Fetal Period

Development of the Fetus

The period from the beginning of the ninth week to birth is known as the **fetal period (**From the 3rd month to the birth)

It is characterized by maturation of tissues and organs and rapid growth of the body.

The length of the fetus is usually indicated as:

the **crown-rump length** (CRL) (sitting height) or as the **crown-heel length** (CHL), the measurement from the vertex of the skull to the heel (standing height). These measurements, expressed in centimeters, are correlated with the age of the fetus in weeks or months.

Development of the Fetus

Growth in length is particularly striking during the third, fourth, and fifth months, while an increase in weight is most striking during the last 2 months of gestation.

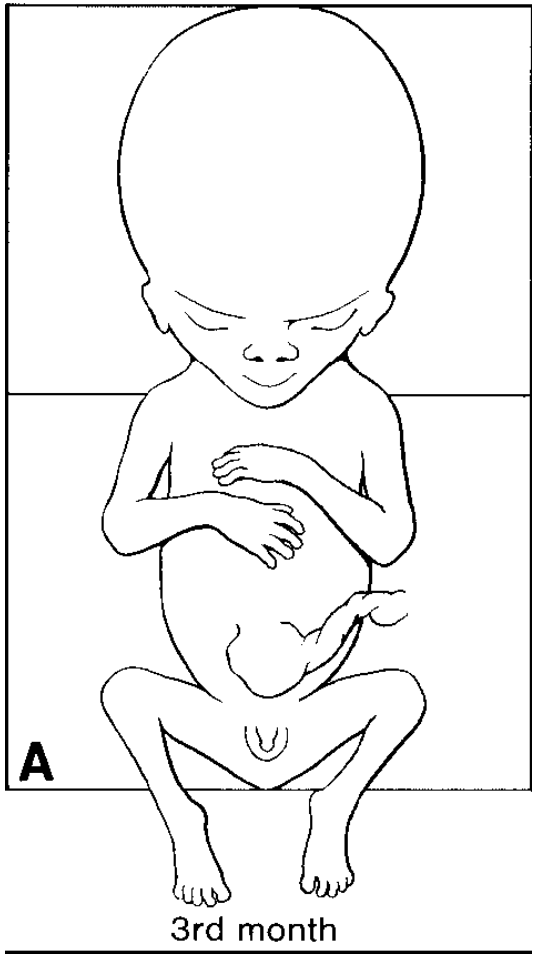
In general, **the length of pregnancy is considered to be 280 days, or 40 weeks after the onset of the last normal menstrual period (LNMP) or more accurately, 266 days or 38 weeks after fertilization.**

MONTHLY CHANGES

One of the most striking changes taking place during fetal life is the relative slowdown in growth of the head compared with the rest of the body.

At the beginning of the third month the head constitutes approximately half of the CRL By the beginning of the fifth month, the size of the head is about one-third of the CHL, and at birth it is approximately one-fourth of the CHL. Hence, over time, growth of the body accelerates but that of the head slows down.

Third month



- The length of the fetus is usually indicated as the crown rump length **(CRL)** (sitting height) or crown-heel length **(CHL)** (standing height)
- At the beginning of the third month, the head constitutes approximately half of the **CRL**
- During the third month the face becomes more human looking.

Developmental changes

- **Age (Weeks) CRL (cm) Weight (g)**

9–12	**5–8**	**10–45**
13–16	**9–14**	**60–200**
17–20	**15–19**	**250–450**
21–24	**20–23**	**500–820**
25–28	**24–27**	**900–1300**
29–32	**28–30**	**1400–2100**
33–36	**31–34**	**2200–2900**
37–38	**35–36**	**3000–3400**

