Neurodevelopmental Care and Caregiver Education for Newborns with Opioid Exposures

Caring for the family and child

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Prenatal Opioid Exposure and Neurodevelopmental Sequelae

The Importance of Ongoing Monitoring to Optimize Outcomes

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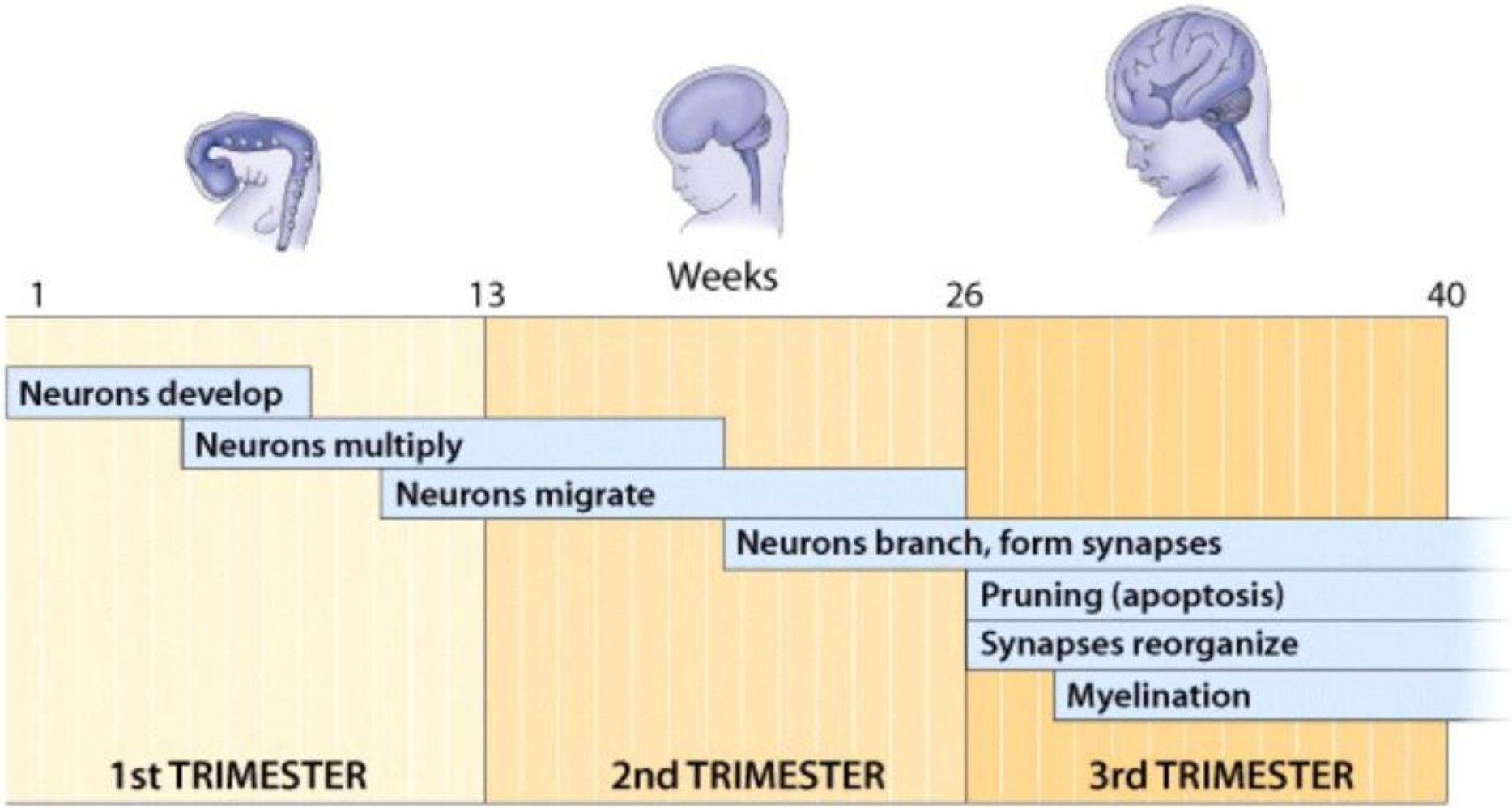
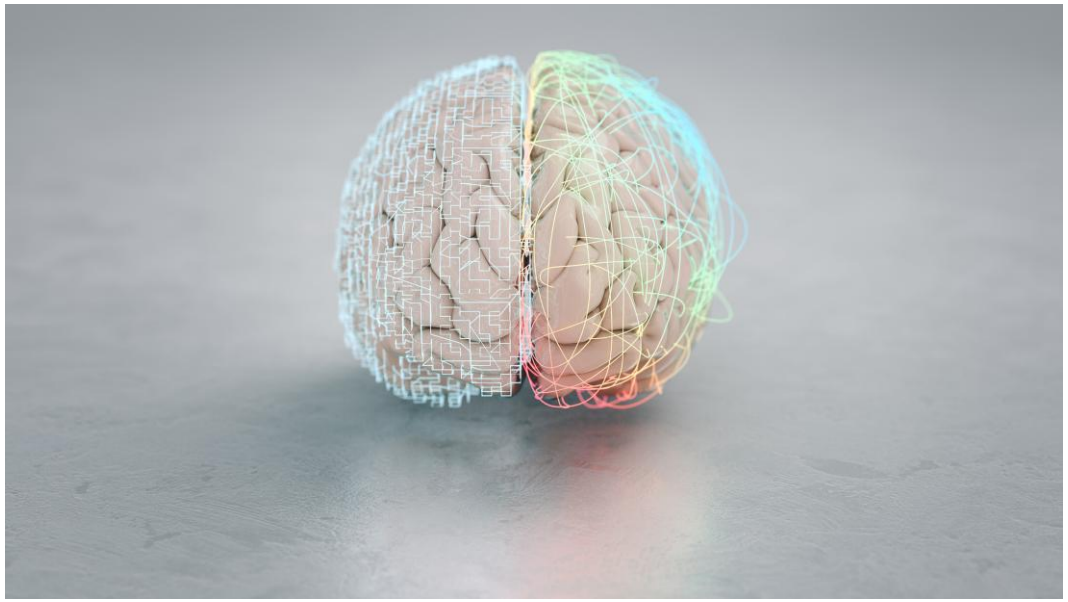
Defining Neurodevelopment

