

**A Decade of Progress –
A Future of Hope**

**Prenatal Trauma & Depression: The Earliest
Intervention**

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Evolution & Diversity

Attachment bonds are affected by the diverse nature of our world. Specifically, the infant/parent biological attachment bond is created within a living system shaped by

- Culture, age, gender, gender identity, race, ethnicity, national origin, religion, sexual orientation, disability, language, socioeconomic status, the attachment organization of the parent, and the generation born into.

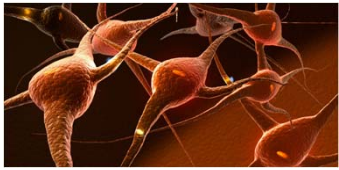
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**Entrainment of the Implicit
Bodyworld**

- With genetics as a guide, the infant’s lived experience within attachment relationships entrains the body to fit into the environment born into. This occurs through the creation of neural networks.



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Entrainment of the Implicit Bodyworld

• With genetics and epigenetics, this process uses biological principles such as:

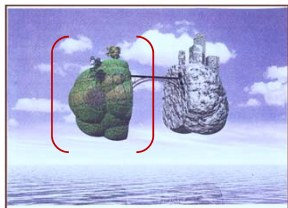
- “What wires together, fires together.” Hebb, 1949
- Long-term potentiation - responses are increased as more episodes occur. Teyler & Di Scenna, 1987
- Kindling – repeated stimulation lowers the threshold for firing. Goddard, 1967, Goddard, McIntyre, & Leech, 1969
- Conditioned stimuli generalize to unconditioned stimuli. Pavlov, 1967

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The Primary Biological Entrainment Period



- Corresponds with the growth and development of the right cerebral hemisphere
- RH is in a sensitive/critical period in human infants from the last trimester in pregnancy to first 2 ½ to 3 years of life.

Chiron et al., 1997; Menlo et al., 2010; Schore, 1994, 2001, 2005

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Right Hemisphere

• There are more connections in the right hemisphere to the emotional processing limbic system and deep subcortical-to-cortical connections that are heavily myelinated for fast transmission.

Barbas, 2007; Griffin et al., 2006; Joseph, 1982; Spence, Shapiro, & Zaidel, 1996; Tucker, 1981, 1992

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Right Hemisphere

- The dominance of the right hemisphere in emotional perception and communication of facial expression, voice prosody, gesture, music, smells, and pheromones is well established.

Benowitz et al., 1983; Blonder, Bowers, & Hellman 1991; Brancucci et al., 2005; Brancucci et al., 2009; Devinsky, 2000; Lattner, Meyer, & Friederici, 2005; Le Grand et al., 2003; Mitchell et al., 2003; Snow, 2000

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Ratio of Verbal to Nonverbal Communication



Burgoon, Guerrero, & Floyd, 2010

Preverbal Language

- Facial expressions
- Eyes
- Voice prosody
- Gestures
- Touch
- Body Posture
- Scent and Smell

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Newborn Period



One-month-old

- Entrainment of circadian rhythms to the light/dark cycle.
- Rapid metabolic stimulation in the visual cortex at 5 to 8 weeks.


McMillen et al., 1991; Tzourio-Mazoyer et al., 2002; Yamada et al., 1997

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Newborn Period



2-month-old


- Infant communicates with brightened eyes, seeks eyes, and vocalizes.
- Visual, auditory, and sensory cortices are in sensitive periods (Occipital, Temporal, and Parietal).
- Activation of core system for face processing in brain occurring in 2-month olds processing faces.

de Graaf-Peters & Hadders-Algra, 2006; Newton, 2008

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Newborn Period Risks



It's a lot!


- Depressed mothers perceived their infants as having more difficult temperaments.
- Depressed mothers have increased negative affect which decreases infant motivation.
- Depressed mothers use less infant-directed speech, less facial and vocal expressions, are less animated, are more likely to speak in a flat tone, and touch their infants less.

McGrath, Records, & Rice, 2008; Sohr-Preston & Scaramella, 2006

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Newborn Period Risks



It's a lot!


- Maternal depression and/or anxiety is associated with increases in both psychological and developmental disturbances in children.
- Mental health of fathers is associated with developmental disturbances in children.
- Risks are not inevitable.

Perinatal Mental Health Stein et al., 2014

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Newborn Period Risks



It's a lot!

- Mechanisms are complex and include genetics, biological, and environmental pathways.
- Early intervention focused on reducing risks for child and reducing symptoms in affected parent is warranted.

