

(CHAPTER 15) FIRST STAGE OF LABOUR

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INTRODUCTION AND THE PARTOGRAPH

In African mothers all the normal risks of labour are present but, in addition, there is a higher incidence of cephalopelvic disproportion (CPD). In Caucasian mothers, the incidence of CPD is under 1%, whereas in African women it is about 10%. There is variation between different areas in Africa, but the overall rate is high throughout Africa.

- Both genetic and nutritional factors appear to play a role in producing a small pelvis. Another factor is a young childbearing age. Young (12-14 year old) girls have a higher risk of CPD compared to 16-17 year old girls because their pelvis is not fully developed.
- The higher incidence of CPD means that more supervision is required of African mothers in labour.
- Obstructed labour is most commonly due to CPD but other causes are malpresentations, hydrocephalus, and rarely cervical stenosis.
- Uterine rupture and asphyxia of the baby are common results of obstructed labour. It is estimated, on a worldwide basis, that one woman dies every 10 minutes from obstructed labour. This chapter is therefore especially important for African obstetrics.

The partograph records the maternal and fetal condition as well as the progress of labour plotted against time in hours.

The central feature of the partogram is the graphical recording of cervical dilation, but descent of the head and uterine activity are also indicators of progress in labour. The advantages of using the partograph are:

- The graphic recording of progress allows staff to see if there is delay. Its main role is therefore to help in the early recognition of prolonged labour. It identifies those mothers who have moved into a high-risk category. It helps prevent rupture of the uterus and perinatal death due to asphyxia and cephalopelvic disproportion (CPD) by allowing intervention before the mother or baby is endangered.
- Its impact on reducing maternal and fetal morbidity and mortality has been well documented. In a WHO study, the introduction of the partograph in hospitals which had not been using it before, there was (a) Decreased rates of CS, PPH and sepsis (b) Fetal outcome was improved (c) the mean duration of labour was reduced.
- While some mothers may be detected antenatally as being at risk of obstructed labour, many can only be identified in labour.
- It simplifies the handing over of the care of mothers by one group of staff to another. It can also be sent with the mother by a referring clinic without the need for a long letter of explanation. It is essential that all members of the staff (doctors and nurses) use the partograph as otherwise it will not work.
- Its use in peripheral clinics ensures that mothers are transferred in good time.
- It provides a visual aid to teaching of students and staff.
- The mother herself is often interested in the pictorial display of her progress in labour. Do not be afraid to show it to her.
- It is cheap to use.
- The partograph has to be introduced with very clear protocols and when you are discussing the partograph it cannot be separated from these protocols. These protocols will vary depending on the transport available and the distance.
- The partograph must be first introduced into the district hospital and then the peripheral clinics. It does not work if you start in the clinics, as the partograph will then be ignored in the district hospital.
- If used together with active management of labour (see below), it reduces the duration of the mother's stay in the labour ward.
- There are 3 aspects to using the partograph:
 - (i) Making assessments on the basis of the history, examination and investigations.
 - (ii) Recording the results of these assessments.
 - (iii) Making plans on the basis of the above. The crucial factor in the management of labour is the timing of interventions, whether these be amniotomy, augmentation, CS or transfer to a central unit. The partograph helps to indicate the optimum timing for these interventions.

(SECTION 1) PROGRESS IN LABOUR

The key word in the management of all 3 stages of labour is progress. When progress is slow, interventions have to be made. The partograph, with alert and action lines, plays a major role in indicating the optimum time for intervention. Labour is divided into the latent and active phases.

(1A) LATENT PHASE OF LABOUR

- The latent phase is from the onset of labour until the cervix reaches 3 cm dilation.
- It is important to record the length of the cervix as well as the dilatation because to diagnose a mother as being in the latent phase, there should be progressive effacement (shortening) of the cervix. If she is in false labour, there is no change in her cervix. However, it can on occasions be difficult to distinguish between a prolonged latent phase and false labour.
- If the latent phase lasts for longer than 8 hours in the presence of at least 2 contractions (lasting 20 seconds or more) every 10 minutes, it is prolonged. If she is in a peripheral unit, she should be transferred to hospital.

CAUSES OF A PROLONGED LATENT

- **Powers:** weak contractions. This diagnosis depends on ruling out the other causes first.

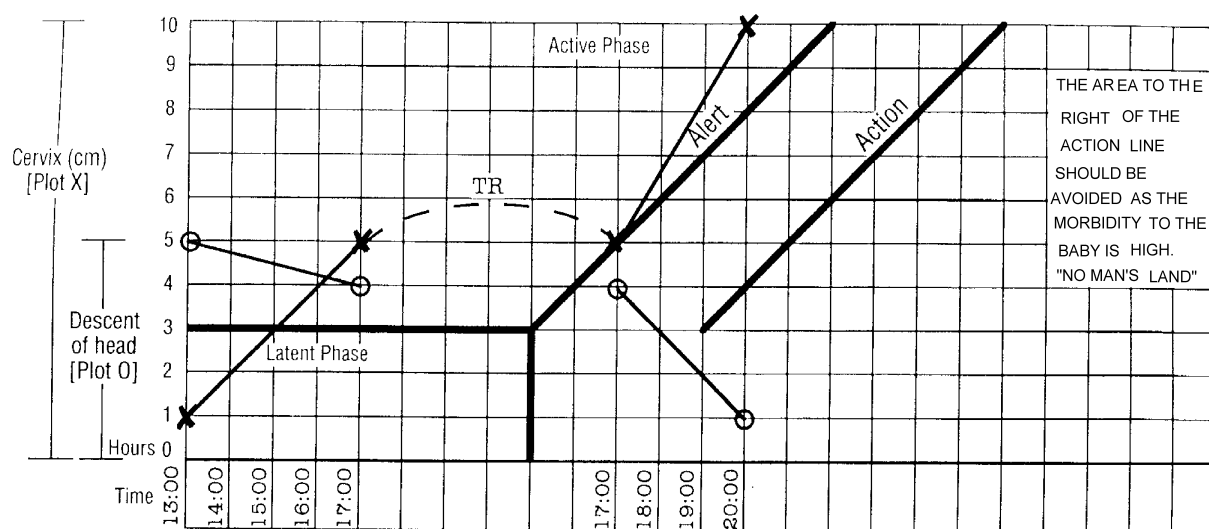
- **Passenger:** a sick baby who is trying to go into labour as labour is thought to be started primarily by the baby. When the baby is in trouble, it tries to get out. Check the fetal heart rate and look at the liquor if the membranes have ruptured. If a baby is showing distress in the latent phase, it is unlikely to survive the stress of labour and is best delivered by CS.
- **Passages:**
 - Bony: Cephalopelvic disproportion (CPD): If the baby is big and the pelvis is small, this is the likely cause. In African mothers a prolonged latent phase may be the first sign of CPD. In this case, there is likely to be major CPD.
 - Soft: Cervical dystocia which can be due to adhesions from bilharzia infection or a previous treatment for cervical intraepithelial neoplasia. These adhesions can make the cervical opening very narrow but they can usually be broken down digitally or with the help of an instrument such as Amnihook or a Kocher's forceps. If the cervix is badly scarred, attempts to dilate it may cause a laceration of the cervix and so in this case a CS is better.

MANAGEMENT OF A PROLONGED LATENT PHASE

There is debate about the significance of a prolonged latent phase and whether the latent phase should be included on the partograph. As a general rule, delay before 4 cm with intact membranes is not serious. However, in African obstetrics, a prolonged latent phase may be more significant as there is a higher incidence of CPD. The management of a prolonged latent phase depends on looking for an underlying cause. It is difficult to make a confident diagnosis of CPD in the latent phase. Depending on your circumstances and the time of the day, you can either:

- Be conservative:** Manage the latent phase conservatively but make sure the baby is well. The problem with using the term "latent phase", is that many mothers are not in labour and the contractions stop. Some believe the term "latent phase" just confuses things and that a mother is either in labour or is not. If you are in doubt check the fetal heart and reassess her 2-4 hours later. The latent phase is best thought of as the grey area between those who are and those who are not in labour. If you are sure the baby is well, it is better just to observe. The advantage of being conservative is that some of these mothers will not be in labour anyway.
- Be active:** Manage the latent phase actively by rupturing the membranes and starting oxytocin in the same doses as are used in active labour (see below). You would then expect the cervix to dilate 1 cm/hour. Active management of the latent phase is better if the cervix is almost fully effaced and 2-3 cm dilated. If the pregnancy is post-date or the mother has reduced fetal movements, it is better to be active and get her into labour.