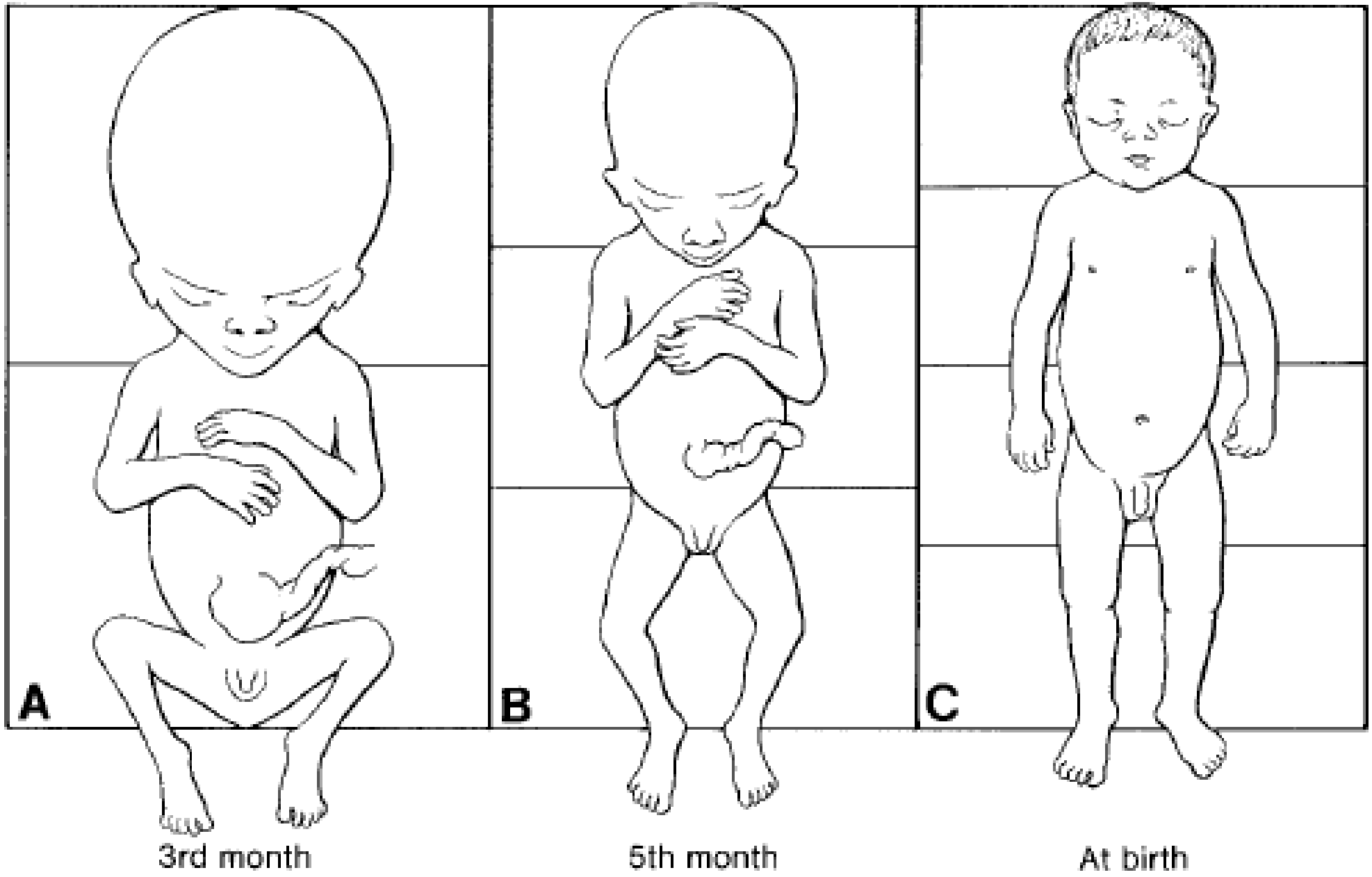


Figure 6.2 Size of the head in relation to the rest of the body at various stages of development.

MONTHLY CHANGES

During the **third month** the face becomes more human looking. The eyes, initially directed laterally, move to the ventral aspect of the face, and the ears come to lie close to their definitive position at the side of the head.

The limbs reach their relative length in comparison with the rest of the body, although the lower limbs are still a little shorter and less well developed than the upper extremities.
Primary ossification centers are present in the long bones and skull by the 12th week.

Also by the 12th week, external genitalia develop to such a degree that the sex of the fetus can be determined by external examination (ultrasound).

MONTHLY CHANGES

During the 6th week **intestinal loops cause a large swelling (herniation) in the umbilical cord,** but by the 12th week the loops withdraw into the abdominal cavity.
At the end of the third month, reflex activity can be evoked in aborted fetuses, indicating muscular activity.

During the **fourth** and **fifth months** the fetus lengthens rapidly and at the end of the first half of intrauterine life its CRL is approximately 15 cm, that is, about half the total length of the newborn.
Theweight of the fetus increases little during this period and by the end of the fifth month is still less than 500 g. The fetus is covered with fine hair, called **lanugo hair;** eyebrows and head hair are also visible.



Figure 6.3 An 11-week fetus. The umbilical cord still shows a swelling at its base, caused by herniated intestinal loops. Toes are developed, and the sex of the fetus can be seen. The skull of this fetus lacks the normal smooth contours.

