

FETAL AGE ASSESSMENT

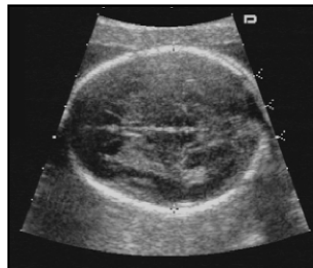
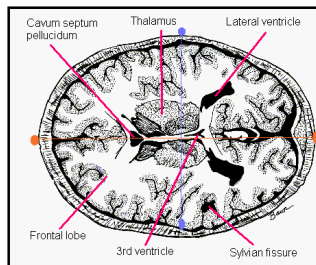
A variety of techniques exist for determining gestational age in the second and third trimesters. The most accurate sonographic method is measurement of the crown-rump length in the first trimester (± 4 days). In the second and third trimesters, all of the following techniques have a range of approximately ± 2 weeks.

At least two separate measurements should be made of each parameter used. When a significant disparity in those two measurements occur, additional measurements should be taken. Some rules of thumb for establishing gestational age in the second and third trimesters include:

- Multiple measurements should be used, such as, BPD, HC, FL and AC
- If the AC falls more than 2 SD from the mean, look for signs of IUGR
- If the FL falls short more than 2 SD, look for other signs of skeletal dysplasia
- If the head measurements and/or the AC fall short, use a ratio of HC/AC
- The cephalic index can be used to determine whether head shape is appropriate

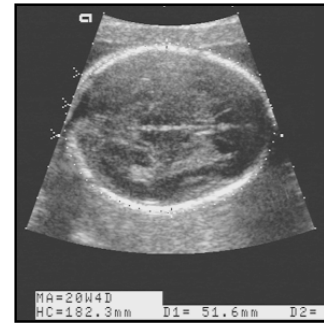
BIPARIETAL DIAMETER

- Axial section through fetal head at the level of the thalami and cavum septum pellucidum
- Measure outer surface of near parietal bone to inner surface of far parietal bone (leading edge to leading edge)
- First measurable between 10 - 12 weeks
- Angle of asynclitism: derived from clinical obstetrics. Sonographically it refers to the relationship between the fetal cranial sagittal suture and the central portion of the ultrasound beam. For an exact BPD, it should be 90°



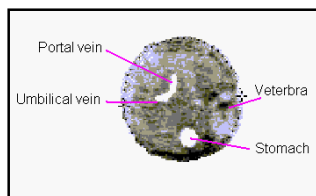
HEAD CIRCUMFERENCE

- Measured at same level as BPD
- Circumference should include scalp echoes when using electronic ellipse software
- When occipito-frontal (OFD) measurements are used in conjunction with BPD, the OFD should be measured outer edge to outer edge
- More accurate than BPD when the fetal head is dolichocephalic or brachycephalic



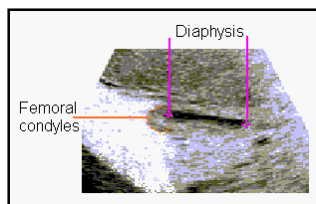
ABDOMINAL CIRCUMFERENCE

- Measured at the level of the portal sinus and stomach
- Circumference measurements (both ellipse and linear) should include soft tissue
- The least reliable in establishing gestational age due to significant genetic and physiologic variations in size after 25 weeks.



FEMUR LENGTH

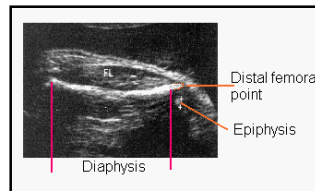
- Best obtained with a linear array (eliminates artifactual bowing due to sector beam geometry)
- Includes only ossified diaphysis, excludes epiphyseal cartilage
- If femur length falls below 2 SD of the mean, short limb dysplasia may be present. Other long bones should be measured



EPIPHYSEAL APPEARANCE

Gestational age can be estimated by identifying the presence of various epiphyses.

<i>EPIPHYSEAL APPEARANCE</i>	
Distal femoral	33 weeks
Proximal tibial	35 weeks
Proximal humeral	38 weeks



OTHER PARAMETERS

A variety of other biometric techniques have been established to estimate fetal age. They include:

- **LONG BONE LENGTH**
- **HUMERAL LENGTH**
- **CLAVICULAR LENGTH**
- **FOOT LENGTH**
- **BINOCULAR DISTANCE** : Measured from lateral orbital rim to lateral orbital rim. May be useful in assessing gestational age in growth retarded fetuses.
- **TRANSCEREBELLAR DISTANCE**: Measured from lateral aspects of cerebellum in an axial plane of section. May also be useful in assessing gestational age in growth retarded fetuses.

FETAL WEIGHT

- Sonography is an inaccurate predictor of absolute weight is more accurate in term and post-term infants
- Variance in pre-term infants >20%
- Changes in weight from previous sonograms may be used as an indicator of growth
- Significant variation in normal fetal weight, especially in the 3rd trimester

BIOPHYSICAL PROFILE

The biophysical profile (BPP) is a system designed to detect fetal asphyxia. It is a graded, binary system that includes the several parameters each of which is scored 0 or 2. If a particular parameter is observed it is scored 2. If it is not observed, it is scored 0. There are no scores of 1 awarded.

- **Fetal breathing movements:** lasting at least 30 seconds over a 30 minute period
- **Gross body movements:** at least three episodes of fetal body and/or limb movements identified over a 30 minute period
- **Fetal tone:** all fetal extremities appear flexed and the fetal chin is flexed on the chest; or at least one episode of limb extension/flexion seen
- **Amniotic fluid volume:** AFI exceeds 5.0 cm
- **Non-stress test (NST):** demonstration of reactive fetal heart rate consisting of 2 episodes of acceleration of ≥ 15 bpm for ~ 15 sec over a 30 minute time frame

<i>BIOPHYSICAL PROFILE SCORING</i>		
<i>SCORE</i>	<i>EXPLANATION</i>	<i>MANAGEMENT</i>
10	No evidence of asphyxia	Conservative
8	No acute asphyxia	Serial testing
6	Acute asphyxia likely	Deliver if >32 weeks
4	Acute asphyxia likely	Deliver if >26 weeks
2	Acute asphyxia very likely	Deliver if >26 weeks
0	Acute asphyxia certain	Deliver if >32 weeks