CAUTION! One of the commonest mistakes in labour management is to diagnose prolonged latent phase when the mother is in false labour. The result is unnecessary induction which may fail, leading to unnecessary caesarean section.



There are a just a few basic points to know about using the partograph.

If in latent phase ⇒ plot the initial dilatation on the left side of the graph.

If in the active phase ⇒ plot the initial dilatation on the alert line.

TR (broken line) ⇒ transferring the recordings from the latent to the active phase at 4 cm or more.

X ⇒ *cervical dilation* is indicated by a cross. When a mother is admitted in active labour (4 cm or more dilated), the initial dilation is plotted on the alert line. If she is initially in the latent phase, the recordings are plotted on the left side of the graph and transferred (TR) to the alert line once she is 4 cm or more dilated.

O ⇒ *the descent* of the head is measured in fifths above the brim and is indicated by a circle (O).

Times: A serious mistake is for staff to record the time on the partograph only when vaginal examinations are performed. This can then give the impression that progress is normal, even if it is very slow. To avoid this, all the times should be filled in on admission. However, if the mother is in the latent phase, only write the times for the latent phase. When she is in the active phase, write up the times for 4 hours after the expected time of delivery.

CAUTION: All staff should use the partograph. Record all sections and not just cervical dilation. If a mother is transferred from another unit, the same partograph should be continued. There is a higher morbidity if a new graph is started, as significant delay will be missed.

HOW TO DIAGNOSE LABOUR

The concept of a latent phase is artificial to some extent and not everybody recognises it. If you do not use the concept of a latent phase, labour is diagnosed by painful contractions accompanied by one of the following objective signs:

- The cervix is fully effaced.
- A show
- Spontaneous rupture of the membranes.

(1B) ACTIVE PHASE OF LABOUR

- A mother is said to be in active labour after 3 cm dilation. However, it is best not to plot the dilation on the active phase until 4 cm. A good rule is that if you are uncertain if the mother is in the latent or active phase, plot the dilation in the latent phase for another 2 hours. One of the commonest reasons for delay in the "active phase" is that the mother is still in the latent phase.
- Once a mother is in active labour, do 2-hourly assessments to record the dilation of her cervix, the descent of the head and the presence of caput or moulding (see below). Four-hourly examinations are too far apart especially in the presence of obstruction. If the cervix is 9 cm she should be examined 1 hour later as you would then expect the cervix to be fully dilated.

The WHO partogram has 2 lines:

(i) The alert line drawn from 3 to 10 cm represents the rate of dilation of 1 cm/hour. This is meant to represent the slowest rate (1 cm/hour) of cervical dilation in normal labour. However, a WHO study (Lancet June 4 1994) showed that 24% of mothers crossed the alert line, 16% crossed the transfer line (see below) and 8% went beyond the action line. Therefore it seems that one quarter of mothers dilate slower than 1 cm/hour. It is also important to realise that many mothers, including primips, dilate faster i.e. at a rate of 2-3 cm/hour.

- If the rate of cervical dilation crosses the alert line but the membranes are intact, this is much less significant than when the alert line is crossed but the membranes have ruptured.
- When a mother is admitted in the active phase of labour, the dilation on admission is placed on the alert line.
- In a high-risk mother e.g. a mother with a previous CS, labour is defined as being delayed if she crosses the alert line.

Transfer line: The original Philpott partograph had a transfer line which is drawn 2 hours to the right of the alert line. This is not in the WHO partogram although it probably should be. If a mother crosses this line and is in a peripheral clinic, preparations should be made to transfer her to hospital. In situations where transfer will be difficult, if you wait until the action line, action will be taken too late.

- If she is already in hospital, the transfer line can be used as the action line and at this stage oxytocin can be started

if indicated. In low risk mothers, delay in the active phase is defined as a mother who crosses the transfer line.

- One third of mothers who cross the transfer line will subsequently make normal progress if their membranes are ruptured.

(ii) The action line is drawn 4 hours to the right of the alert line. When cervical dilation reaches this line, progress in labour is dangerously slow. A decision has to be made, usually by the doctor, as to the further management. The cause of the slow progress should be diagnosed and corrected. The action taken can be either to use oxytocin, do a CS or to await spontaneous progress.

- Oxytocin will be needed in most primips if progress remains slow unless there are definite signs of CPD.
- Delay late in the first stage is usually more serious than delay in early labour. If there is delay after 8 cm, junior staff should consult.
- When mothers are delivered to the right of the action line, morbidity and mortality for the baby rises. These both increase the further labour goes past the action line.

CAUSES OF DELAY IN THE ACTIVE PHASE OF LABOUR	
POWERS:	If the uterus is not contracting strongly enough.
PASSAGES:	<i>Bony:</i> if there is a mechanical obstruction due to CPD. <i>Soft:</i> the resistance of the cervix and the vagina which is greater in primips than multips and is partly responsible for the longer labours in primips.
PASSENGER	Malpresentation or malposition of the baby.
PATIENT:	If the mother's bladder or rectum are full.

(SECTION 2) ASSESSING A MOTHER WITH DELAY IN THE FIRST STAGE

(A) History:

What is her parity: This is the most important factor to take into account. If she is a multip, how has she delivered before? Has she had a CS before?

(B) General examination:

It is difficult to assess the strength of contractions by the mother's reaction to the pain. But if she has a lot of pain, it means it is more likely that her contractions are strong, and if there is delay the cause is more likely to be CPD. If she is exhausted with a fast pulse and dehydration, these point to CPD as the cause of delay.

(C) Abdominal examination:

Measure the fundal height. Palpate and time the contractions. Assess the amount of head above the pelvic brim. Look for overlap (see below).

(D) Vaginal examination:

- Are the membranes intact? As a general rule, if the membranes are still intact during labour, slow progress is usually not caused by disproportion. When the membranes are ruptured, slow progress is more likely to be due to disproportion although it could still be due to weak contractions.
- Check the dilation and presentation. Be careful not to miss a brow or a hydrocephalic which are not always obvious.
- Check the level of the head and its position. Look for caput and moulding.

(2A) ASSESSING THE POWERS

Inefficient or weak uterine contractions have been recognised as the most common cause of poor progress in labour. The duration of a contraction is a very good guide to the strength of contractions. For contractions to dilate the cervix,

they should:

- Last between 40-60 seconds. If they last more than 60 seconds they are too strong. Weak contractions are short, lasting under 40 seconds.
- Occur 3-4 times every 10 minutes. If 5 or more contractions occur in a 10 minute interval, this is too frequent. The contractions should be assessed for 10 minutes every half hour.

It is always a good idea to palpate and time 1 or 2 contractions yourself because relying on what is recorded on the partograph is not always reliable. The amount of pain experienced by the mother is also not a good guide to the strength of the contractions. If you think the contractions are weak, the treatment is to rupture her membranes and start oxytocin.

RUPTURING THE MEMBRANES

This is the first step in managing slow labour. Its advantages are that it speeds up labour and allows you to see the liquor. The disadvantages are:

- the risk of cord prolapse
- if labour becomes prolonged, there is an increased risk of intrauterine infection
- the risk of HIV transmission.

If the mother has crossed the action line, it is better to rupture the membranes.

