



Normal Labor

Normal labor is defined as uterine contractions that result in progressive dilatation and effacement of the cervix.

Diagnosis of Labor *contractions *Show *Cervical effacement & dilatation

1-Contractions

Labor is defined as uterine contractions that result in progressive dilatation and stretching of the cervix.

Braxton-Hicks contractions

Are uterine contractions occurring prior to the onset of labor. They are normal and can be demonstrated with fetal monitoring techniques early in the second trimester of pregnancy. These innocent contractions can be painful, regular and frequent, although they usually are not.

While the uterine of labor are usually painful, they are sometimes only mildly painful, particularly in the early stages of labour. Occasionally, they are painless.

True Labor contractions	Braxton-Hicks contraction
*Regular	*irregular
*increase in frequency	*does not increase in frequency
*not relieved by analgesic	*relieved by analgesic
*increased in frequency by enema	*Not
*associated with stretching & dilatation of cervix	*not productive
*associated with bulge of fore water	*Not associated with bulge of for water

2-Show

Expulsion of the cervical mucus plug together with some blood from the small vessels in the cervical canal.

It is associated with commencement of dilatation of the internal cervical os and labor usually supervenes within 24 hours.

N.B Occasionally there is no show or it is only evident after labor is established

3-Cervical dilatation and Effacement

***In primigravida effacement of the cervix precedes dilatation and suggests that the onset of clinical labor is imminent, especially if there are additional signs, such as a show or discharge of amniotic fluid.**

***Dilatation of the external os only commences when labor is established**

Cervical dilatation alone does not confirm labor, since many women will demonstrate some dilatation(1-3cm) for weeks or months prior to the onset of true labor.

Thus, in other than obvious circumstances, labor will usually be determined by observing the patient over time and demonstrating progressive cervical changes, in the presence of regular, frequent, painful uterine contractions.

Stages of Labor

Labor is usually divided into 4 stages:

1-First stage.. The stage of dilatation of the cervix and upper birth canal ends with full cervical dilation. Starts from onset of labor to full cervical dilation.

2-Second stage:starts from full cervical dilatation till delivery of the infant.

3-third stage:starts from delivery of infant till delivery of placenta and membranes.

4-fourth stage ..Some consider it as the one hour after birth ,stage of recovery.

Labor usually lasts 12-14 hours in primigravida and 6-8 hours in multigravida. These averages are only approximate, and there is considerable variation from one woman to the next, and from one labor to the next.

First Stage

During this stage progressive cervical dilatation and effacement occurs and it is divided into two phases: *latent phase *active phase

Progress in first stage:

1-Contractions become progressively stronger and more frequent

2-Mother feels pain at the dorsal region, but as contractions become stronger pain is felt in the abdomen as well.

3-Fetal head and amniotic sac, if membranes intact, are forced down against the internal cervical os

4-Dilatation of the cervix takes place from above downwards and the upper part of the cervix become incorporated in the lower uterine segment, then when the cervix is taken up the external os starts to dilate

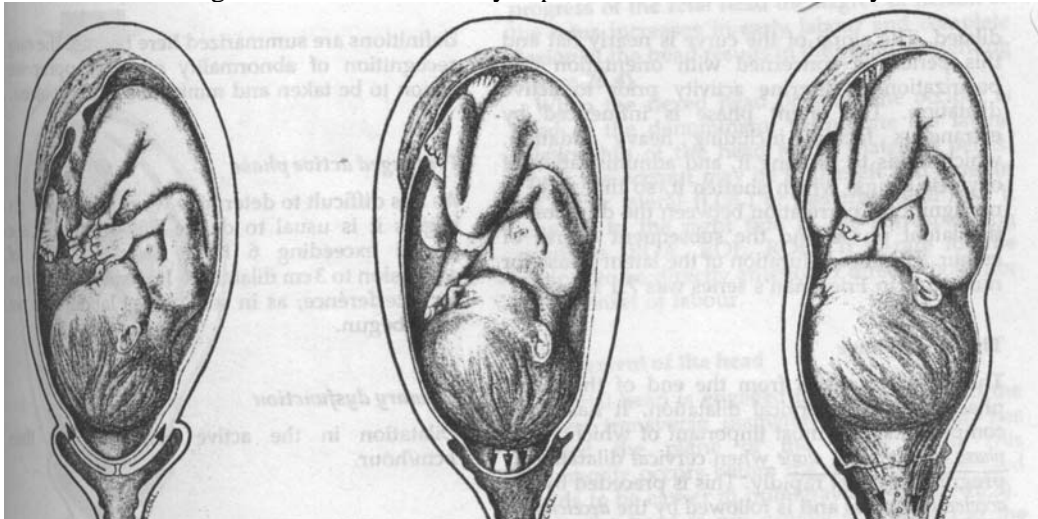
Causes of cervical dilatation and effacement:

- 1-contraction of the longitudinal muscle fibers of the uterine body
- 2-Passive stretching by the presence of the presenting part, this is helped by softening of the cervix which occurred progressively throughout pregnancy

N.B Bag of fore water

This refers to the area of the fetal membranes in front of the fetal head and overlying the cervix. It becomes tense during contraction.

- If the head is well-fitted to the lower uterine segment, it acts as obturator (ball & valve) preventing transmission of the hydrostatic pressure to the fore water.
- If the head is not fitted to the lower segment, the full hydrostatic pressure force is exerted on the bag of fore water and early rupture of membranes is likely to occur.



- A-Early labor. Cervix is beginning to dilate. The well-fitted head acts as an obturator, preventing transmission of pressure to the fore water during uterine contraction
- B-Late first stage. Increasing pressure results in ballooning of the fore water
- C-Rupture of the membranes, usually about the time of full dilation of the cervix

*The ability of bag of waters to stretch and occupy the dilating internal os is generally considered beneficial to progression of the first stage of labor, however, this concept is doubtful, since there is no apparent difference in the rate of cervical dilation and duration of the first stage of labor whether or not the fetal membranes are intact.

*Early rupture of membranes is usually associated with malposition or malpresentation, in these conditions usually labor is prolonged. This gives a false impression that intact membranes is useful for the progression of labor and cervical dilation

Cervical dilatation pattern consists of two phases:

1-Latent phase

Extends from the onset of regular uterine contractions to the beginning of the active phase(3-4cm cervical dilatation). The slope of the curve is nearly flat.

The rate of cervical dilation is $<0.6\text{cm/hour}$

Usually it average 12 hours(maximum 20 hours) in primigravida and 8 hours(maximum 14hours) in multigravida.

N.B there is no correlation between the length of latent phase and subsequent progress in active phase.

2-Active Phase

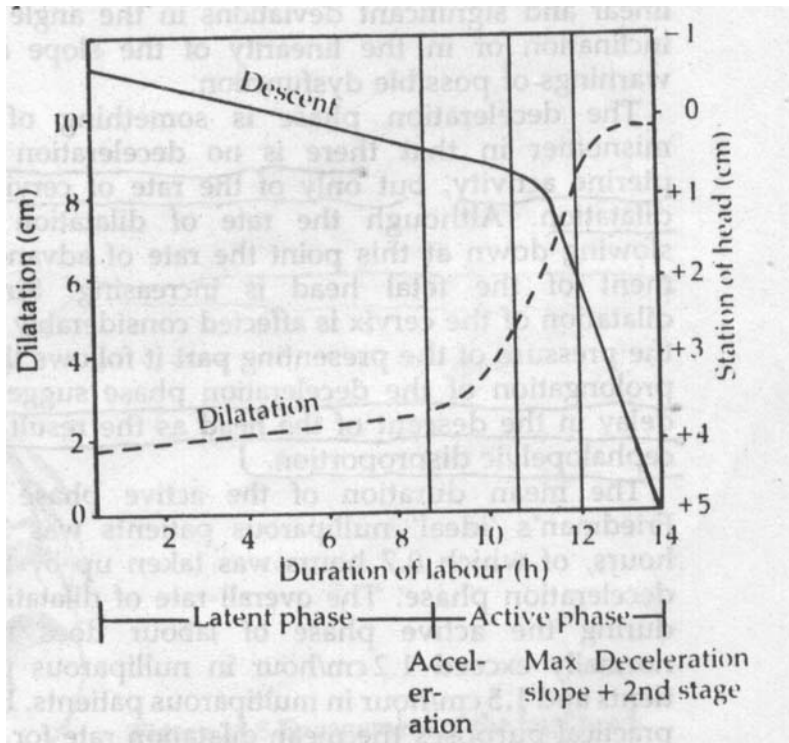
From 3-4 cm cervical dilation until full dilation of the cervix , it has 3 components:

Acceleration phase: Cervical dilation rate $>0.6\text{cm/hour}$

Maximum slope of dilation: Cervix $>5\text{cm}$, rate of dilation $>1.2\text{cm/hour}$ for primigravida and 1.5cm/hour in multigravida

Deceleration: Cervix $>8-9\text{cm}$ dilated, not completely effaced.