"Neurodevelopment is defined as the dynamic interrelationship between environment, genes, and the brain, where the brain develops over time to establish sensory, motor, cognitive, socioemotional, cultural, and behavioral adaptive functions"[1]


1
13
Weeks
26
40
Neurons develop
Neurons multiply
Neurons migrate
Neurons branch, form synapses
Pruning (apoptosis)
Synapses reorganize
Myelination
1st TRIMESTER
2nd TRIMESTER
3rd TRIMESTER

What is neurodevelopment really?[1,3]

- During the developmental period,
- Gradually developing and using skills in one's context
- That are observable expressions of brain activity
- Across multiple areas, including
  - Sensory
  - Cognitive
  - Motor
  - Language
  - Adaptive
  - Social-Emotional/Behavioral



Pediatrics. 2017;139(Supplement_1):S12-S22. doi:10.1542/peds.2016-2828D

1

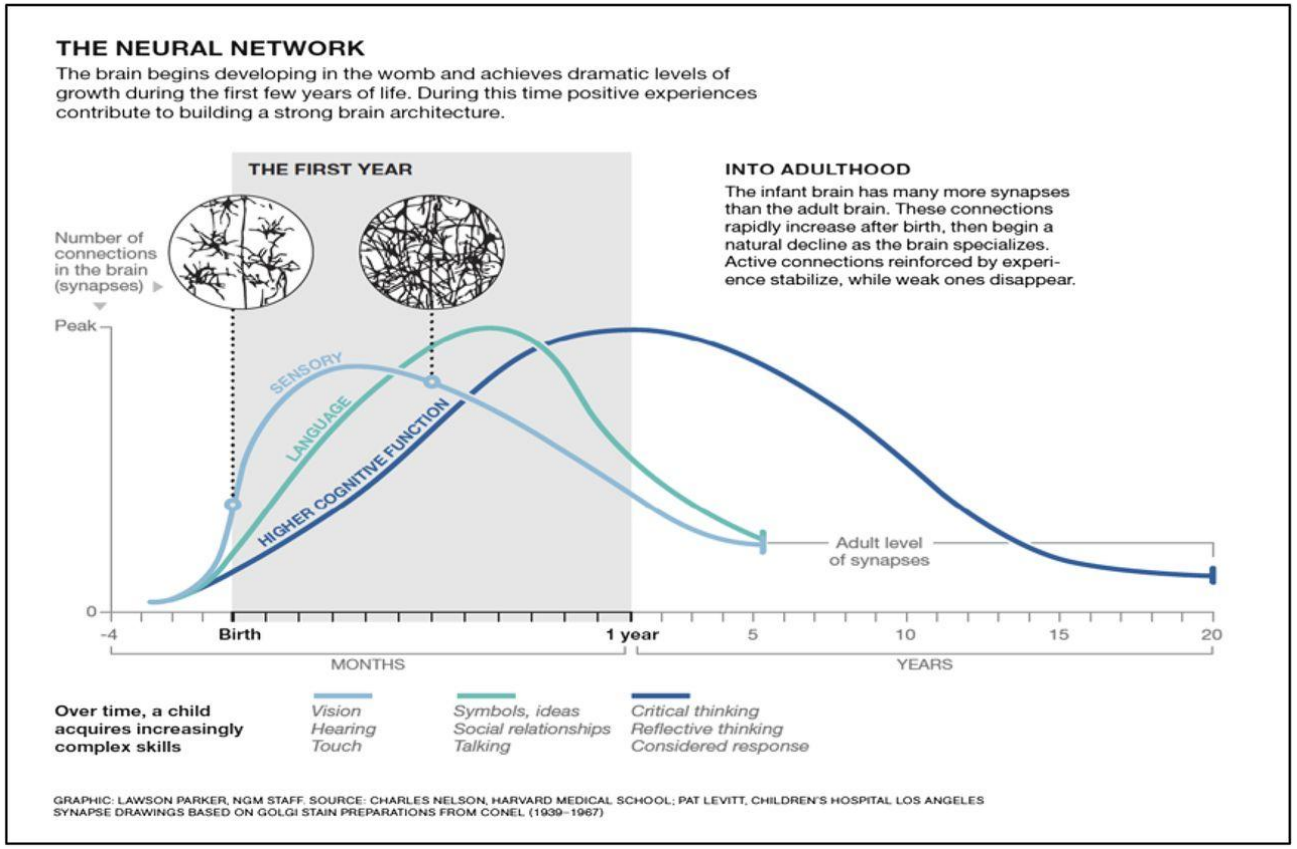


Figure Legend:

The neural network: development from the prenatal period into adulthood, including key time periods (ie, sensitive and critical) for specific domains. (Reprinted with permission from Bhattacharjee Y. Baby Brains – The First Year. National Geographic. Available at: http://ngm.nationalgeographic.com/2015/01/baby-brains/bhattacharjee-text.)

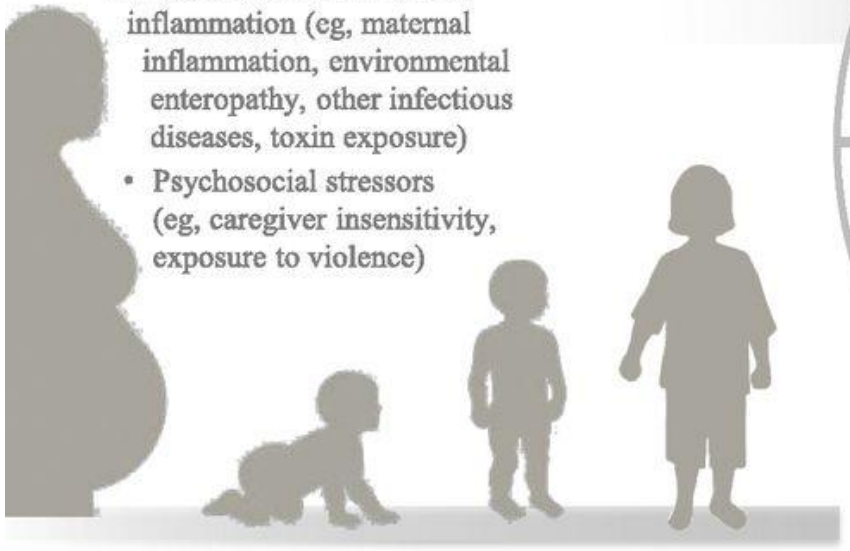
And why is it important?