OXYTOCIN REGIMES

- Weak uterine contractions is a problem seen much more commonly in primips than multips. This is partly because the contractions in a primip have to be stronger to overcome the greater resistance of the cervix and vagina which have not been stretched before.
- The aim of oxytocin augmentation in labour is to produce adequate uterine activity so that the cervix dilates normally, while avoiding uterine hyperstimulation and fetal compromise.
- The dose of oxytocin used has to be matched to the standard of monitoring in your labour ward. To avoid problems it is often better to start with a lower dose than one would use if intensive monitoring were possible.
- Oxytocin regimes can be divided into:
 - low dose: such as 1 mU/min increased by 1 mU/min every 30-40 minutes
 - High dose: such as 6 mU/min increased by 6 mU/min every 15-20 minutes.

Labour is shorter with the higher doses but this occurs at the expense of an increased incidence of uterine hyperstimulation. Labour is longer with the low dose regimes but this is a better alternative than to risk uterine hyperstimulation.

OXYTOCIN 2 UNITS/LITRE			OXYTOCIN 10 UNITS/LITRE		
10 dpm	= 40 ml/hr	= 1 mU/min	10 dpm	= 40 ml/hr	= 5 mU/min
20 dpm	= 80 ml/hr	= 2 mU/min	20 dpm	= 80 ml/hr	= 10 mU/min
30 dpm	= 120 ml/hr	= 3 mU/min	30 dpm	= 120 ml/hr	= 15 mU/min
40 dpm	= 160 ml/hr	= 4 mU/min	40 dpm	= 160 ml/hr	= 20 mU/min
50 dpm	= 200 ml/hr	= 5 mU/min	50 dpm	= 200 ml/hr	= 25 mU/min
60 dpm	= 240 ml/hr	= 6 mU/min	60 dpm	= 240 ml/hr	= 30 mU/min

Primips: for induction or acceleration of labour:

- If she is a primip, her uterus does not rupture if overstimulated with oxytocin. The main risk in using oxytocin in primips is producing fetal hypoxia.
- Use 10 units of oxytocin in 1 litre Ringer's Lactate or normal-saline. Use a giving set where 15 drops = 1 ml. Start with 10 dpm and increase every 30 minutes until 4 strong contractions in 10 minutes are achieved. The maximum necessary should be 60 dpm. Higher rates than this are only required if labour is being induced, rather than accelerating spontaneous labour.
- In hospitals where there may be inadequate staffing, a simpler regime that has been found useful is to use 2 units/litre which is run at 40 dpm. This seldom results in hyperstimulation. Review the mother after 2 hours.

Multips:

- Oxytocin is usually only required to induce labour. The uterus of a multip in spontaneous labour usually contracts well so that slow progress is usually a sign of obstruction.
- Sometimes a multip has slow progress due to weak contractions but time the contractions yourself and look for signs of CPD before giving oxytocin. The commonest reason for its use is a prolonged latent phase.
- Do not use oxytocin with a grande-multip.
- Oxytocin may rupture the uterus especially if there is a malpresentation or disproportion.
- Use 2 units of oxytocin in 1 litre of Ringers or normal-saline. Start with 10 dpm and increase every 30 minutes. If this regime fails to produce adequate contractions, then use 10 units/litre.

Be careful using oxytocin:

- If the liquor is meconium stained unless you have staff that will monitor the baby carefully. Otherwise you can cause fetal hypoxia. One is much happier using oxytocin in the presence of clear liquor. Thick meconium is a definite contraindication to oxytocin. Furthermore, about 50% of primips with meconium in early labour have CPD.
- If there is already a lot of moulding with the head unengaged. This indicates that there is an obstruction rather than weak contractions.
- In the presence of a previous CS or if the presenting part is not a vertex (unless you are experienced).

Titrating oxytocin:

With oxytocin, the aim is to produce 3-4 contractions every 10 minutes. If contractions are adequate for 2 hours or more but there is no change in the cervical dilation or descent of the head, then there is likely to be obstruction. It is important to allow 2 hours of adequate contractions before deciding that progress is not occurring.

- If more than 4 contractions occur every 10 minutes, halve the drip rate.
- If fetal distress occurs, stop the oxytocin and restart at half the previous rate once the fetal heart is normal again.
- In a mother in spontaneous labour, it should not be necessary to give more than 1 litre of 10 units of oxytocin. If progress is still poor despite this, CPD is very likely. A good way of checking the amount of oxytocin that has been given is to look at the infusion bag and see how much has been infused. If there is poor progress in a primip (who is in spontaneous labour) despite 1 litre of oxytocin (10 u/l) having been infused, do not use a 2nd litre. She probably has CPD.

KEY POINT: IF PROGRESS IS STILL POOR AFTER 2 HOURS OF STRONG CONTRACTIONS, THERE IS LIKELY TO BE CPD.

If she is a grande-multip:

- The risks of oxytocin are greater in mothers of high parity and it is safer if not used in these. If there is delay, rupture her membranes but do not use oxytocin. Encourage her to walk about as this improves uterine contractions. She can then be reassessed after 2 hours.
- Sometimes there is delay in a grande-multip but there are no signs of obstruction. Even if the contractions seem weak, it is still not advisable to use oxytocin. A useful tip when there is delay after 6 cm dilation is to try to stretch the cervix and push it up around the head. Encourage her to bear down at the same time as you push the cervix up.

CAUTION: Do not allow a grande multip to cross the action line on the partograph, as the result is likely to be a ruptured uterus. A grande multip may only need 2 hours of obstructed labour to rupture her uterus. This is an important point to teach midwives and doctors.

CAUTION: The risk of uterine rupture is much greater when oxytocin is used in the presence of obstruction.

Mechanical obstruction can be due to:

(i) **Cephalo-pelvic disproportion (CPD)** where the usual problem is that the whole pelvis is too small and this first becomes apparent at the pelvic brim. When obstruction occurs at the brim, the head will be 3/5 to 5/5 above the brim. Occasionally, obstruction occurs after the head has engaged, and this is cavity or outlet obstruction.

(ii) **Occipito-posterior (OP) position:**

- The head is slightly deflexed in this position so that the anteroposterior diameter is about 1 cm bigger than normal. This larger size can cause delay in the first or second stage in primips or multips. The obstruction can occur at the inlet, the cavity or the outlet.
- A direct OP position at the brim in early labour behaves like a brow.
- While the OP position often causes obstruction, the cause of the OP position may be a small pelvis.
- Diagnosing an OP position in early labour is not easy, as it is difficult to feel the position of the fontanelles vaginally. When the occiput is posterior, the back will also be posterior and difficult to feel. Another clue in diagnosis is that there will often be a visible depression at or just below the umbilicus at the junction between the unengaged head and the rest of the baby.

(iii) **Malpresentations:** such as face, brow, compound presentation or transverse lie.

(iv) **Hydrocephalus** can be the cause of CPD and this is diagnosed by feeling the widely separated suture lines of the baby's head.

(SECTION 3) SIGNS OF OBSTRUCTED LABOUR DUE TO CPD

It is best to think of these in 3 groups (a) Diagnostic signs (b) Late or gross signs which are not always present (c) the suggestive signs.

(3A) DIAGNOSTIC SIGNS

(i) **THE CERVIX FAILS TO DILATE DESPITE GOOD UTERINE CONTRACTIONS**

- Multips, especially those of high parity, are more likely to reach full dilation than primips. However, obstruction and rupture can occur before full dilation even in grande-multips. Obstruction in most primips occurs before full dilation especially if oxytocin is not used.
- CPD before 4 cm dilation is unusual and it is more likely that delay at this stage is due to poor contractions. However, a primip with major CPD can get stuck at 3-4 cm. In this situation, gross signs of CPD will be found such as overlap of the head (see below), oedema of the cervix and moulding with the head still 4/5ths above.
- Arrest at 8-9 cm is common in CPD, because it is difficult for the cervix to dilate completely around the presenting part without some degree of fetal descent having occurred.
- If the cervix dilates more than 1 cm/hour, this is a good sign and you should be reluctant to intervene even if you think there are other signs of CPD.
- Oedema of the cervix occurs because the head presses the cervix against the bony pelvis and blocks venous return. It is not a diagnostic sign as it can also occur with premature pushing. If the mother has not been pushing, oedema of the cervix is an early sign of CPD.
- Application of the head to the cervix is best assessed during a contraction. In a normal labour, the cervix becomes tightly applied to the presenting part. If the cervix hangs loosely during a contraction, it means the head is being held up by CPD. However, this may also occur if the uterine contractions are weak.
- Sometimes the dilation of the cervix becomes less after the membranes rupture. For example if the cervix is 8 cm when the membranes are bulging, it may become 5 cm after the membranes have ruptured. This can occur in a normal labour but the cervix will quickly dilate up again. If there is CPD, the cervix can remain 5 cm 2 hours later as the presenting part is held up by the bony pelvis. This is mentioned so that you will believe previous examinations by others.

