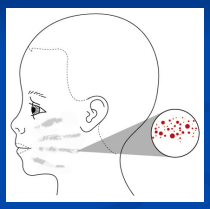
Physics of Trauma

- "If they don't cruise, they don't bruise."

Location of Injury: Toddler and Child

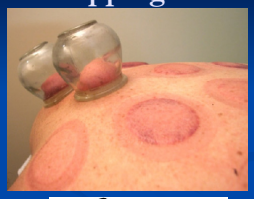
Pattern of Injury

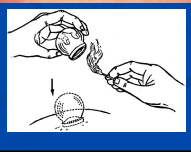



"Bruises"

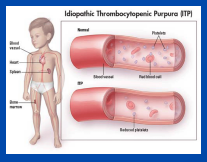

"Patterned Bruising"

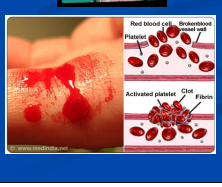
"Traditional Medicines"
Coining and Cupping



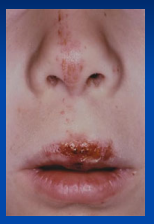


Bleeding Disorders





Abrasions and Lacerations



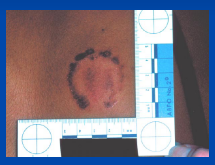

Burns

- Location
- Shape
- Size

Fig 2: Illustrations of Characteristic Patterns of Scald Abuse

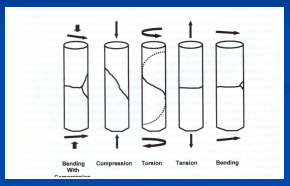
Type of scalding injury	Cutaneous burn pattern	Clues to nonaccidental injury
Forced Immersion	*Tide Mark*	Lack of splash marks "Mirror image" burns Clear demarcation of injury
	Donut Hole	Lack of splash marks Buttocks spared due to contact with cooler bottom of container
	Zebra Stripe	Lack of splash marks Sparing of flexural creases
Spill/Splash	*Arrowhead Pattern*	Posterior location Area with initial contact has most severe burn, with damage decreasing as liquid flows downward and cools Irregular contour and margins

Bites




Physics of Trauma

- Skeletal trauma



Skeletal Survey

Summary of Child Abuse Emergencies

- Physical abuse of a child less than 2 years
- Significant injury without explanation
- Abdominal injury
- Head injury
- Circumferential, deep, or extensive burn
- Sexual assault less than 72 hours
- Risks associated with Domestic Violence

Ask Yourself…

- Is the injury typical?
- Is it developmentally appropriate?
- Is the location typical?
- Is there a pattern?
- Is there a history given?
- Is the history plausible?
- Is the child in a high-risk environment?
- Am I still concerned about this child?