Perinatal Mental Health
Stein et al., 2014

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Mother/Infant

This case represents a composite of cases seen by NCAR in First 5/
HDS/FHCSD funded grants

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Newborn Period

- 29 y old Latina mother (Carla)
- 3 m old female infant (Daria)
- Carla's ACE score = 5
 - Mo beat her
 - Parents separated
 - Mo hit by father – DV
 - Fa alcoholic
 - Sister attempted suicide
- Yelland score = 5 (has any of these things happened to you since baby was born)
 - Moved to a new house
 - Partner lost a job
 - Bills you couldn't pay
 - Not enough money to buy food
 - Serious conflict between family members

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Newborn Period

- Carla was close to her grandmother who died when she was 10.
- Carla stated that she had a sister she felt close to who attempted suicide.
- Sister developed cancer.
- Sister died of cancer.
- Carla had depression and anxiety during pregnancy but stated not before.
- She reported "lots of anger" during pregnancy.
- Carla stated she doesn't have anyone to help her.
- "I take care of everyone."

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Newborn Period

- Parent Stress Index-4-SF
 - Parent Distress 94th percentile high clinical range
- BAI – 28 Severe anxiety
- BDI-II – 25 Moderate depression
- Carla referred by her baby's pediatrician because Carla was sleep deprived and irritable with Daria.
- Carla expressed little interest in doing things and felt stressed by the demands of child rearing, other children, and extended family.
- Carla, her husband, and Daria lived with 2 older children ages 7 and 9, her mother, and 2 other family relatives.
- PHQ-9 = 12 moderate

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Newborn Period

- Daria born at 36 wks gestation – 5 lb 6 oz
- In NICU for 3 days
- Carla cancelled the first developmental screening requested by therapist.
- First session, Carla was very stressed and preoccupied.
- She didn't focus on Daria.
- Daria was looking at her mother for most of the session but lowered her eyes the few times Carla glanced at her.
- Daria interacted a bit with clinician when clinician moved to the mat and used infant mirror.
- Carla was invited to the mat but did not interact with Daria but continued her intense discussion about her husband.

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Newborn Period

- 14 sessions provided
 - 2 individual
 - 12 dyadic
- Father in 4 dyadic sessions
- Carla stated she felt depressed and “sometimes feels like hitting Daria.” She denied having done so and stated she could not hurt her infant.
- Safety plan put in place.

- Fa reported that Carla yells; Carla agreed.
 - Worked with how to care for herself.
 - How to regulate her own emotions.
 - Educated on how yelling scares the baby and contributes to Daria turning her eyes away.
 - Worked on assertiveness.
 - Husband agreed to help her once a night.

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Newborn Period

- Questions focused on **safety assessment**
 - How often do you have the thought of hitting Daria?
 - Have you ever attempted to act on this?
 - Are you alone with Daria most of the time?
 - Have you ever been depressed and/or anxious before now?
 - Were you depressed and/or anxious in pregnancy?
 - Have you ever deliberately hurt yourself or someone else?

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Newborn Period

<ul style="list-style-type: none">• Risk Level Mother<ul style="list-style-type: none">• High• Risk Level Infant<ul style="list-style-type: none">• High• Observational Risk Level Mother<ul style="list-style-type: none">• High• Observational Risk Level Infant<ul style="list-style-type: none">• High	<p style="text-align: center;">Parent Child Early Relational Assessment – PC-ERA</p> <ul style="list-style-type: none">• Infant 2.5 Area of concern• Parent 2.38 Area of concern• Dyad 1.86 Area of definite concern
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Newborn Period

- Baby was unplanned.
- Talked with Carla about how she lived her life prior to baby.
- She was referred to psychiatry for possible medications to reduce her anxiety and depression.
- She elected not to make psychiatry appointment.
- Encouraged Carla to attend to baby through nonverbal check-ins even while talking using a smile if she could (something the clinician did).
- Referred Carla to the Coffee Club group for mothers; she elected not to attend.

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Newborn Period

- Referrals to Care Coordination for overall family assistance including food.
- Helped Carla see how Daria responded to her face, eyes, voice, touch, and gesture.
- Encouraged Carla to sing to baby and practiced in session.
- Encouraged Carla to keep Daria's appointments.
- Helped Carla use lower, softer voice, slower movements, and more animation in her face with Daria and watch how she responds.

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Newborn Period

- Help Carla communicate with her husband in an assertive, non shaming way.
- Reverse Role-played interactions with husband (clinician playing Carla and Carla playing her husband) throughout treatment.
- Carla began stating that she is aware of how her own dysregulation affects the baby.
- "Daria doesn't want to watch me sometimes because it is too much for her."
- Focused on Carla regulating herself and her baby.