- The young brain is highly susceptible to both positive and negative experiences during gestation & early life[3]
- Neuropsychiatric concerns in adulthood are associated with vulnerability and differences in childhood[4]
- Emphasis on prevention and treatment in childhood may offset concerns later in life[4]
  - Limit worsening of initial concerns
  - Prevent cascading effects

Early childhood adversity

Early environment disrupts normal biology:

- Depriving environments (eg, poverty, low quality institutional care)
- Adverse birth outcomes (eg, prematurity, SGA, LBW, IUGR)
- Malnutrition (including under- and overnutrition)
- Infectious and noninfectious inflammation (eg, maternal inflammation, environmental enteropathy, other infectious diseases, toxin exposure)
- Psychosocial stressors (eg, caregiver insensitivity, exposure to violence)



Biological change

Genetic endowment

Genetic variants alter susceptibility to specific adversities

("gene x environment interaction")

Developmental trajectory

- Early setbacks may compound social disadvantage
- Biological change embedded in behavior

Epigenetic changes

(eg, DNA and histone modification causing altered gene expression; telomere shortening)

Altered homeostatic systems

(eg, derangements in microbiome and metabolic, immune, and stress regulatory axes)

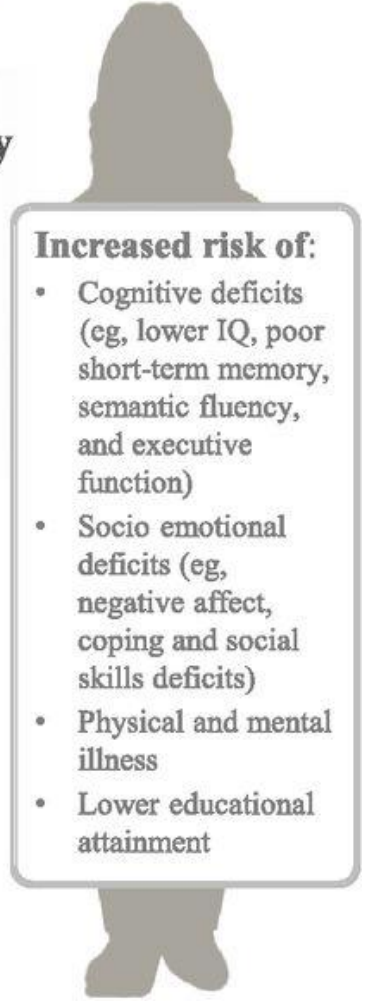
Neurodevelopmental disruption

(eg, due to aberrant or absent stimulation; disturbed hormonal or inflammatory environments)

Excess inflammation

(eg, due to stress response dysregulation during fetal or postnatal development, or environmental enteropathy)

Adult outcomes



Increased risk of:

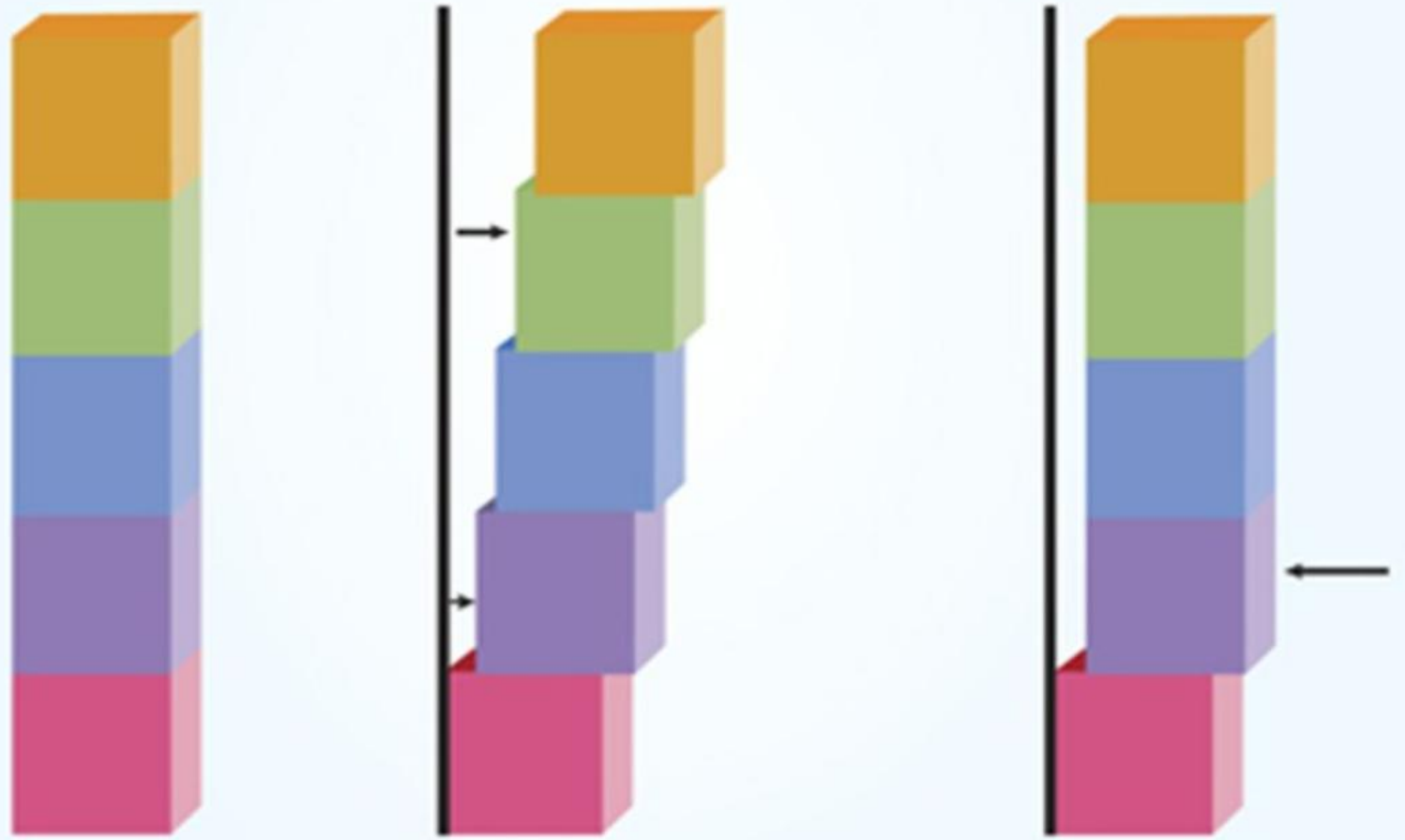
- Cognitive deficits (eg, lower IQ, poor short-term memory, semantic fluency, and executive function)
- Socio emotional deficits (eg, negative affect, coping and social skills deficits)
- Physical and mental illness
- Lower educational attainment

