CHAPTER 12

FETAL DEVELOPMENT

When does implantation occur?

The tiny human implants himself or herself in the nutrient lining of the womb 8 to 10 days after fertilization.

Wilcox AJ, Baird DD, Weinberg CR.
Time of implantation of the conceptus and loss of pregnancy.
N Engl J Med. 1999;340:1796-1799.

And then?

About three days later, this tiny living human male or female sends a chemical hormonal message out into the mother's body, which stops her menstrual periods. Later, it is this tiny passenger who causes her breasts to enlarge in preparation for nursing, softens her pelvic bones to prepare for labor, and, without question, sets his or her birthday. The onset of labor is a unilateral fetal decision (see chapter 10).

Why is the primitive streak important?

It really isn't. Much is made of the fact that identical twinning cannot occur after the 14th day, when this early spinal cord can be seen. Actually, identical twinning probably happens in the first 2-4 days of life. Use of the primitive streak is a thinly veiled attempt to dehumanize the early human embryo, so that destruc-

tive embryo experimentation can proceed and that I.V.F. embryos can be killed.

When does the heart begin to beat?

At 18 days [when the mother is only four days late for her first menstrual period], and by 21 days it is pumping, through a closed circulatory system, blood whose type is different from that of the mother.

J.M. Tanner, G. R. Taylor, and the Editors of Time-Life Books, *Growth*, New York: Life Science Library, 1965, p. 64

When is the brain functioning?

Brain waves have been recorded at 40 days on the Electroencephalogram (EEG).

H. Hamlin, "Life or Death by EEG," *JAMA*, Oct. 12, 1964, p. 113

Brain function, as measured on the Electroencephalogram, "appears to be reliably present in the fetus at about eight weeks gestation," or six weeks after conception.

J. Goldenring, "Development of the Fetal Brain," *New England Jour. of Med.*, Aug. 26, 1982, p. 564

Only several generations ago, doctors used the ending of respiration to measure the end of human life. This is no longer true, for the use of artificial ventilators is common.

Only one generation ago, doctors were using the ending of the heartbeat to measure the end of human life. This is no longer true, for now the heart can be stopped and restarted for different operations. It also may stop during a heart attack and sometimes can be restarted.

Today, the definitive and final measure of the end of human life is brain death. This happens when there is irreversible cessation of total brain function. The final scientific measurement of this is the permanent ending of brain waves.

Since all authorities accept that the end of an individual's life is measured by the ending of his brain

function (as measured by brain waves on the EEG), would it not be logical for them to at least agree that individual's life began with the onset of that same human brain function, as measured by brain waves recorded on that same instrument?

Early on, this being has gill slits and a tail. Isn't this proof that it is not human then?

The "gill slits" are not slits but folds of skin much like an infant's "double chin." These stretch out as he grows.

The tail isn't a tail either. The central nervous system consists of brain and spinal cord. It is the most important part of the early body and grows the fastest. The tail is really the end of the spinal cord which grows faster than the torso. The torso catches up with it, and its tip then becomes your adult "tail bone."

> "The body of the unborn baby is more complex than ours. The preborn baby has several extra parts to his body which he needs only so long as he lives inside his mother. He has his own space capsule, the amniotic sac. He has his own lifeline, the umbilical cord, and he has his own root system, the placenta. These all belong to the baby himself, not to his mother. They are all developed from his original cell."
>
> Day & Liley, *The Secret World of a Baby,* Random House, 1968, p. 13

How early do some organs form?

The eye, ear and respiratory systems begin to form four weeks after fertilization.

K. Moore, *Before We Were Born,* 3rd ed., 1989, p. 278

And function?

Very early, e.g., glucagon, a blood sugar hormone, has been demonstrated in the fetal pancreas 6 weeks

after fertilization, and insulin by 7 to 8.

