

Fetal and Early Child Neuro Development

Lecture notes for Paradise Community College PSY240 Developmental Psychology

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Neuro development is how the brain and central nervous system develop.

Includes developmental milestones, myelination, neuro organization and processing skills. ND is about what goes wrong in those areas and most importantly, what to do to fix aberrations and shortfalls.

Measured by receptive and expressive functions; Hearing, seeing, and tactile functions are receptive. Language, mobility and manual are expressive.

Receptive function is how the brain receives, filters and stores information.

Expressive function is how the brain utilizes the receptive information.

One way to determine and pinpoint brain damage or functional challenges is to look at the output, or expressive functions of the brain.

Fetal Development

Embryonic stage

2 weeks of gestation yolk sac forms and embryonic cells flatten into disc shape 2 cells thick.

4 weeks of gestation neural tube closes. Basic fetal features, limb buds, 1/8" in length.

Neural tube defects caused by lack of folic acid occur before this time.

5 weeks of gestation sees rapid head and brain development. Arm buds look like paddles, fetus is now 1/4" in length.

Mother's thyroid helps direct brain development. Low thyroid = Cretinism.

6 weeks of gestation upper lip, fingers begin to form, basic movements, fetus is now 1/2" in length.

Hear bulge forms and beats at up 160 bpm

7 weeks of gestation arms develop bones and begin to bend at elbows, toes form, taste buds develop, fetus is now 3/4" in length

Hormones change fetal brain structure differentiating male and female brain development

8 weeks of gestation the neck develops, head rounds out, eyelids close, hearing begins.

Eighth cranial nerve (auditory nerve) is the first cranial nerve to form at 8 weeks.

9 weeks of gestation genitalia develops, red blood cells begin to develop in liver, head is 1/2 of length and fetus is 2" long and 1/3 oz.

Placenta now takes over job of furnishing hormones.

Fetal stage

10 weeks of gestation bones begin to harden, swallowing and kicking, makes fist, fingernails form and fetus is 2 1/2" long and 1/2 oz.

12 weeks of gestation red blood cells form in the bone marrow, kidneys begin to function and reflexes develop.

14 weeks of gestation fingerprints develop, grasp reflex forms and face makes grimaces, ovaries in female have about 2 million eggs.

16 weeks of gestation lungs begin to develop and amniotic fluid is "breathed" and fetus is now growing toenails.

18 weeks of gestation sweat glands develop and myelin is beginning to form on neural pathways.

20 weeks of gestation vernix caseosa forms, meconium develops in intestines and the brain begins to wire specialty centers.

25 weeks of gestation proprioception is forming, fetus can now remember sounds like a vacuum cleaner running.

27 weeks of gestation eyes open, optic nerve and pupil reflex form and fetus is viable for birth but with complications.

30 weeks of gestation memories take shape in consciousness, brain is developing 250,000 cells per minute for a total of 100 billion at birth.

35 weeks of gestation the fetus can now survive premature birth without severe complications, fetus is putting on weight fleshing out.

37-42 weeks of gestation is considered a "full term baby" fetus packs on more fat to help regulate body temperature outside the womb.

Prenatal care

Take folic acid and prenatal vitamins prior to conception

Mothers taking EFAs like lecithin add 5 points to child's IQ

Early child care

Breastfeeding adds 5 points to IQ

Organizes the brain

Begins lateral eye and ear development

Reading and math problems relate to these early development steps

Some symptoms of ADHD lie in these and other early childhood development stages

Completing developmental milestones

Organizes the brain i.e. lack of army crawl relates to reading problems, poor language development and eye development issues.

Born with startle reflex, pupil reflex, babinski reflex, birth cry, random motion and grasp reflex.

Processing Skills

Sound social skills lie in auditory processing skills

Math and reading are at first primarily visual processing skills

Emotionality lies in mixed eye/ear dominance and low processing skills

The final product

Every child is a product of the input through the receptive functions. The way the child takes in auditory, visual and tactile information and where he processes and stores it in the brain will determine the expressive function of all aspects of the child. If there are aberrations in the receptive functions such as sensory integration problems or missed development levels the child will not relate appropriately to sight, sounds and touch. Speech and language development, academic skills and motor skills will suffer.

If the child filters visual, auditory or tactile input through emotional avenues because of hemispheric dominance issues then the result will be emotional and impulsive with no sense of time, distance or consequences.

If the child has low processing skills the child will struggle with concepts and behave developmentally according to the level of achievement neurologically. For instance; if an eight year old child processes on the level of a five year old they will behave like a five year old and relate to children younger than they are rather than their peers. This child will often display bully tendencies as adaptive function when relating to his peers.

"You cannot expect organized function from a disorganized brain!"