Sensitive period effects

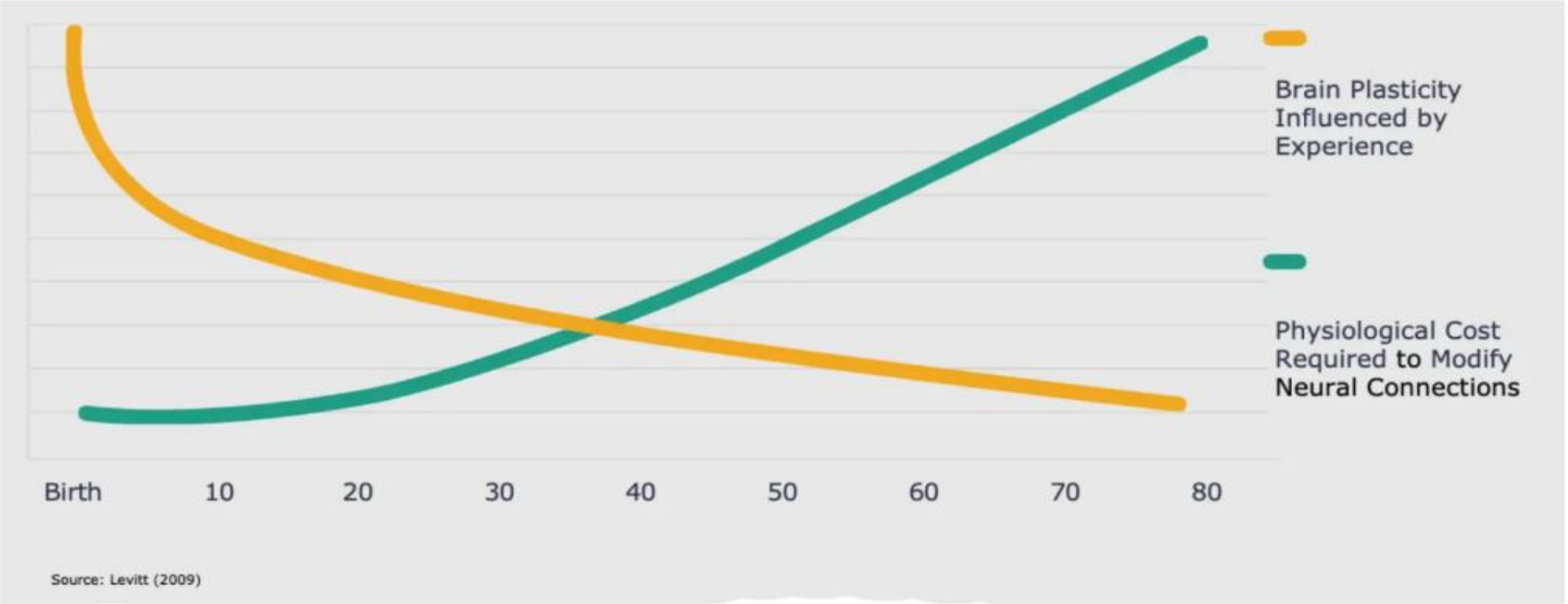
Adversity impacts key domains most when concurring with periods of rapid development.

Developmental impact of intervention:

Prevention of cascading effects



Timing Matters



The brain is more influenced by experience in a child's earliest years. The brain's ability to adapt —known as brain plasticity—declines as we age. *Adapted from a graph created by Pat Levitt in collaboration with the Center on the Developing Child at Harvard University (2009).*

Neurodevelopmental Care in the Early Days of Life

- Approach with Compassionate, Respectful, and Caring Delivery of Services
- Facilitate Early Relational Health
- Emphasize Developmental Monitoring
- Connect to Early Intervention
- Consider the Family Environment
  - Resiliency/protective factors
  - Stressors
  - Perinatal Mental Health Status

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Developmental Care

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Developmental Care in Newborn Phase

Admit to Special Care for 4-7 days for OEN monitoring

DOL 1-2 OT involvement begins – 3-5 visits

Assessment includes: Physical Assessment and Eat, Sleep and Consolability.

Acute Care Therapy Visits

- Family Support
- Educate on Positioning
- Support for Feeding
- Educate on Transitions and Safe Sleep
- Educate on Massage
- Discuss SHINE clinic and TEIS