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Newborn Period

- **Termination**
- Carla less preoccupied at termination.
- She received more empathy from family members and husband.
- Carla understood how Daria was trying to capture her attention.
- She sang to Daria daily.
- Carla kept a developmental appt – baby on target.
- Carla more relaxed with improved mood.
- She stated she stays calmer when arguing with her husband, and there were fewer arguments.
- Husband found another job

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Newborn Period

- **Pre**
- Parent Stress Index-4-SF
 - Parent Distress 94th percentile high clinical range
- BAI – 28 severe anxiety
- BDI-II – 25 moderate depression
- Parent-Child Early Relational Assessment
 - Infant 2.5 Area of concern
 - Parent 2.38 Area of concern
 - Dyad 1.86 Area of concern
- **Post**
- Parent Stress Index-4-SF
 - Parent Distress **2nd percentile** low clinical range; no defensive responding
- BAI – 2 **normal** range
- BDI-II – 1 **normal** range
- Parent-Child Early Relational Assessment
 - Infant 4.5 **Area of strength**
 - Parent 4.0 **Area of strength**
 - Dyad 4.2 **Area of strength**
- **Carla stated, “We are stable now.”**

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Newborn Period Referrals

- Mental health assessment
- Psychiatric appt for medication evaluation
- Primary Care medical evaluation
- First/HDS/FHCSD/NCAR Maternal Depression Services
- Individual therapy mother
- Dyadic therapy mother/infant
- Mother support group
- Family Psychoeducation group
- BEBE dyadic experiential group
- Infant Massage
- Infant Development Classes
- Care Coordination
- Home visiting

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Pregnancy

Third Trimester

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Pregnancy

- First Trimester – Week 1 through week 12
- Second Trimester – Week 13 through week 27
- **Third Trimester – Week 28 to birth**
- **Fourth Trimester – Post Natal/Newborn Period**
 - **First 3 months of life**


Beginning of Primary Attachment Period

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Strongest Predictors of Postpartum Depression



Prenatal stress can be amplified with a newborn


- Depression during pregnancy
- Anxiety during pregnancy
- Stressful life events during pregnancy
- Low levels of social support
- Previous history of depression

Robertson, Grace, Wallington, & Stewart, 2004; meta-analyses of 24,000 participants

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Prenatal Attachment Risks



Stressors make it harder to daydream about future baby

- Depression and anxiety in pregnancy
- Low self esteem
- Low social support
- Negative cognitive style
- Low income
- Major life events
- History of abuse

Lefkovic, Baji, & Rigo, 2014; Robertson, Grace, Wallington, & Stewart, 2004

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'Non-Removed' Unconscious

- Events occurring in pregnancy and the first two years of life or "the preverbal period" appear to reflect events encoded in memory that is unconscious and cannot be "removed."

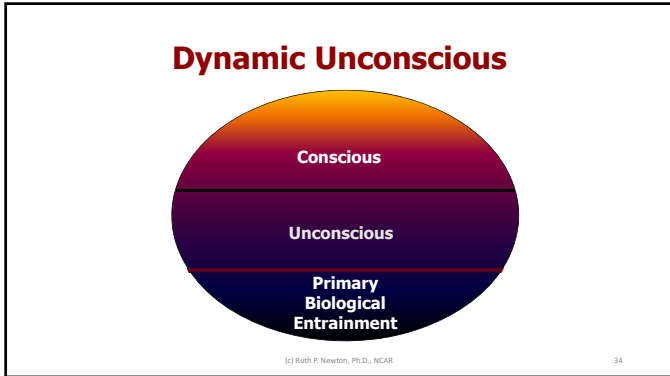
Gainotti, 2012

- This is likely the Primary Biological Entrainment Period

Newton, 2011, 2019

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Third Trimester

- 40% of mother's cortisol crosses into the placenta.

Glover, Teixeira, Gitau, & Fisk, 1999

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Third Trimester

Fetus responds to environmental stress of healthy women


- A benign cognitive stressor given to pregnant women at 24 to 36 weeks gestation.
- Greater effect found in third trimester.
- Fetus had increased heart rate variability and decreased movement with maternal stress.
- Fetal heart rate and movement return to original levels when stressor is offset.

DiPietro, Costigan, & Gurewitsch, 2003; heart rate variability

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Third Trimester



- Pregnant women with high versus low anxiety scores had increased systolic blood pressure and respiration rates when given a benign cognitive stressor.
- Fetuses of women with high anxiety scores had significant increases in heart rate than did fetuses of women with low anxiety scores.