MONTHLY CHANGES

During the fifth month movements of the fetus can be felt by the mother.

During the **second half of intrauterine life,** weight increases considerably, particularly during the last 2.5 months, when 50% of the full-term weight (approximately 3200 g) is added.

During the **sixth month,** the skin of the fetus is reddish and has a wrinkled appearance because of the lack of underlying connective tissue.

A fetus born early in the sixth month has great difficulty surviving. Although several organ systems are able to function, the respiratory system and the central nervous system have not differentiated sufficiently, and coordination between the two systems is not yet well established.

MONTHLY CHANGES

By 6.5 to 7 months, the fetus has a length of about 25 cm and weighs approximately 1100 g. If born at this time, the infant has a 90% chance of surviving.

During the last 2 months, the fetus obtains well-rounded contours as the result of deposition of subcutaneous fat. By the end of intrauterine life, the skin is covered by a whitish, fatty substance (**vernix caseosa**) composed of secretory products from sebaceous glands.

At the end of the **ninth month** the skull has the largest circumference of all parts of the body, an important fact with regard to its passage through the birth canal.

At the time of birth the weight of a normal fetus is 3000 to 3400 g; its CRL is about 36 cm; and its CHL is about 50 cm. Sexual characteristics are pronounced, and the testes should be in the scrotum.



Figure 6.4 A 12-week fetus in utero. Note the extremely thin skin and underlying blood vessels. The face has all of the human characteristics, but the ears are still primitive. Movements begin at this time but are usually not felt by the mother.



Figure 6.5 An 18-week-old fetus connected to the placenta by its umbilical cord. The skin of the fetus is thin because of lack of subcutaneous fat. Note the placenta with its cotyledons and the amnion.

TABLE 6.2 Developmental Horizons during Fetal Life

Event	Age (Weeks)
Tastebuds appear	7
Swallowing	10
Respiratory movements	14–16
Sucking movements	24
Some sounds can be heard	24–26
Eyes sensitive to light*	28

*Recognition of form and color occurs postnatally.

TIME OF BIRTH

The date of birth is most accurately indicated as 266 days, or 38 weeks, after fertilization. The oocyte is usually fertilized within 12 hours of ovulation. However sperm deposited in the reproductive tract up to 6 days prior to ovulation can survive to fertilize oocytes. Thus, most pregnancies occur when sexual intercourse occurs within a 6-day period that ends on the day of ovulation.

A pregnant woman usually will see her obstetrician when she has missed two successive menstrual bleeds and it is readily understandable that the day of fertilization is difficult to determine.

TIME OF BIRTH

The obstetrician calculates the date of birth as 280 days or 40 weeks from the first day of the LNMP. In women with regular 28-day menstrual periods the method is fairly accurate, but when cycles are irregular, substantial miscalculations may be made. An additional complication occurs when the woman has some bleeding about 14 days after fertilization as a result of erosive activity by the implanting blastocyst. Hence the day of delivery is not always easy to determine. Most fetuses are born within 10 to 14 days of the calculated delivery date. If they are born much earlier, they are categorized as **premature;** if born later, they are considered **postmature.**

TIME OF BIRTH

A valuable tool for assisting in determination is **ultrasound,** which can provide an accurate (1 to 2 days) measurement of CRL during the 7th to 14th weeks.
Measurements commonly used in the 16th to 30th weeks are **biparietal diameter (BPD),** head and abdominal circumference, and femur length.

An accurate determination of fetal size and age is important for managing pregnancy, especially if the mother has a small pelvis or the baby has a birth defect.

EDD

- The obstetrician calculates the date of birth as 280 days or 40 weeks from the first day of the LNMP.
- Add 1 year for the LNMP.
- Subtract 3 months
- Add 1 week
- Example
- LNMP is on 3rd June 2007 so the EDD is

1. 3rd June 2007 + 1yr = 3rd June 2008.
2. 3rd June 2008 – 3 = 3rd March 2008.
3. 3rd March 2008 + 1wk = 10th March 2008

Intrauterine growth restriction (IUGR)

Causative factors include

- Chromosomal abnormalities (10%).
- Teratogens.
- Infections
- Poor maternal health (hypertension and renal and cardiac disease).
- The mother’s nutritional status and socioeconomic level, use of cigarettes, alcohol, and other drugs.
- Placental insufficiency.
- Multiple births (e.g., twins, triplets).

Thank You