In clinical practice the acceleration and deceleration phases are not readily recognized unless frequent vaginal examinations are performed.



Pattern of cervical dilation and head descent in primigravida

Duration of Active phase

*The mean duration of the active phase in ideal nullipara's patients is 3.4 hours of which 0.7 hour is taken by the deceleration phase.

*The overall rate of dilation during active phase is 1.2 cm/hour in primigravida and 1.5 cm/hour in multigravida.

-For practical purposes the mean dilation rate for all patients is considered 1 cm/hour.

Abnormalities of First Stage

1) Prolonged latent phase

Defined as >20 hours in nullipara or >14 hours in multipara

It leads to maternal exhaustion.

Causes:

- 1-False labor
- 2-Unripe cervix
- 3-heavy sedation
- 4-Uterine inertia

Management:

- 1-Observation
- 2-Avoid amniotomy
- 3-avoid heavy sedation
- 4-Oxytocine stimulation for uterine inertia

N.B as mentioned before the duration of latent phase does not affect the subsequent progress in active phase.

2) Protracted Active Phase

Rate of cervical dilation <1.2cm in nulliparas or <1.5cm in multipara

Causes:

1-Fetal Malposition (OP position is the commonest cause)

2-CPD

3-Hypotonic Inertia

4-Anaesthesia

Management:

1-OP position (see its management)

2-CPD: CS

3-oxytocine for inertia

CS rate is 70%

3) Secondary Arrest

Cessation of dilation for >2hours.

Cause...CPD, usually CS is required.

4) Precipitous Labor

Cervical dilation >5cm/hour in nulliparas and >10cm/hour in multiparas

Second Stage of Labor

***Starts from full cervical dilation till expulsion of the infant.**

***Generally it takes 2hours in primigravida and 1 hour in multigravida.**

By the time the cervix has reached full dilation (10cm) the contractions are occurring every 2-3 minutes. Two phases are recognized:

-Phase I : there is little or no vaginal stretching and hence no desire to bear down. The old concept of encouraging the mother to push at this phase is unnecessary and potentially harmful as it can lead to exhaustion, distress and increased chance of operative delivery(anatomical 2nd stage)

-Phase II: in this phase the head reaches the pelvic floor and reflex involuntary bearing down with contraction of abdominal muscles starts(functional 2nd stage).

By the time the head reaches the pelvic floor, if the efforts are good, spontaneous delivery is likely to occur with 10 contractions(20 minutes) in multipara and 20 contractions(40 minutes) in primipara. Epidural anesthesia prolong the second stage

N.BAs the fetal head descends below 0 station, the mother will perceive a sensation of pressure in the rectal area, similar to the sensation of an imminent bowel movement. At this time she will feel the urge to bear down, holding her

breath and performing a Valsalva, to try to expel the baby. This is called pushing.

The maternal pushing efforts assist in speeding the delivery

Abnormalities of second stage

1) Failure of descent

Arrest of descent of the head in second stage is usually due to CPD and Cs is required.

2) Protracted Descent

Head descent is <1cm/hour in primigravida and <2cm/hour in multigravid

Causes:

1-CPD

2-Full bladder

3-Macrosomia

4-Inadequate pushing due to anesthesia

3) Precipitous labor

Complications:

-Trauma to birth canal

-Fetal distress

-Trauma to fetus

-Postpartum hemorrhage

Cardinal movements during labor (Relation of the head to birth canal)

During labor the head progresses through the following movements

1-Flexion

2-Engagement

3-Descent

4-internal rotation

5-Extension

6-Resititution and external rotation

1) Flexion

Results from fundal pressure on the fetal buttocks and resistance of the cervix to the progressing head leading to complete flexion of the head, chin become close to chest with vertex presentation, with LOT is the commonest because the ovoid shape of head fits in the brim more convinciely when the sagittal suture is in the transverse diameter of pelvic inlet

2) Engagement

passage of the widest transverse diameter of the fetal head (BPD=9.5cm) through the plane of pelvic brim.

This is common before labor and in primigravida it occurs at 36th. Week of pregnancy. In multigravida it occurs during labor.