(ii) **THE HEAD FAILS TO DESCEND AND INCREASING MOULDING OCCURS**

(a) **Head descent:** In normal labour the head is usually 4/5 above at 4 cm dilation, 3/5 above at 6-8 cm dilation and engaged by 8-10 cm dilation. Sometimes in the African pelvis the head may not engage until full dilation and this is

much more likely in a multip. A head that is too high for the degree of dilation of the cervix is a potential sign of obstruction e.g. head 4/5 above at 7 cm dilation. This becomes more likely if moulding is also present. The later engagement of the head in the African is due to differences in the soft tissues as well as the pelvis.

- If there is fixed moulding and the head is still above the ischial spines, this is a good sign of CPD.
- At full dilation, failure of the head to descend with contractions and bearing down efforts strongly suggests CPD. You can also try to assess the descent of the head during a contraction after 7 cm. At this stage you would expect the head to descend to the ischial spines during a contraction. If it does, this is a good sign that the delivery will be normal. If it does not, CPD is likely.

(b) **Moulding** is a normal part of labour and is graded as follows:

0 = normal separation of the bones with open sutures.

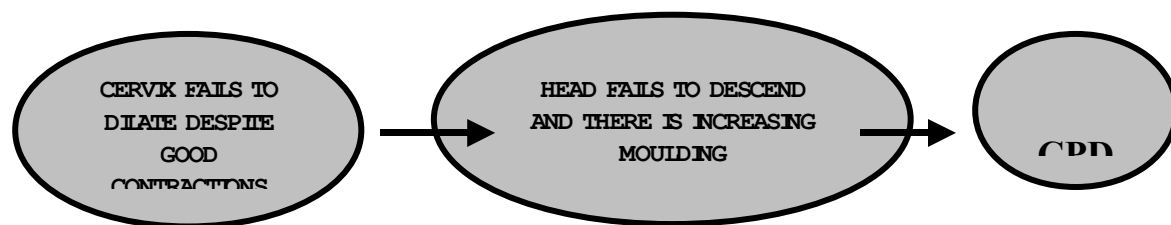
+1 = bones touch each other.

+2 = bones overlap but can be separated with digital pressure.

+3 = bones overlap and cannot be separated with digital pressure i.e. the moulding is fixed. There are various degrees of fixed moulding. The greater the overlap, the more likely there is to be CPD.

- It is best to assess moulding at the sagittal suture (parieto-parietal junction) and at the parieto-occipital sutures. Moulding occurs initially at the occipito-parietal junction and later at the sagittal suture. The advantage of using two suture lines is that if you find +3 moulding at the occipito-parietal suture, you should assess the sagittal suture carefully. Some add the moulding score at both sutures to give a total score out of 6 although the WHO partograph gives the score out of 3.
- It is not usually possible to assess the degree of moulding until the cervix is at least 4 cm dilated.
- Assessing the amount of moulding is not a very exact science. It is often difficult to distinguish between physiological and pathological moulding.
- If fixed overlapping of the skull bones occurs (+3) and the head is still not engaged, this suggests that there is disproportion. However, it is better to demonstrate that increasing moulding is occurring but the head is not descending. This observation is best made by one observer over a period of a few hours. A useful rule of thumb is that +2 moulding with the head 4/5th above or +3 moulding with the head 3/5th above is highly predictive of CPD. Occasionally with increasing flexion of the head, the moulding will reduce and the head descends but this is unusual. If there is increasing moulding but the head is descending, this is not CPD.
- Caput alone is not a sign of CPD but if a lot of caput is present, you should look for other signs of CPD. Caput can also be present if a mother pushes before full dilation or with prolonged labour from any cause. Absence of caput suggests that her contractions are weak.

KEY POINT: SEVERE (+3) MOULDING WITH A NON ENGAGED HEAD IS A GOOD WAY OF DIAGNOSING CPD. IF MOULDING INCREASES BUT THE HEAD DOES NOT DESCEND, THIS IS ALSO DIAGNOSTIC OF CPD.



(iii) SECONDARY INERTIA

This may occur in some but not all cases of CPD. This means the mother was having good contractions but the contractions become weak. It is important to recognise that this is nearly always caused by CPD and it is usually an error to augment labour with oxytocin. The main problem with the diagnosis of secondary inertia is that unless you have seen the mother earlier, it is hard to know if her contractions were always weak or have become so. The presence of other signs of CPD helps you make this distinction. Secondary inertia can occur in primips and multips, and may even occur in grande-multips. In fact, the pattern of labour in obstruction in multips is more frequently one of secondary inertia than that of very strong contractions.

If a patient is fully dilated but she has no contractions at all, this is secondary inertia and CPD is very likely.

(3B) SIGNS OF SEVERE OR LATE CPD

- (i) **Overlap** of the head (see Fig.1 below) also supports the diagnosis of CPD. Overlap can be divided into two types:

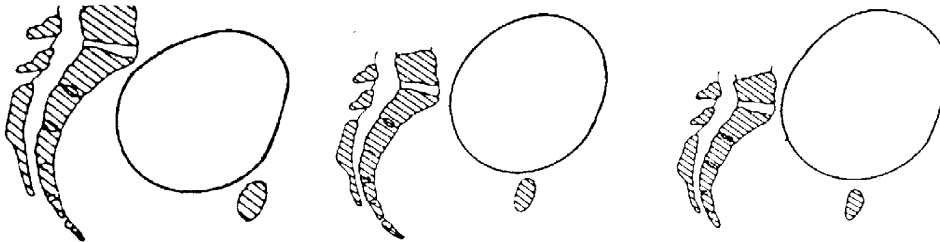


Fig 1: Showing mild, moderate and severe overlap.

- **Anterior:** The head overlaps or sticks out in front of the pubic symphysis. This is the more serious type as it indicates a major degree of CPD if it is found in a mother in labour. When the head fits normally into the pelvis, it is only in contact with the back of the pubic symphysis. In cases of CPD it first overlaps the upper border of the symphysis pubis and then extends beyond its anterior surface.
- **Antero-lateral:** The head overlaps the superior pubic ramus. This is a less serious form of overlap and with flexion and moulding of the head, it may disappear. Instead of feeling for this type of overlap in the midline, you feel 3-4 cm lateral to the midline.

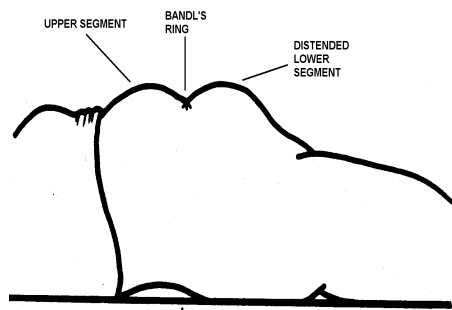
Overlap is most easily felt for at the same time as bimanual examination although you can also do this at abdominal examination. First feel the pubic symphysis and the superior pubic ramus. Then run your hand up and feel the head. You can then form an impression of whether the head is protruding beyond, lies flush with or is inside the pubis or superior pubic ramus. Overlap alerts you to the fact that there may be significant CPD. However, overlap antenatally or in early labour is not so significant, as it can disappear as the head engages. A full rectum may also cause the head to overlap.