F. Cunningham, "Pancreas," *William's Obstet.*, 19th ed., 1993, p. 183-4

Thumbsucking has been photographed at 7 weeks after fertilization.

W. Liley, *The Fetus As Personality, Fetal Therapy*, 1986, p. 8-17

When does the developing baby first move?

"In the sixth to seventh weeks. . . . If the area of the lips is gently stroked, the child responds by bending the upper body to one side and making a quick backward motion with his arms. This is called a 'total pattern response' because it involves most of the body, rather than a local part."

L. B. Arey, *Developmental Anatomy* (6th ed.), Philadelphia: W. B. Sanders Co., 1954

At eight weeks, "if we tickle the baby's nose, he will flex his head backwards away from the stimulus."

A. Hellgers, M.D., "Fetal Development, 31," *Theological Studies*, vol. 3, no. 7, 1970, p. 26

Another example is from a surgical technician whose letter said, "When we opened her abdomen (for a tubal pregnancy), the tube had expelled an inch-long fetus, about 4-6 weeks old. It was still alive in the sack.

"That tiny baby was waving its little arms and kicking its little legs and even turned its whole body over."

J. Dobson, *Focus on the Family Mag.*, Aug. '91, pg. 16

But pregnant women don't "feel life" until four or five months!

The inside of the uterus has no feeling. The baby has to be almost a foot long (30 cm.) and weigh about one pound (454 gm.) before he or she is large enough to brace a shoulder against one wall and kick hard enough against the opposite wall to dent it outward. Then the mother feels it because the outside of the uterus is covered by a sensitive peritoneal surface.

What is the development at seven to eight weeks?

The baby's stomach secretes gastric juice by eight weeks. Now we can listen to the tiny one's heartbeat on an ultrasonic stethoscope. These are now common in doctors' offices and on hospital wards. They are never used in abortion facilities, however, as this information is universally withheld from mothers prior to abortion. Abortionists know that if they tell women there already is a heartbeat — and certainly if they would let her listen to the heartbeat — some mothers would change their minds. The actual sounds of an six-week-old baby's heartbeat are available on tape from Cincinnati Right to Life, 1802 W. Galbraith Rd., Cincinnati, OH 45239 ($3.00).

> "Eleven years ago, while giving an anesthetic for a ruptured tubal pregnancy (at two months), I was handed what I believed to be the smallest human being ever seen. The embryo sac was intact and transparent. Within the sac was a tiny (one-third inch) human male swimming extremely vigorously in the amniotic fluid, while attached to the wall by the umbilical cord. This tiny human was perfectly developed with long, tapering fingers, feet and toes. It was almost transparent, as regards the skin, and the delicate arteries and veins were prominent to the ends of the fingers.
>
> "The baby was extremely alive and swam about the sac approximately one time per second with a natural swimmers stroke. This tiny human did not look at all like the photos and drawings of 'embryos' which I have seen, nor did it look like the few embryos I have been able to observe since then, obviously because this one was alive.
>
> "When the sac was opened, the tiny human immediately lost its life and took on the appearance of what is accepted as the appearance of an embryo at this stage (blunt extremities, etc.)."

P.E. Rockwell, M.D., Director of Anesthesiology,
Leonard Hospital, Troy, New York, U.S. Supreme Court.,
Markle vs. Abele, 72-56, 72-730, p. 11, 1972

When are all his body systems present?

By eight weeks (two months).

Hooker & Davenport, *The Prenatal Origin of Behavior,*
University of Kansas Press, 1952

When do teeth form?

All 20 milk-teeth buds are present at six and a half weeks.

"Life Before Birth," *Life Magazine*, Apr. 30, 1965, p. 10

And include dental lamina at 8 weeks.

Med. Embryology, Longman, 3rd Ed., 1975, p. 406

How about nine weeks?

At nine to ten weeks, he squints, swallows, moves his tongue, and if you stroke his palm, will make a tight fist.

By nine weeks he will "bend his fingers round an object in the palm of his hand."