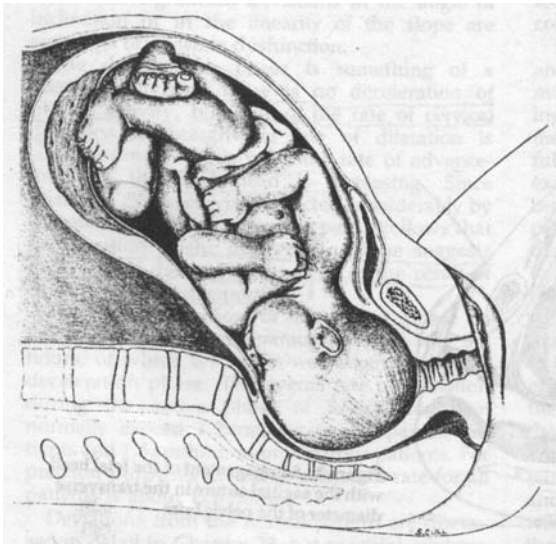
Flexion



Engagement in LOT

3)Descent

Results from contractions of the uterus with tendency for downward descent, however, the degree of the head descent is limited by the cervix until the second stage of labor.



4)Internal Rotation of head

As the head descent and meets the pelvic floor muscles, it rotates with the occiput directed anteriorly.

At pelvic floor contractions on the long axis of the fetus with resistance of the pelvic floor muscle together with the shape of the pelvic diaphragm(which is inclined downward & backward) angling the leading point of the head in this direction, bringing the occiput anteriorly.

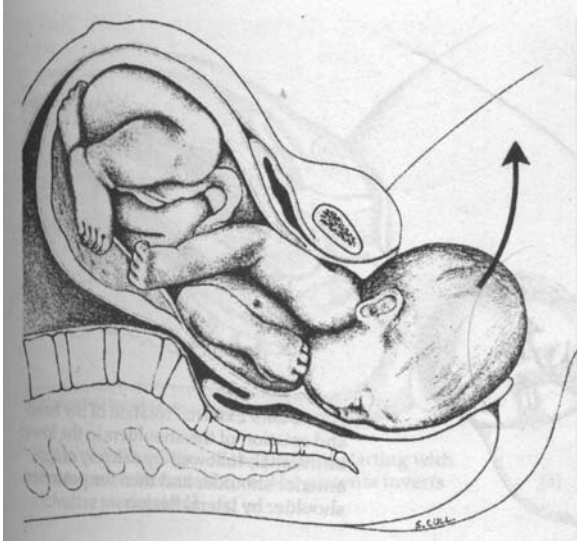
N.B *At pelvic brim the head favor a transverse diameter for the head to fit with the sagittal suture in a transverse position.

***Clinical observations suggest that the shape of the pelvis is a more important contributory factor than soft tissues in directing the occiput anteriorly**

5)Extension and Delivery of Head

The combined effect of descent and internal rotation bring the presenting diameter to the plane of outlet with the occiput lying under the pubic arch and the sinciput at the lower border of the sacrum and coccyx.

With further descent of the head , it extends to be delivered from the under surface of the symphysis pubis(occiput..sinciput..forehead..face)



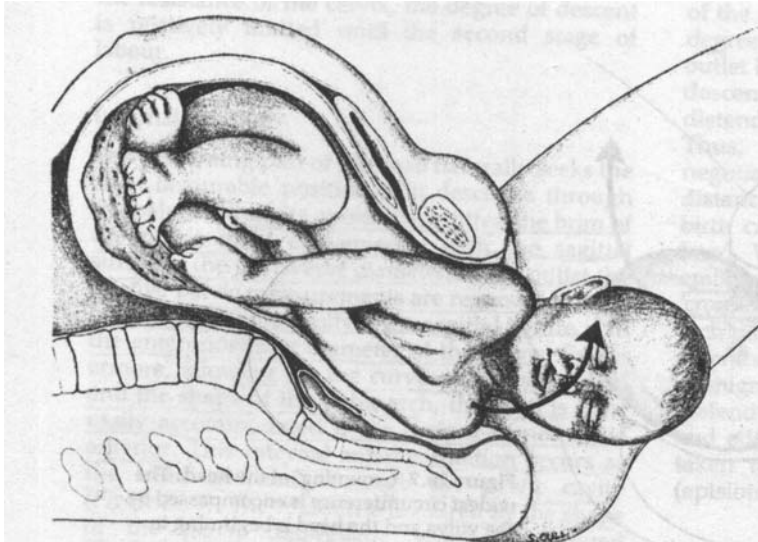
Crowning of Head

When the head with the widest diameter passes under the symphysis pubis, embraced by the vulva and does not recede in between contractions. This is called crowning. If episiotomy is needed it should be done after crowning.