(b) **Asynclitism:** This means the head is tilted laterally towards one or other shoulder. The baby therefore presents at the cervix with one of the parietal bones palpable. The sagittal suture is either very posterior or anterior. It occurs because the head is trying to fit itself into a pelvis that is too small. Normally the sagittal suture should be equidistant between the symphysis and the sacrum. The presence of asynclitism should make you suspect CPD but sometimes it can occur in early labour and is only abnormal if it persists and the mother is making slow progress.

(c) **Bandl's ring:** In both primips and multips, a Bandl's or retraction ring may appear near the level of the umbilicus. This is due to overstretching of the lower segment around the baby's head and shoulders with a ring occurring at the junction of the upper and lower segment. Above the ring is the retracted upper segment and below it is the distended lower segment. The stretched and thin lower segment becomes tender and appears as a bulge below the Bandl's ring. A Bandl's ring is an easy and important sign to appreciate, as you then know there is obstruction. It is, however, a late sign and delivery by CS is needed to avoid uterine rupture. If the sign is missed in a multip, rupture of the uterus is likely to occur soon.

Fig. 2: Showing a Bandl's ring. It has to be distinguished from:

- A full bladder. With a Bandl's ring, it is not possible to feel an upper edge whereas with a full bladder you can.
- The depression at the umbilicus caused by an OP position due to the gap between the baby's head and body. This becomes less obvious during a contraction whereas a Bandl's ring becomes more obvious.



(3C) ASSOCIATED SIGNS

These are not diagnostic of CPD but tend to support the diagnosis.

- **Caput:** The presence of a large caput is useful in alerting you that CPD may be present. But caput without moulding can occur with slow labour merely from the pressure of a non-dilating cervix. It helps to divide caput into 2 types:
 - (a) Cervical caput: the oedema only occurs in the part of the scalp inside the cervix. This can occur in normal labour and is not a sign of CPD.
 - (b) Generalised caput occurs over the whole scalp and is more suggestive of CPD. However if the cervix is fully dilated, the caput can be generalised even without CPD.
- **Urinary retention** is an important sign of CPD. It occurs because the presenting part squeezes the bladder base so firmly. If the mother is then catheterised and **blood-stained urine** is found, you should strongly suspect CPD. The great advantage of this sign is that it is easily recognised by all staff and is not subjective. It is not diagnostic of CPD but should make you suspect that CPD is present. Therefore in a mother who is making slow progress and in whom you suspect CPD, put in a catheter. Haematuria occurs after several hours of obstruction so it is not an early sign but not a late sign either. It should be distinguished from the haematuria of bladder/uterine rupture where the "urine" appears as pure blood. Haematuria in the 2nd stage of labour is not so significant.
- **Bladder oedema** may sometimes cause a suprapubic mass even though the bladder is empty, and this is also suggestive of CPD.
- Usually when labour is obstructed, the **membranes have ruptured**. But it is possible for obstruction to occur and the uterus to rupture when the membranes are intact.
- **Fetal distress** occurs due to head compression. Meconium staining of the liquor which develops in labour may be a sign of CPD but can also occur with any prolonged labour.
- **Maternal distress:** If a mother is admitted with dehydration, fever and tachycardia, these are all late signs that usually indicate obstructed labour.
- **Size of baby and pelvis:** If the pelvis is small or borderline, or the baby is big or in a posterior position, these all make CPD more likely. It is always useful in a mother who is making slow progress to assess both the size of the pelvis and the baby. Then relate the two together to assess the risk of CPD.
- **Vulval oedema** is not a sign of CPD but is due to the mother pushing prematurely. It is common in areas where traditional birth attendants encourage the mother to push. Some of these mothers will have CPD.

(3D) MAKING A DIAGNOSIS OF CPD

It has to be said that the diagnosis of CPD is often difficult. The usual problem for beginners is overdiagnosing CPD.

- If there is fixed moulding with an unengaged head, then you should suspect the diagnosis. However, it is often very difficult to make a confident diagnosis on a single examination.

- The best way of making the diagnosis of CPD is to observe progress over 2-4 hours. Give adequate analgesia and correct any dehydration.
 - If contractions are adequate and no descent or dilation has occurred over 2-4 hours, the diagnosis of CPD can be made. Augmentation with oxytocin should only be continued if progress is normal i.e. over 1 cm/hour. If progress is slower than this with good contractions, then there is usually CPD.
 - If you demonstrate increasing moulding in the presence of failure of the head to descend, this is diagnostic of CPD.

If she is a primip and you are not certain of the diagnosis of CPD, augment labour with oxytocin. In fact, it is usually difficult to diagnose CPD in primips without first augmenting with oxytocin.

If she is a multip with slow progress, she should be assessed by somebody with experience. If the contractions are weak and there are no signs of CPD, you can augment labour with oxytocin. If you have little experience, it is better to deliver by CS.

If she is a grande-multip with CPD, she often progresses normally to full dilation although obstruction can also occur before full dilation of the cervix. You therefore have to look for other signs of CPD i.e. a head that stays too high for the degree of dilation of the cervix, excessive moulding for the level of the head and poor application of the head to the cervix. Oxytocin should not be used to correct slow progress even if her contractions seem weak.

Early versus late delay: As a general rule, delay which occurs after 7 cm dilation (secondary arrest) is more significant than delay which occurs before 7 cm. This is because it is more often a sign of CPD. Delay in early labour is more often due to weak contractions. However, sometimes delay as early as 4-5 cm is the first sign of CPD so you cannot ignore early delay.

Previous history: If the mother had previous difficult deliveries or had a stillborn baby, these should alert you to the fact that CPD is more likely to occur in this pregnancy.

In summary there are only two reasons for slow progress in labour: poor contractions and obstructed labour. If progress is slow (less than 1 cm/hour) look for and correct the cause if possible. Assess the contractions yourself:

- *If good contractions:* check the level of the head and the amount of moulding.
- *If poor contractions:* use oxytocin especially in primips. Reassess after 2-4 hours of adequate contractions. If progress is still less than 1 cm/hour, then a CS is usually indicated.

If you are in doubt about whether to do a CS or not for poor progress, provided the fetal heart is normal and the mother is not a grand-multip, you can reassess her in 1-2 hours. For management of slow progress with a previous CS, see the chapter on previous CS.

KEY POINT: IT IS DIFFICULT TO DIAGNOSE CPD IN A PRIMIP WITHOUT FIRST AUGMENTING WITH OXYTOCIN, PROVIDED THE LIQUOR IS CLEAR.

SUMMARY OF THE SIGNS OF CPD	
Diagnostic	• Cervix fails to dilate despite strong contractions • Head fails to descend and there is increasing moulding
Late or severe	Bandl's ring, Overlap, Asynclitism
Suggestive	Large caput, haematuria, oedema of cervix,

(SECTION 4) OTHER POINTS ABOUT LABOUR PROGRESS

(4A) ACTIVE MANAGEMENT OF LABOUR

Many of the above points summarise what is known as the active management of labour. The aim of active management is to reduce the length of time a mother stays in the labour ward and to reduce the CS rate for failure to progress. Active management applies to primips and involves:

- Regular assessment to diagnose slow cervical dilation
- Early rupture of the membranes but where HIV prevalence is high, this should only be performed if progress is slow.
- Oxytocin is used if there is delay at any time in the first stage. A high dose regime of oxytocin is used i.e. 6 mU/min which is increased by 6 mU/min every 30 minutes to a maximum of 40 mU/min. Only one litre bag with 10 U of oxytocin should be necessary and the maximum duration of administration is 6 hours.
- Close support i.e. one person should stay with the mother at all times. A companion for the mother in labour has been shown to reduce the incidence of delay in the first and second stages of labour. It is an important low-cost intervention and is especially appropriate for developing countries. The companion can be a family member.