Valman & Pearson, "What the Fetus Feels,"
British Med. Jour., Jan. 26, 1980

When does he start to breathe?

"By 11 to 12 weeks (3 months), he is breathing fluid steadily and continues so until birth. At birth, he will breathe air. He does not drown by breathing fluid within his mother, because he obtains his oxygen from his umbilical cord. This breathing develops the organs of respiration."

"Life Before Birth," *Life Magazine*, Apr. 30, 1965, p. 13

"Maternal cigarette smoking during pregnancy decreases the frequency of fetal breathing by 20%. The 'well documented' higher incidence of prematurity, stillbirth, and slower development of reading skill may be related to this decrease."

F. Manning, "Meeting of Royal College of Physicians & Surgeons," *Family Practice News*, March 15, 1976

"In the 11th week of gestation, fetal breathing is irregular and episodic. As gestation continues, the breathing movements become more vigorous and rapid."

C. Dawes, "Fetal Breathing: Indication of Well Being," *Family Practice News*, Mar. 16, 1976, p. 6

Episodic spontaneous breathing movements have been observed in the healthy human fetus as early as ten weeks gestational age.

Conners et al., "Control of Fetal Breathing in the Human Fetus," Am J. OB-GYN, April '89, p. 932

And 11 weeks (9 weeks post-fertilization).

Cunningham, Wm. *Obstetrics*, 1993, p. 193

When can he swallow?

At 11 weeks.

Valman & Pearson, *British Med. Jour.*, "What the Fetus Feels," 26 Jan. 1980, p. 233

What of detailed development, like fingernails and eyelashes?

Fingernails are present by 11 to 12 weeks; eyelashes by 16 weeks. Fingerprints are completely established during the fourth month of gestation.

Hamilton et al., *Human Embryology*, Fourth Ed., 1972, p. 567

At what point are all his body systems working?

By 11 weeks.

"Life Before Birth," *Life Magazine*, Apr. 30, 1965, p. 13

How does the size of the baby increase in weight?

At 12 weeks (three months) she weighs about 30 gm (1.0 ounce); at 16 weeks about 170 gm (6 ounces); and at 20 weeks (four months), approximately 454 gm (one pound).

When is taste present?

"Taste buds are working between 13 and 15 weeks gestation" (11 to 13 weeks after conception).

Mistretta & Bradley, *Taste in Utero*, 1977, p. 62

Bradley et al., "Dev. Taste Buds . . . ,"
J. Anat. 101 (4) 1967, p. 743-752

How about hearing?

"Auditory sense is present in the infant 24 weeks before birth [14 weeks after conception]. This involves brain functioning and memory patterns."

M. Clemens, "5th International Congress Psychosomatic,"
OB & GYN, Rome: Medical Tribune, Mar. 22, 1978, p. 7

Fetal hearing and fetal learning are present at 20 weeks and perhaps as early as 16 weeks. (With controls) fetal babies remembered music played at these ages.

W. Evans, U. of Keele; R. Parncutt, U. of Bath, to
Brit. Psy. Soc. 3-26-98

Recent technology allowed a tiny microphone to be placed by the fetus's head and

> "We heard almost everything, from people talking 12 feet away, to a door opening in the room, to a cart going down the hall with the door closed. The clarity was incredible. It was easy to tell who was talking."

The results showed the fetus hears everything we do, only 10 decibels less. Their earliest response to sound was at 26 weeks.

Is Noise an Intrauterine Threat, Phelan & Satt,
by R. McGuire, Med. Tribune, Nov. 30, 1989

He certainly can't cry!

Although the watery environment in which he lives presents small opportunity for crying, which does require air, the unborn knows how to cry, and given a chance to do so, he will.