Monk, et al., 2000

Fetus responds to environmental stress of anxious women

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Third Trimester



- Fetuses begin reacting to auditory stimuli at 30 weeks gestation.
- Fetal heart rate increases to mother's voice and decreases to stranger's voice.
- Responses sustained for 4 min.


Kisilevsky et al., 2003

Fetus can differentiate mother's voice from a stranger's voice

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Third Trimester



- Auditory sounds repeatedly heard in last trimester are recognized at birth.
- Fetus can monitor frequency changes.
- Simple sound differentiation and memory are present.

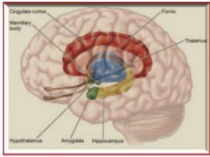
Huotilainen et al., 2005; magnetoencephalography (MEG) data

Fetus has short-term memory for repeated sounds

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Third Trimester



- Prematurely born infants at 24 to 34 gestational weeks.
- Pitch differentiation occurred after 30 weeks gestation but not before.
- Hemispheres functionally lateralized at 30 weeks gestation.
- Right hemisphere specialization for auditory processing appears at 30 weeks gestation.

Functional differentiation of the hemispheres at 30 weeks gestation

Mento, Suppiej, Altoe, & Bisiacchi, 2010

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Carla's Third Trimester of Pregnancy

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Carla's Third Trimester

- Carla assessed at 34 weeks; she stated she was fine and medically fetus was healthy.
- Clinician noted that Carla was flat faced and not animated. Edinburgh given to assess if other services were needed.
- Carla was asked who would attend the birth: "My husband but not my mother. She stayed with us before Miguel's birth (her now 7 y old), and all she did was criticize me telling me I looked fat, so I told her not to make the trip."
- Clinician asked how she was feeling overall about her pregnancy, she said, "I didn't really want to have another child, but I have to get use to it don't I, look at me!"

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Carla's Third Trimester

- EPDS - 16
 - likelihood of depression high
 - Item 10 not endorsed
- Maternal Fetal Attachment Scale- 71 (refer if score is between 24 & 75)
Score 1 (definitely no); 2 (no), 3 (uncertain), 4 (yes), 5 (definitely yes)
 - Have Imagination about the fetus – 3.08 (uncertain range)
 - Take action to ensure her own health – 3.67 (uncertain range)
 - Takes actions towards fetus, i.e., talk to, stroking – 2.56 (No range)
 - Total score for Maternal Fetal Attachment – 2.96 (high end of no range)
- Risk Level Carla
 - **High**
- Observational Risk Level Carla
 - **High**
- Prenatal Attachment concerns
 - **High**

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Third Trimester

- Questions focused on **risk assessment and support**
 - Have there been any stressful life events occurring in your pregnancy?
 - Were you depressed and/or anxious with your other two pregnancies?
 - Were you depressed and/or anxious prior to being pregnancy at any time in your life?
 - You mentioned your mother is not supportive are there other people in your life who are supportive?

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Third Trimester Referrals

- Mental health assessment
- Possible psychiatric appt
- Individual therapy mother
- Pregnancy support group
- Flag for dyadic assessment during newborn period
- Family Support group
- BEBE experiential group with mothers and infants
- Care Coordination for ongoing prenatal visits
- Home visiting

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Pregnancy


Second Trimester

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Second Trimester



Fetuses of depressed women functionally depressed at birth

- Depressed pregnant women in 2nd trimester had higher prenatal cortisol and lower dopamine and serotonin (neurotransmitters).
- Higher levels of premature deliveries.
- Higher levels of low birth weight.
- Newborns of depressed mothers had inferior Brazelton Neonatal Behavior Assessment Scale scores given within 48 h of birth.
- Newborns had same biochemistry at birth as prenatally depressed women.

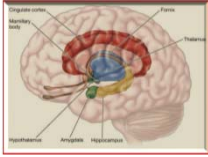
Field et al., 2004; longitudinal study

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Second Trimester



Reduced structural connectivity in right amygdala

- Depressed pregnant women recruited at 26 wk gestation.
- Two weeks after birth, newborns had MRI and Diffusion Tensor imaging.
- Infants of mothers with high levels of depression had microstructural abnormalities in the amygdala (associated with stress reactivity).


Rifkin-Graboi et al., 2013

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Second Trimester Prenatal Attachment



- Future mother begins to form impressions of infant based on fetal movement.
- Increased fetal movement is associated with increased affection for the unborn child.
- Family experiences and the psychology of parents play a role.
- Cultures can influence the hope for a boy versus a girl.


Siddiqui & Hagglof, 2000

Fetal movements begins between 16 – 25 weeks gestation

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Second Trimester Prenatal Attachment



- Maternal-Fetal Attachment Scale (MFAS)
- Prenatal attachment has predicted postnatal attachment in some studies.
- Fetal movement has distinct pattern in last trimester that future mother responds to with increased synchrony.
- Greater fantasizing about child associated with greater involvement after birth.