N.B frequently, specially in primigravida, soft tissues are not able to distend adequately so the tearing of the perineum and adjacent tissues may occur unless steps are taken to avoid it by making a formal incision (episiotomy)

6)Restitution and External Rotation

Following delivery of the head the occiput rotates to the lateral position. This is to untwist the neck when the shoulder enter the pelvis.(occiput become directed to side of shoulder)



Delivery of Shoulders

The widest diameter of the shoulders, the biacromial (12.5cm) passes the pelvic brim at the time when the anterior rotation of the head occurs.

- Internal rotation of the occiput is favorable for both the head and the shoulders.
- similarly, external rotation of the head is associated with rotation of the shoulders to bring them into the anteroposterior diameter of the outlet
- Anterior shoulder is delivered first from the under surface of pubic arch followed by posterior shoulder. Delivery occurs by lateral flexion of the trunk.
- the trunk and buttocks follow with the same or the next contraction.

Third Stage of Labor

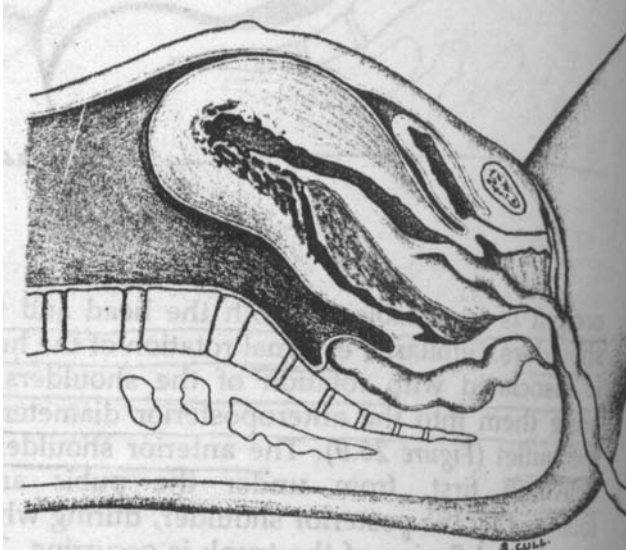
Placental separation occurs through the spongia layer of the deciduas at the time of expulsion of the fetus or very soon afterwards. **Duration is 5 minutes.**

The uterine contractions and retraction reduces the uterine volume and the area of the placental site, leading to separation of placenta. During this process there is inevitably some bleeding from the maternal sinuses at the placental bed with formation of retroplacental hematoma which play some part in further separation of placenta.

Two mechanisms of placental separation occurs:

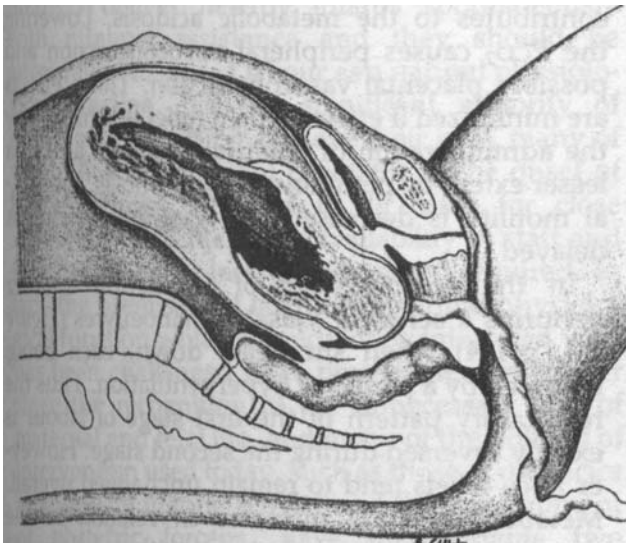
1-Mathews-Duncan mechanism

The leading edge of the placenta separates first and the placenta is delivered with its raw surface exposed.