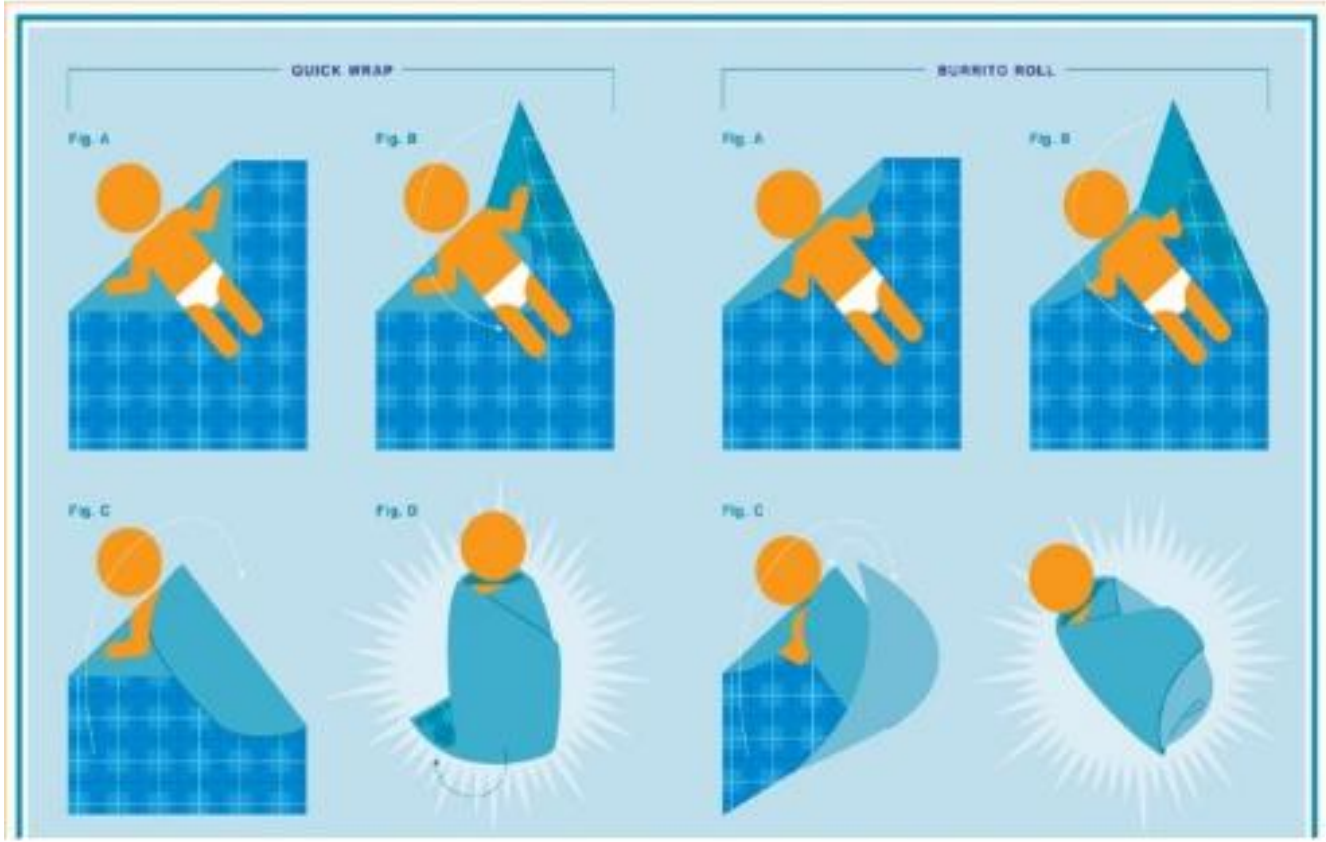
Family Support

- **Congratulating family on their newest edition!**
- **Want to be a help to them at this time.**
- **Provide some tips and tricks to help explain how to best help your baby right now.**
- **Take a look at how they are tolerating movement and show you some ways to move and support your baby.**