Cranley, 1981; Siddiqui & Hagglof, 2000; longitudinal study

Fetal movement begins in the 2nd trimester

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Carla's Second Trimester of Pregnancy

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Carla's Second Trimester

- Carla attended her checkup at 23 weeks. Medically all is well with her and baby.
- Carla stated that the baby moved "so I guess I'm having a baby." And "at least it's a girl, I like girl clothes."
- She also mentioned she wanted to return to work but her husband said that she needed to stay home now to take care of the children and prepare for the new baby.
- She also said that she "hates" being fat, and she was getting her weight under control before she was pregnant.

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Carla's Second Trimester

- Risk Level Carla
 - **Moderate**
- Observational Risk Level Carla
 - **Low to Moderate**
- Pregnancy is more negative than positive
 - **Moderate to high**
- EPDS – 8
 - Likelihood of depression is considered
 - Item 10 not endorsed
- Pregnancy Experience Scale – Items measure how uplifting or a hassle is pregnancy experience
 - **0=Not at all; 1=Somewhat; 2=Quite a bit; 3=A great deal**
 - Uplifts Intensity - 1.16 somewhat
 - Hassles Intensity – 2.83 quite of bit

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Second Trimester

- Questions focused on **social support**
 - Do you have thoughts about who your baby is?
 - Have there been any stressful life events occurring in your pregnancy?
 - Where are you going to have the baby (hospital, birthing center, home birth)?
 - What have you done to prepare for the new baby?
 - What is it like to have a girl when you have two boys?
 - Do you feel this is a good time in your life to have another baby?

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Second Trimester Referrals

- Mental health assessment
- Individual therapy Carla
- Pregnancy support group
- Family Support group
- BEBE experiential group with mothers and infants
- Care Coordination for ongoing prenatal visits
- Home visiting

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Pregnancy

First Trimester

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First Trimester



Formation of Body Structures


- Hormones increase in the pregnant woman at 5 weeks.
- Neural tube forms and closes (becomes the brain and spinal cord) and heart and other organs starting forming at week 6.
- Head and limb buds form at about week 7.
- Nose appears week 8.
- Toes appear week 9.
- Elbows bend at week 10.
- Genitals develop week 11.
- Fingernails form week 12.
- Fetus is about 2.5 inches in size weighing .5 oz at the end of first trimester.

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First Trimester



Vulnerability to infection

- Substantial risk for infection in first trimester can occur because of the natural immune suppression that occurs in pregnancy so immune system doesn't defensively attack the budding fetus who is only 50% related to the female.
- Nausea and disgust, particularly for food tastes and texture, are thought to be evolutionary conserved functions in the service of guarding against pathogens.

Fessler, Eng, & Navarrete, 2005;
Navarrete, Fessler, & Eng, 2007

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Carla's First Trimester of Pregnancy

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Carla's First Trimester

- Carla comes in because a pregnancy test was positive.
- "I can't be pregnant now."
- Doctor confirmed she is pregnant, and she broke down in tears.
- "I have two boys already; I want to finish my education."

- "I'm working at Walmart's stockroom, and it gives me freedom."
- Doctor asked if she wants to speak to a clinician; she agrees.

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Carla's First Trimester

- Speaking with the clinician, Carla states that her mother had five kids that Carla basically raised because her mother "was mean and drank all the time. She would hit us if we did anything wrong, but you would never know what you did wrong."
- "When I first met my husband, I thought I could get out of that way of life as he was a good provider and supportive, but now I'll have three."
- "I don't want to take care of any more children."

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Carla's First Trimester

- Risk Level Carla
 - **High**
- Observational Risk Level Carla
 - **High**
- Social Support for Pregnancy
 - **Very Low**
- EPDS – 17
 - Likelihood of depression is high
 - Item 10 not endorsed
- Social Support Questionnaire – Short Form
 - Number of support people – 1.33
 - Satisfaction with this number - a little dissatisfied

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First Trimester

- Questions focused on **individual and family support**
 - It sounds like your husband is a good provider and is supportive, what do you think will be his response?
 - How do you think your children will react?
 - Would you be willing to talk with a counselor about your thoughts and feelings about having another baby?
 - Did you have depression and/or anxiety with your other pregnancies?

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First Trimester Referrals

- Mental health assessment
- Individual therapy Carla
- Family therapy
- Pregnancy support group

- Family Support group
- Care Coordination for ongoing prenatal visits

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But when all goes well enough, we have the next generation



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