(4B) OTHER POINTS

Obstructed labour remains one of the commonest causes of maternal death in Africa. You should have a strong suspicion of this condition in any mother admitted after first trying to deliver at home or if she has always delivered at home in previous pregnancies. She may initially give a wrong history of how long she has been in labour. You must look for the signs of obstructed labour. As she may be also septic and dehydrated, resuscitate her first with intravenous fluids and antibiotics. It is dangerous to assume that a multip will deliver safely just because she has a good past history. If she has a borderline pelvis, she only needs a slightly larger baby or an occipito-posterior position to develop obstructed labour.

Pushing before full dilation: If she pushes before she is fully dilated this lead to fetal distress. The raised intra-abdominal pressure leads to raised intra-uterine pressure. This reduces the placental blood flow. Therefore if a mother has the urge to push before full dilation it is better to give her analgesia and encourage her not to push. An epidural is helpful if available. There is also a small risk of the cervix tearing although it tends to dilate rather than tear in this situation.

A multip stuck at 7-8 cm ($\pm$ fetal distress $\pm$ the mother pushing before full dilation): This is not an uncommon problem. The question is whether there is CPD. It is often very helpful to get the mother to push for a few contractions (in the pushing position) while at the same time you can gently try to push the cervix over the head. If the head descends well, then CPD is unlikely and often a normal delivery is the result.

Trial of labour is an old term which was used when either the baby was suspected of being large or the pelvis small and there was a high index of suspicion of CPD. It was applied to either primips or multips. The mother was encouraged to deliver in hospital and not in a clinic. However, all labours are a trial of labour and provided the mother can be transferred to hospital within 2 hours of a problem being detected, there is no need to encourage hospital delivery in these cases. Hospitals would be overburdened if every case of suspected CPD was referred. There would be a tendency to refer every case of suspected big baby or small pelvis.

The term **precipitate or fast labour** only applies to labour with abruptions or if the mother has taken herbal medication which has an oxytocic effect. In this case, the uterine contractions can be so strong as to rupture the uterus or tear the cervix. Otherwise a fast labour is a good labour without any extra risk to the mother or baby apart from the fact that delivery may occur before she reaches the health facility.

If the cervix has become oedematous: this may be due to pushing before full dilation or due to CPD. If CPD is excluded, then: (a) in early labour, sedate the mother to stop her pushing. (b) If she is already 8-9 cm dilated, get her to push during a contraction. As the head comes down, try to push the cervix gently up over it.

(4C) COMMON MISTAKES IN MANAGING LABOUR

(i) **Making a wrong diagnosis** of labour e.g. accepting the diagnosis of labour in a mother in who labour has not begun or managing a mother in the latent phase as if she was in the active phase will result in an increased likelihood of her requiring a CS.

(ii) **Primip versus multip**: Failure to make the distinction between a primip and a multip. While oxytocin is often required in primips in spontaneous labour, it is rarely required in multips in spontaneous labour. Even in the second stage, oxytocin can be used in primips with slow progress provided there is no fetal distress and the uterus relaxes in between contractions. Slow progress in a multip in either the first or second stage is usually due to obstruction rather than inefficient uterine action.

(iii) **Spontaneous versus induced labour**: Failure to make the distinction between spontaneous and induced labour. Oxytocin can be used to induce labour in multips and primips but higher doses may be required compared with augmentation of spontaneous labour.

(SECTION 5) MATERNAL CONDITION IN LABOUR

(5A) GENERAL CARE OF THE MOTHER IN LABOUR

(a) **General condition**: Look at and talk to the mother as this will give you a lot of information about her general condition and how her labour is progressing. There is a tendency among medical staff to look at the chart, do a pelvic examination and to ignore the mother. Make an effort to talk to her first.

(b) **BP** is checked hourly in active labour but in hypertensive mothers it is checked every half-hour. BP tends to go up in labour and this is why it is necessary to check it so often.

(c) **Pulse** rate is checked hourly. The normal range is 80-100/minute. If a mother has a pulse rate above 110/minute, you should look for a cause: pyrexia, dehydration or maternal distress.

(d) **Temperature** is checked 4 hourly. The normal range of oral temperature is 36° to 37° C. A temperature above 37.5° C should be treated (see below).

(e) **Urine**: The volume is recorded every time it is passed and it is tested for protein and ketones. Ketones are present in up to 40% of normal labours. Clinically significant ketosis is very unlikely to occur in the first 12 hours of labour.

(f) **Fluids/hydration**:

- During labour, solid food is not recommended but sips of water are allowed. Other fluids can be given provided there are isotonic, at body temperature and clear (can read newspaper print through it). The risk of aspiration is not high and provided solids are avoided, drinks are allowed.
- Prolonged labour delays gastric emptying. This is why it may be necessary to give intravenous fluids to a mother.
- If labour is slow and ketosis is present, the correct treatment is to hydrate the mother with normal saline or Ringer's lactate. The problem with using 5% dextrose is that it causes hyperglycaemia in the baby and should the baby become hypoxic, the glucose will be converted to lactic acid. If 5% dextrose is used it should be alternated with normal saline or Ringer's lactate. Up to 2 litres of normal saline or Ringer's lactate and 1 litre of 5% dextrose may be given over 24 hours.
- Low risk mothers can however continue to take oral fluids even if there is +1 or +2 ketonuria present. Those with risk factors (and therefore may require a Caesarean section) or long labours are given intravenous fluids.
- The signs of dehydration in labour are a dry tongue, a tachycardia and ketonuria.

(g) **Check** that there is a recent haemoglobin and blood group result.

(h) **Analgesia:** Record all drugs and intravenous fluids. Pethidine and occasionally morphine can be used for analgesia:

Pethidine:

IV: The advantage of intravenous administration is its immediate effect which allows a lower dose to be used more effectively. The usual dose is 50 mg. It is especially useful if the cervix is already 7 cm or more dilated. Its duration of action is about 2 hours so it can be repeated 2 hourly.

IM: 75-100 mg can be given. The duration of action is about 4 hours (although this varies from mother to mother) so that it can be repeated 4 hourly. Pethidine 100 mg IM should only be used in a hospital where it is possible to resuscitate a depressed neonate and give naloxone.

Morphine: There is a place for using morphine 10 mg IM or IV for stronger analgesia in cases of intrauterine death, fetal abnormality or occasionally when pethidine is ineffective and epidural anaesthesia is not available. Despite belief to the contrary, the respiratory depressant effect on the baby is not much greater than pethidine.

It is not necessary to routinely give an anti-emetic with opiates. If vomiting or nausea occurs, give promethazine 25 mg IM or IV, or hydroxyzine 50 mg IM.

(5B) PYREXIA IN LABOUR

A temperature over 37.5° C should always be regarded as a serious complication of labour. It threatens the health of the mother and the safety of the baby. Irrespective of the cause, a baby in labour tolerates pyrexia poorly. Fetal tachycardia is usually the first response and whenever this occurs, it is important to check the maternal temperature.

Causes

- If the membranes are ruptured for more than a few hours, it is wise to regard any pyrexia as being due to intrauterine infection. It is a diagnosis made by exclusion once respiratory and renal infections or malaria have been ruled out.
- Sometimes dehydration and labour itself will produce a slight rise in temperature but in these cases it should settle with rehydration.
- Where epidural anaesthesia is used, it commonly causes pyrexia due to interference with the normal temperature control mechanisms.

Management

Irrespective of the cause of the pyrexia, it is important to get the temperature down so that the baby is better able to tolerate labour. The following steps should be taken:

- Intravenous fluids: Run in a litre of normal saline or Ringer's lactate.
- Fan the mother and tepid sponge her.
- Give her paracetamol 1 gram PO stat.
- Start antibiotics. If possible take a high vaginal swab, blood and urine cultures before starting broad spectrum antibiotics. Do not rely on ampicillin alone but add an aminoglycoside and metronidazole. In malarial areas, a malaria smear should be taken and antimalarials should be started.
- Amnioinfusion has been suggested as an effective method of getting antibiotics into the uterine cavity but this is still experimental. There is however no reason why amnioinfusion could not be used if there are decelerations in the fetal heart in the presence of pyrexia. However, if meconium is also present, a CS is a safer option.