A doctor

"... injected an air bubble into the baby's amniotic sac and then took x-rays. It so happened that the air bubble covered the baby's face. The whole procedure had no doubt given the little fellow quite a bit of jostling about, and the moment that he had air to inhale and exhale they heard the clear sound of a protesting wail emitting from the uterus. Late that same night, the mother awakened her doctor with a telephone call, to report that when she lay down to sleep the air bubble got over the baby's head again, and he was crying so loudly he was keeping both her and her husband awake. The doctor advised her to prop herself upright with pillows so that the air could not reach the baby's head, which was by now in the lower part of the uterus."

Day & Liley, *Modern Motherhood*,
Random House, 1969, pp. 50-51

Does the unborn baby dream?

Using ultrasound techniques, it was first shown that REM (rapid eye movements), which are characteristic of active dream states, have been demonstrated at 23 weeks.

J. Birnhaltz, "The Development of Human Fetal Eye Movement Patterns," *Science*, 1981, vol. 213, pp. 679-681

REM have since been recorded 17 weeks after conception.

S. Levi, Brugman University of Brussels,
American Medical Association News, February 1, 1983

Since REM are characteristic of dream states after birth, researchers are asking if the unborn child also dreams.

Does he/she think?

In adults, when we contemplate a physical move or

action from a resting state, our heart rate accelerates several seconds before the motion. Similarly, the fetal baby's heart rate speeds up six to ten seconds prior to fetal movement. Is this conscious thought and planning?

N. Lauerson & H. Hochberg, "Does the Fetus Think?"
JAMA, vol. 247, no. 23, July 18, 1982

> "We now know that the unborn child is an aware, reacting human being who, from the sixth month on (and perhaps earlier), leads an active emotional life.
> "The fetus can, on a primitive level, even learn in utero.
> "Whether he ultimately sees himself and, hence, acts as a sad or happy, aggressive or meek, secure or anxiety-ridden person depends, in part, on the messages he gets about himself in the womb."
>
> T. Verney & J. Kelly, *The Secret Life of the Unborn Child*, Delta Books, 1981, p. 12

> "At eight weeks of life a tapping stimulus on the amniotic sac results in arm movements . . . the primitive brain receives the stimulus, selects a response and transmits the response as a signal to the arm."
>
> M. Rosen, "Learning Before Birth," *Harpers Magazine*, April 1978

You mean that the unborn baby's emotions can be affected?

This is probably true.

> "We know already that even embryonic nervous tissue is 'open' to maternal communication via brain chemicals called 'neurotransmitters.' This is a finding with enormous implications. It means that the mother's emotional state can affect the unborn almost from conception onward. Even before the baby can hear in the womb, or think consciously, it is capable of sensing discord between

its parents. If the mother is in constant turmoil, its own environment will be tainted by the biochemistry of fear and hostility, grief, and anger."

Shettles & Varick, *Rites of Life*,
Grand Rapids: Zondervan, 1983, pp. 87-89

At four-and-a-half months, a very bright light on a woman's abdomen will cause the baby to slowly move its hand to a position shielding the eyes.

Loud music will cause the baby to cover its ears.

A woman in an unhappy marriage has a 237% greater risk of bearing a child with physical and psychological problems than a woman in a secure relationship.

T. Verney & J. Kelly, *The Secret Life of the Unborn Child*,
Delta Books, 1981, p. 49

Agreeing with Dr. Liley, Dr. W. Freud (grandson of Sigmund Freud), observed 10,000 ultrasound visualizations and reported, "It looks as if the fetus has a lot of intentionality." He also once saw unborn twins fighting.

1st International Congress, Pre & Peri Natal Psychology,
Toronto, July 8-10, 1983

So the fetus is really the Second Patient? Can he or she be treated?

"The status of the fetus has been elevated to that of a patient who, in large measure, can be given the same meticulous care that obstetricians have long given the pregnant woman."

Cunningham, F.G., et. al, *Williams Obstetrics*, 19th ed.
(Norwalk, CT: Appleton & Lange, 1993), 165.