Assessment and Application

- Muscle Tone
- Quality of Movement
- State Regulation
- Reflexes

State support and soothing

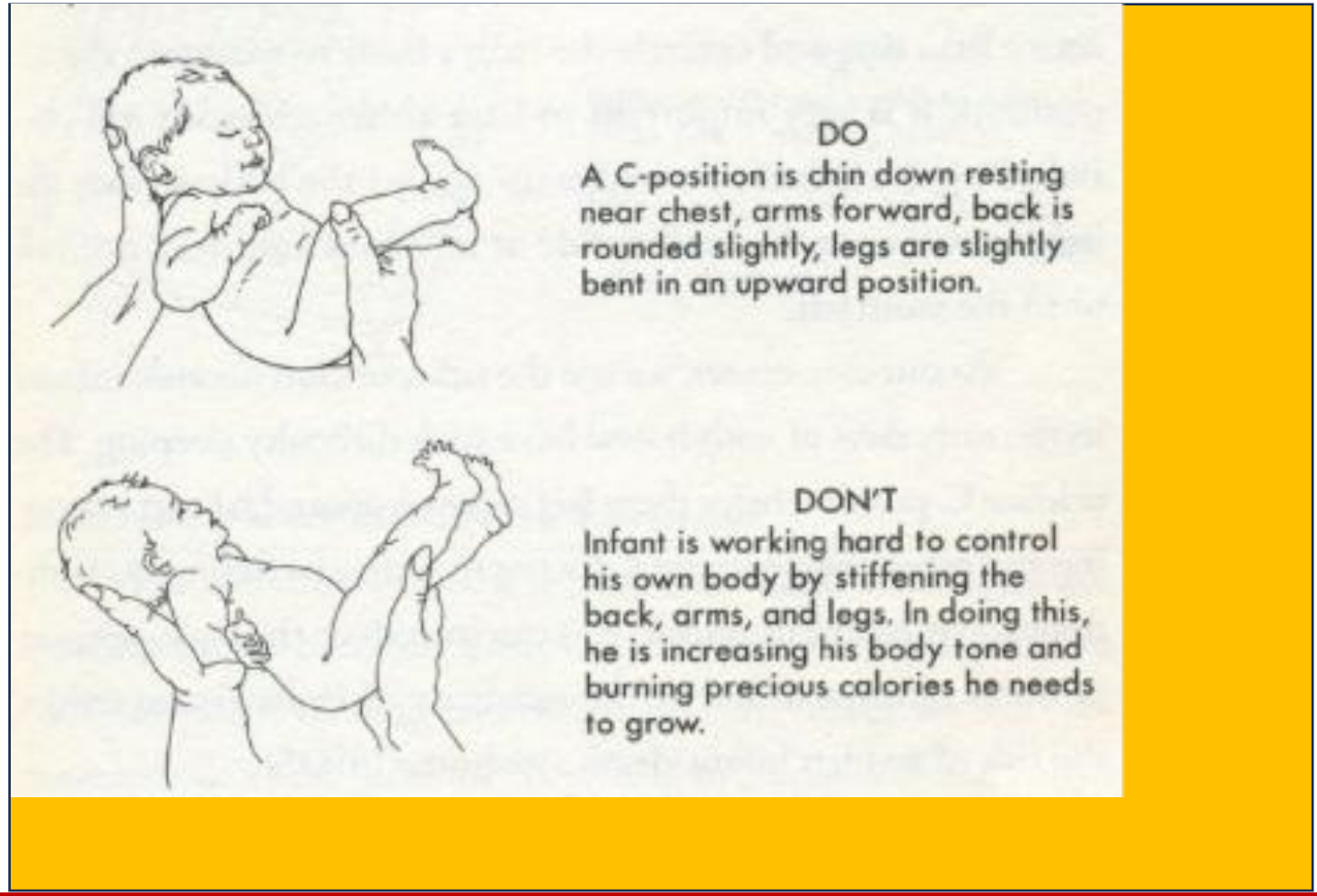


5 S's

- Swaddle
- Side/Stomach
- Shushing
- Swaying
- Sucking

Positioning for Daily Living Skills

- Feeding
- Sleeping
- Diapering
- Holding



Holding Skin to Skin

- Benefits of Skin to Skin
  - Womb Space
  - Positive Touch
  - Pressure like a Hug
  - Pressure on Front of Body most calming

Benefits of Massage

- Containment
- Guided Movement
- Positive Touch
- Relaxation
- Bonding
- Endorphins

Education to Support Development

- Sleeping
- Feeding
- Consolability
- Stress Cues
- Massage
- Developmental Positioning

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Thank You!

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