These measures should bring down the maternal temperature within 1 hour.

- It is difficult to interpret the fetal heart rate until you get the maternal temperature down. If fetal tachycardia persists after the maternal temperature is back to normal, or other signs of fetal distress are present, then CS should be considered.
- As long as labour is progressing, a vaginal delivery can be anticipated. If there is slow progress in labour in association with the pyrexia, then CS should be considered. A baby is unlikely to survive a difficult labour in the

presence of intrauterine infection.

If labour is obstructed: Many mothers who are admitted in labour with pyrexia have already been in labour for a long time. In these cases, signs of obstructed labour will be present from the time of admission. It is important to start antibiotics and rehydration before performing any operative procedure. If a CS is necessary, pack her abdomen before opening the uterus and do a good washout of the peritoneal cavity after the CS. Vicryl or Dexon should be used to close the uterus rather than catgut as infection causes catgut to dissolve quickly.

For the baby delivered in the presence of chorioamnionitis, the following are guidelines:

- Mild infection with a well term baby: just observe.
- Severe infection or ill term baby: start antibiotics.
- Preterm baby + infection: start antibiotics. If possible, swabs should be taken before treatment.

(SECTION 6) FETAL CONDITION IN LABOUR

(6A) THE FETAL HEART RATE

(While most units have to function without the use of cardiotocography, it is still helps to discuss this first so that the principles can be applied to intermittent auscultation.)

This is recorded every 15-30 minutes in the first stage and after every contraction in the second stage. Babies most likely to become distressed are those where labour is prolonged, augmented or induced. There are three features that you should assess:

(i) **The baseline rate** between contractions is normally between 100 and 160. A baseline tachycardia is above 160 and is often due to maternal pyrexia so check the mother's temperature. It may also be due to fetal hypoxia especially if decelerations are also present.

If a tachycardia occurs: In gradually developing hypoxia, the baby responds to inadequate oxygen by increasing the heart rate to cause a rise in cardiac output. A baseline tachycardia which persists for 10 minutes suggests distress.

If a bradycardia occurs: In acute hypoxia, the baby is more likely to respond with a bradycardia. This may be caused by an abruption, scar dehiscence, cord prolapse, uterine hyperstimulation or epidural top-up. Sometimes it follows a vaginal examination and is due to a vagal response in the baby. A baseline bradycardia, which lasts over 10 minutes, will result in fetal hypoxia and acidosis.

(ii) **Decelerations:** The presence or absence of decelerations and the relation of the deceleration to the contraction is noted. Decelerations are common in labour and are not always a sign of distress. They can be due to:

- Head compression
- Cord compression
- Placental insufficiency

The following are used to tell the difference between decelerations which are causing fetal distress and those which are not:

- The degree the fetal heart rate drops during a contraction does not tell if the decelerations are significant or not. However, if it drops to below 60 beats per minute, distress is more likely. A deceleration which is over 60 beats in magnitude and which lasts more than 60 seconds is likely to be associated with significant fetal distress.
- If the deceleration continues for more than 30 seconds after the end of the contraction, it is late. A fetal heart rate of less than 100 beats per minute 30 seconds after a contraction suggests fetal distress. If the total deceleration lasts more than 60 seconds, this is a sign of distress.
- Significant decelerations are usually accompanied by a baseline tachycardia or loss of beat to beat variability. Fetal hypoxia of any severity produces decelerations and if these persist, they will be

accompanied by a rise in the baseline heart rate and/or reduced beat to beat variability.

CAUTION: Sometimes you can mistake decelerations for accelerations. However, if you remember that accelerations (which occur in response to fetal movements) are uncommon in established labour, you will avoid this mistake. In labour, the baseline on the cardiotocograph is usually the top part of the trace.

(iii) Beat to beat variability

This can only be assessed with cardiotocography. The normal baseline varies between 5-15 beats per minute. A good rule is that if the beat to beat variability is normal, the baby is in a reasonable condition. Therefore labour can be allowed to continue despite other abnormal features in the fetal heart rate, provided that delivery is anticipated in a reasonably short time (within the next 30-60 minutes). This rule is particularly useful in the late first stage and the second stage of labour.

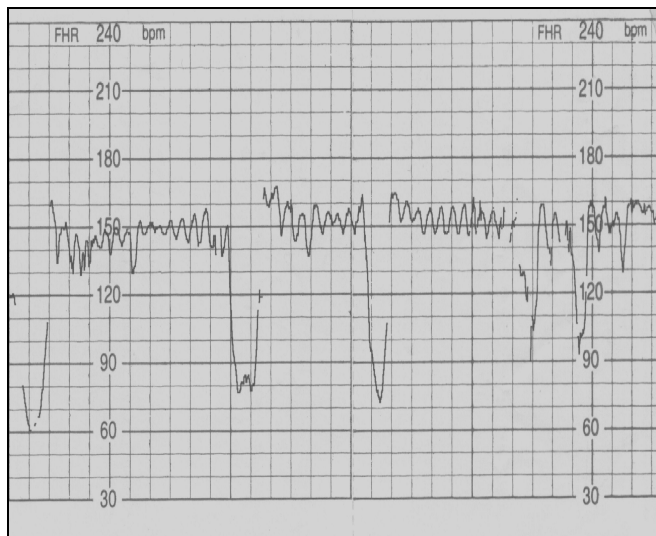
KEY POINTS TO INTERPRET THE FETAL HEART

The mother must be lying on her side. To interpret a fetal heart recording you must look at 3 parameters,

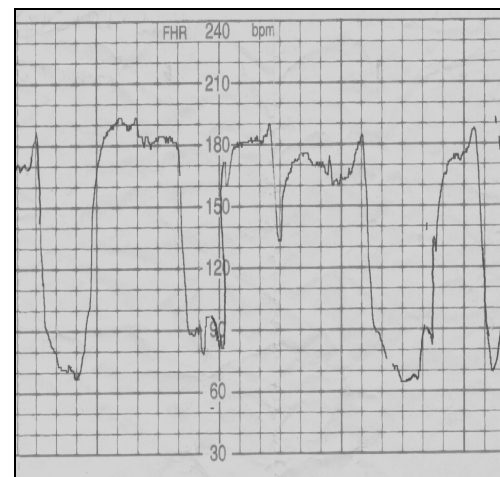
- The baseline rate,
- The beat to beat variability
- The presence or absence of decelerations.

Two of these three need to be abnormal before you should diagnose distress.

- Significant decelerations are accompanied by an abnormal baseline or loss of beat to beat variability. Decelerations which do not indicate fetal distress have a normal baseline and normal variability. This is a much better way of judging the significance of decelerations than timing a deceleration with the contractions.
- Essentially a persistent bradycardia, or a tachycardia with decelerations are indications for delivery.



CTG 1: Decelerations with a normal baseline rate and normal beat to beat variation $\Rightarrow$ observe and consider amnioinfusion.



CTG 2: Decelerations with a baseline tachycardia of 180/minute. There is also reduced beat to beat variation. These decelerations indicate distress.

INTERMITTENT AUSCULTATION

Monitoring the fetal heart is more difficult without cardiotocography. The Pinard stethoscope is difficult to use properly. The hand held doptone is a much cheaper alternative to cardiotocography and is as good in diagnosing fetal distress. Monitoring with the Pinard is not as good. Midwives should be instructed to record:

- (i) The baseline heart rate
- (ii) What happens to the FH during and after a contraction. If a deceleration is present, try to tell if it is early or late.

In a clinic, if decelerations are detected in early labour, the mother should be transferred to hospital. In late labour, if the decelerations are early, try to keep the mother in the clinic but if they are late decelerations, the mother should be transferred if possible.

(6B) LIQUOR

Note the appearance of the liquor if the membranes have ruptured. The main advantage of amniotomy in early labour is to see if there is meconium. This will allow mothers to be divided into low risk groups (if the liquor is clear) where monitoring would be minimal, or to a high risk group (if the liquor is meconium stained) where intensive monitoring may be necessary to avoid poor fetal outcome.