2-Schultz mechanism

If the placenta is inserted at the fundus and central area separates first, the placenta inverts and draws the membranes after it, covering the raw surface (inverted umbrella)



Signs of placental separation and descent

- 1- A sudden gush of blood observed
- 2- Lengthening of the visible portion of the umbilical cord
- 3- The uterus becomes round and firm(it usually become soft and flat immediately after birth)
- 4- Rising of the fundus. The top of the uterus is usually half-way between the pubic bone and the umbilicus. With separation of placenta it seems to enlarge and approach the umbilicus.

- 5- Immediately after the delivery of the baby, uterine contractions stop and labor pains go away. As placenta separates, the woman will again feel painful uterine cramps. As the placenta descends through the birth canal, she will again feel the urge to bear down and will push out the placenta

Fourth stage

It is a clinical description relating to the recovery phase immediately following the completion of the third stage of labor, during which careful observation of the patient is required to ensure that the uterus does not relax and that bleeding does not occur.

Summary points

Labour should be defined on the basis of regular uterine contractions with progressive changes in the cervix(stretching and dilation)

Labor has 3 stages:

First stage from onset of true labor to full cervical dialation. It is divided into two phases according to pattern of cervical dilation. Latent and Active phases.

Women in latent phase:

- 1-are less than 4cm dilated
 - 2-Have regular, frequent contractions that may or may not be painful
 - 3-Dilate only very slowly(<0.6cm/h)
 - 4-Can usually taik or laugh during their contractions
- Duration 14 h(max.20)in primi, 8h(max.14)inmultipara.

Women in active phase:

- 1-Are at least 4cm dilated
 - 2-have regular contractions that are usually moderately painful
 - 3-demonstrate progressive cervical dilation of at least 1.2-1.5cm/h
 - 4-usually are not comfortable with talking or laughing during their contractions.
- Duration average 3.4h in primi. Rate of cervical dilation 1.2-1.5cm/h,during maximum slope of dilation.

Acceleration and deceleration phases needs frequent examinations to be noticed.

Second stage

Starts with full cervical dilation and ends with expulsion of fetus.it is related to descent of the fetus with movements: flexion, engagement, descent, internalrotation, Extension, restitution and external rotation.

Anterior shoulder delivered first then posterior shoulder due to lateral flexion of trunk. So 2nd stage is concerned with descent. Lasts 2h in primi, 1h, in multipara.

Third stage, duration 5 minutes

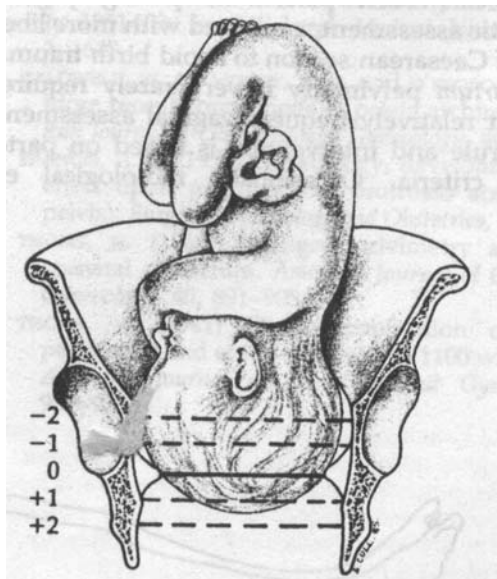
placenta is usually separated with its leading edge leading to delivery with the raw surface (Mauriceau-Duncan) or if at the fundus it separates from the center and delivered with its raw surface covered. The main cause of placental separation is contractions and retraction of the uterus.

Descent and Engagement

Descent means that the fetal head descends through the birth canal. The station of the fetal head describes how far it has descended through the birth canal.

This station is determined relative to the maternal ischial spines, bony prominence on each side of the maternal pelvic sidewall.

0 station (zero station) means that the top of the head has descended through the birth canal just to the level of maternal ischial spines, this usually means that the fetal head is fully engaged (completely engaged), because the widest portion of the fetal head has entered the opening of the birth canal (pelvic inlet)



If fetal head has not reached the ischial spines, this is indicated by negative numbers, such as -2 (meaning the top of the head is still 2cm above the ischial spines)

If the fetal head has descended further than the ischial spines, this is indicated by positive numbers, such as +2 (meaning the top of fetal head is now 2cm below the ischial spines)

Negative numbers above -3 indicate the fetal head is unengaged (floating). Positive numbers beyond +3 indicate the fetal head is crowning or about to deliver.

Women having their first baby often demonstrate deep engagement (0 or +1) for days or weeks before labor. Multipara may not engage below -2 or -3 till 2nd stage.

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