Diaphragmatic hernia and obstructive hydrocephalus can be corrected while still in the womb. In addition:

"Medical treatment of the fetus includes exchange transfusion, thyroid hormone replacement and administration of steroids for surfactant induction.

transfusion, thyroid hormone replacement and administration of steroids for surfactant induction. Correction of obstructive uropathy with urinary diversion has proved successful in decreasing fetal morbidity and mortality, while other procedures are still in the experimental stage. Extrauterine fetal surgery is performed only rarely but represents an exciting new direction in the treatment of medicine's youngest patients."

Camosy, P., "Fetal Medicine: Treating the Unborn Patient," Am. Fam. Physician, 52 (5) (October 1995): 1385-92

Give specific examples:

In a 4-month-old fetus with a fatally weak immune system, three intrauterine bone marrow transplants were done and the baby was born healthy.

A. Flake, New England Journal of Medicine 12-12-97

A 21-week baby had a spina bifida that was compressing his brain. In a first-of-its-kind, Dr. J. Bruner at Vanderbilt University opened the uterus and repaired the defect. As he was about to close the uterine incision, the baby reached his arm out into the air and took hold of the surgeon's finger. Snapped at that second by photographer Michael Clancy, the picture is dramatic proof of the humanity of the preborn.

Five-year followups at Vanderbilt and at Children's Hospital in Philadelphia of 200 such intrauterine spina bidifa repairs showed no hydrocephalus, and 67% had less leg paralysis requiring postpartum surgery. In 7%, such open repairs caused premature labor and fetal death.

J. Urology, Oct. 2000, M. Johnson
2002 Meeting Soc. Maternal – Fetal Med.

How many weeks are there in a pregnancy and how do you measure them?

There are 40 weeks. We measure a pregnancy from the time the ovum begins to ripen, that is, at the start of a woman's menstrual period. After about two weeks of growth, the egg is released from the ovary. Fertilization can then occur. This is about two weeks before her next period is due. Four of the 40 weeks have already elapsed at the time she misses her first period.

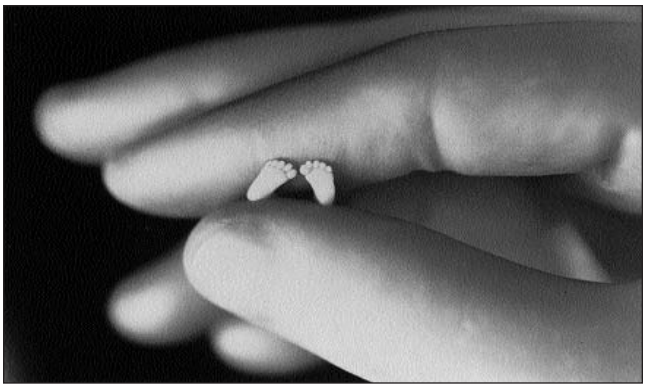
Gestational age dates from the first day of the mother's last menstrual period. Actual age of the baby dates from fertilization.

What is birth?

Birth is the emergence of the infant from the mother's womb, the severing of the umbilical cord, and the beginning of the child's existence, physically detached from the mother's body. The only change that occurs at birth is a change in the external life support system of the child. The child is no different before birth than after, except that he has changed his method of feeding and obtaining oxygen. Before birth, nutrition and oxygen were obtained from the mother through the baby's umbilical cord. After birth, oxygen is obtained from his own lungs and nutrition through his own stomach, if he is mature enough to be nourished that way. If he is quite premature, nourishment would continue through our present, reasonably sophisticated external life support systems in the form of intravenous feeding, which is

similar to the umbilical cord feeding from the mother.

Did you “come from” a fertilized ovum? No, you once were a fertilized ovum who grew and developed into the child or adult you are today. Nothing has been added to the fertilized ovum, who you once were, except nutrition.



Tiny human feet at 10 weeks development.

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