- About a third of babies with meconium will develop fetal distress and about a tenth will develop meconium aspiration.
- Meconium in African mothers appears to be more common. One explanation for this is the higher intake of laxatives from herbal medication, as these will cause the baby to pass meconium.

Grading meconium: It is useful to grade meconium realising that it is the amount of liquor into which the meconium is passed that is important:

Grade 1: A good volume of liquor that is lightly stained with meconium. If the liquor is held in a test tube, it is possible to read newspaper print through it whereas with grade 2 it is not. It has the consistency of tea.

Grade 2: A reasonable volume of liquor which is heavily meconium stained. It has the consistency of soup.

Grade 3: Thick meconium with no liquor. It has the consistency of porridge. The risk of hypoxia and/or meconium aspiration are greatly increased in this group.

- Therefore thick meconium is more significant than dilute. Also, fresh meconium which develops in labour is more significant than old.
- In those who drain no liquor when the membranes rupture, 1/3 will subsequently drain meconium, 1/3 will subsequently drain clear liquor and 1/3 never drain any liquor.
- In general it is not necessary to do a CS on the basis of meconium alone if the fetal heart is normal. In the absence of distress and if there is no other independent indication for CS, a vaginal delivery can be expected. However with true grade 3 meconium in early labour, a CS is often required.
- You also have to check that there are no signs of CPD as meconium which develops in labour indicates that the baby is under stress. The baby must be monitored closely for signs of distress and the group which runs into most problems are postmature babies.

KEY POINT: IF THE LIQUOR IS CLEAR, FETAL DISTRESS IS UNLIKELY UNLESS THERE HAS BEEN AN ACUTE EVENT SUCH AS CORD PROLAPSE, SCAR RUPTURE OR ABRUPTIO PLACENTAE. THINK TWICE BEFORE YOU DIAGNOSE FETAL DISTRESS IN THE PRESENCE OF CLEAR LIQUOR.

(6C) MANAGEMENT OF FETAL DISTRESS

The management of fetal distress in labour is based on the fact that oxygen transfer at the placenta is mostly dependent on the perfusion of the fetal and maternal sides of the placenta. The following steps aim to improve the oxygen supply to the baby. These steps are sometimes called "in-utero resuscitation". If you diagnose fetal distress, first do these steps and reassess the fetal heart after 10-20 minutes. If the distress improves, you can allow labour to progress. If there is still distress, you have to deliver the baby by the quickest route. If it is not possible to do a CS, you can still do these steps as they will improve the baby's chances of surviving.

(i) **Position:** Turn the mother on her side (preferably left) to correct any supine hypotension.

(ii) **Give her fluids:** Give 500 ml of normal saline or Ringer's lactate which has the effect of increasing placental blood flow by increasing the maternal blood volume.

(iii) **Give oxygen** at 8 litres per minute as increasing maternal oxygen saturation also marginally increases fetal oxygenation.

(iv) **Stop any oxytocin** infusion to prevent uterine overstimulation.

(v) **Do a vaginal examination** to make sure there is no cord prolapse and to check the dilation.

(vi) **Tocolytics** can be given to suppress uterine contractions. This allows the baby to recover while other steps are taking effect. Beta-mimetics are the most effective e.g. ♦ hexoprenaline 5-10 ug IV over 2 minutes ♦ salbutamol 0.5 mg IV ♦ Terbutaline 0.25 mg. If beta-mimetics are not available, then 4 g IV of magnesium sulphate or 20 mg of nifedipine PO can be used instead.

(vii) **AMNIOINFUSION**

This is a relatively new method for reducing fetal distress. The aim is to reduce cord compression by infusing a litre of normal saline or Ringer's lactate (at room temperature) into the uterus. If decelerations persist, then they are probably due to placental insufficiency. The indications for amnioinfusion are if decelerations are present:

- Amnioinfusion is especially applicable in mothers who have had pre-labour rupture of the membranes.
- It can be used in any mother with fetal distress. If there will be a delay before CS, it can even be inserted while awaiting theatre.

Method: The membranes must be ruptured. An infant feeding tube, suction catheter or nasogastric tube is inserted between the baby's head and the posterior lip of the cervix. It may be necessary to push the head up slightly to allow it to pass. Initially run in 500 ml of saline or Ringer's lactate over 30 minutes and then 500 ml at 2 ml/minute with the fluid bag suspended 1 metre above the mother. It can take at least 10 minutes to achieve significant expansion of the amniotic fluid volume. Some of the fluid will drain out vaginally so the bed may get wet. If the bed becomes very wet, check the tube is still in the uterus.

Does the fetal heart improve? After performing these measures, you should see an improvement in the fetal heart within 10-15 minutes. If there is no improvement, you should deliver the baby by the quickest route.

Safety/ Complications:

- It actually decreases rather than increases the risk of infection by its dilutional effect.
- It may increase the risk of cord prolapse.
- Overall it is safe and does not affect the length of labour.
- It has been shown to be safe in mothers with a previous CS.
- As it is a simple procedure, it can be recommended for use in any labour ward.

(SECTION 7) ROUTINE LABOUR WARD ROUNDS AND ORGANISATION OF THE LABOUR WARD

Rather than waiting for problems to arise, there should be routine ward rounds by the doctor in charge at specific times of the day i.e. at start of the day, lunchtime, handover time to evening staff, and at 2200 hours. This is in addition to the regular assessment performed by the labour ward staff. When working in a full labour ward you have to develop a system of assessing mothers quickly. The following is a suggested routine.

(i) **Look at the mother's antenatal chart** for the previous history and any antenatal problems. Then check her inpatient chart to see if she had a previous admission. You are then ready to review her labour record.

(ii) **General (maternal condition):** Look at and talk to the mother. Has she got adequate analgesia? Look at her BP and temperature. Are intravenous fluids up if indicated?

(iii) **Abdominal (fetal condition):** You should examine her abdomen before doing a pelvic examination.

- Check for the presentation and be careful not to miss twins or a breech.
- Measure the fundal height and estimate the weight of the baby especially in primips. If the estimated

weight is over 3.5 kg, then this should alert you to look for CPD and to do a pelvic examination in these mothers. In a multip with previous normal deliveries, you would be worried if the estimated weight was over 4 kg.

- A small baby alerts you to possible growth restriction (IUGR).
- Estimate how many fifths the head is above the brim.

(iv) **Pelvic (condition of cervix):** It is not necessary or practical to repeat all pelvic examinations performed by the midwives. An estimate of the pelvic size is important when:

- There is poor progress in labour especially in multips.
- If the liquor is meconium stained especially in a primip or if there are decelerations in the fetal heart.
- If you think the baby is big.
- If she had a previous CS
- In mothers with eclampsia or cardiac disease where you cannot allow a prolonged labour.

A common mistake when doing a pelvic examination is to only get half the information. The dilation and presentation are the obvious findings. The amount of moulding, level of the head assessed bimanually, position and pelvic size are the less obvious findings which should also be noted.

ORGANISATION

- Where resources are limited, it is important to put patients at high risk in an intensive care part of the labour ward. This allows the best use of experienced staff and equipment.
- For audit purposes, it is useful to divide women into the following groups:
 1. Primips in spontaneous labour with a single cephalic pregnancy, > 37 weeks
 2. Primips, labour induced or delivered by elective CS with a single cephalic pregnancy, > 37 weeks.
 3. Multips in spontaneous labour with a single cephalic pregnancy, > 37 weeks
 4. Multips (no previous CS) labour induced or delivered by elective CS, with a single cephalic pregnancy > 37 weeks
 5. Multips with a previous CS with a single cephalic pregnancy > 37 weeks.
 6. Primips with a breech
 7. Multips with a breech including those with a previous CS.
 8. All mothers with multiple pregnancy including those with a previous CS
 9. All abnormal lies including those with previous CS
 10. All single cephalic pregnancies 36 weeks and less including those with a previous CS.