

# Abnormal labour

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## Abstract

Labour is considered abnormal once it deviates from accepted rates of progress, which are dependent on the stage of labour and the parity of the parturient. The leading indication for primary caesarean section is “failure to progress” or “labour dystocia” – a blanket term that indicates an abnormal labour process, but fails to give any indication of the underlying problem. We discuss both normal and abnormal labour and have used three cases to highlight aspects of abnormal labour.

**Keywords** Abnormal labour; failure to progress; first stage; labour; labour dystocia; second stage; third stage

## Introduction

In order to define abnormal labour, and to discuss management of the same, it is imperative to first define normal labour. Labour is divided into three stages:

1. First stage of labour – is defined as “regular painful uterine contractions leading to progressive dilatation of the cervix and descent of the presenting part” – from onset of labour, until full dilatation. This first stage can be further divided into “latent” phase and “active phase” – characterised by gradual, and then rapid cervical change respectively. The NICE (National Institute for Health and Care Excellence) guidelines further define the “latent” phase as painful contractions over a period of time which may or may not be continuous, causing cervical effacement and dilatation up to 4 cm “Established” first stage of labour is therefore defined by regular painful contractions and progressive cervical dilatation from 4 cm.
2. Second stage of labour – from complete cervical dilatation to delivery of the fetus. This second stage can also be further divided into two phases – “passive” during which the woman is not actively pushing, followed by “active” – from the start of active maternal expulsive effort until delivery of the fetus.
3. Third stage of labour – from delivery of the fetus to complete delivery of the placenta and membranes.

It can be difficult to determine exactly when labour begins, as the normal uterus contracts intermittently and infrequently throughout pregnancy. In later weeks of pregnancy the cervix often begins to soften, efface and dilate, and early labour contractions are also typically mild and infrequent. Traditionally the

onset of active labour has been defined from 4 cm dilated, or from the time of hospital admission, whichever is later.

## Case 1

EJ is a 37 year old Gravida 1 Para 0, who presented to hospital in preterm labour at 35 + 4 weeks gestation. Pregnancy up to that point had been low-risk and uncomplicated, and she had planned to deliver at a primary birthing unit (standalone midwifery birthing unit), but owing to prematurity was transferred to secondary care.

On presentation she was contracting two in 10 minutes, there were 2/5ths of head palpable per abdomen, and the cervix was 4 cm dilated and fully effaced. Membranes were intact. Continuous fetal heart rate monitoring was commenced using a cardiotocogram (CTG), and was normal. She was started on intravenous benzylpenicillin for Group B streptococcus (GBS) prophylaxis. She continued to contract two in 10 minutes, and after 4 hours the cervix was 5 cm dilated. The CTG remained normal, she was coping well with labour, and membranes remained intact. After a further 4 hours of labour with the same rate of contractions, the cervix was now 6 cm dilated, she continued to cope well with contractions and the CTG was normal. After a considered discussion she consented to have an amniotomy performed, after which the rate of contractions increased to four in 10 minutes. Some 3 hours after the amniotomy she was describing rectal pressure and on examination was found to be fully dilated, station 1 cm below the spines, occipito-anterior position. She commenced active pushing, and an hour later had a normal vaginal delivery of a live male infant. The third stage of labour was actively managed, and the estimated blood loss was 300 mL.

Progress through the first two stages of labour is defined by the “three P’s” – the “passage” referring to the women’s dynamic pelvic diameters; the “passenger” referring to the size, presentation and position of the fetus; and the “powers” referring to the strength of uterine contractions.

In modern medicine, conditions such as rickets, which gave rise to abnormally damaged and often fixed deformities of pelvic architecture, are almost entirely a thing of the past, meaning the “passage” is rarely a cause of obstructed labour. There are now therefore two main reasons why labour stalls: mechanical obstruction, resulting from the “passenger” – either fetopelvic disproportion or fetal malposition; and dynamic labour disorders, in which the strength of uterine contractions is inadequate.

In the 1950s Emmanual Friedman established criteria for normal progress through the first stage of labour, giving rise to the Friedman curve, which for many decades was used as the benchmark against which labour progress was measured. The minimum acceptable rate of progress was 1 cm an hour for nulliparous women, and 1.5 cm per hour for multiparous. In recent years this standard has been challenged, and a number of review articles have suggested that normal labour progresses somewhat slower, especially in primiparous women. The 2014 NICE guidelines for intrapartum care have been modified to state a minimum acceptable rate of progress in active first stage of 0.5 cm per hour. These observed changes in normal labour progression are thought to be due to women themselves (increasing body mass index, advancing maternal age), as well as modern anaesthetic and obstetric practices.

Abnormal first stage of labour typically takes one of two shapes – either abnormally slow progress from onset to full

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dilatation, as defined by the above criteria, or secondary arrest – where there is good progress initially, followed by a halt or slowing in progress towards the end of the first stage. In order to assess the rate of progress, frequency of uterine contractions, cervical dilatation and descent of the fetal head per abdomen are plotted on a partogram, with action lines drawn at intervals to indicate where progress does not meet the accepted standard.

Simple measures are initially undertaken. There is evidence to support that adequate hydration improves myometrial contractility, therefore insertion of an intravenous (IV) line and commencement of IV fluid therapy is an appropriate initial first step.

If labour progresses abnormally despite simple measures, interventions are recommended. The first step is to perform an amniotomy (artificial rupture of the membranes), provided that this has not already occurred spontaneously. Rupturing the membranes is thought to mechanically stimulate hormone release which facilitates increased strength and frequency of contractions. A Cochrane review published in 2013 looked at 15 different studies involving 5583 women in which amniotomy was either performed as a routine procedure, or where labour was prolonged, and found no evidence that amniotomy shortened the length of the first stage of labour, and in fact was associated with a small increase in the Caesarean section rate. This increase is presumably due to the small risk of cord prolapse or fetal heart rate abnormalities associated with amniotomy.

After performing an amniotomy, the next intervention to augment the strength and frequency of labour contractions is usually an oxytocin infusion, which can be increased or decreased as required, in order to achieve a desirable frequency of contractions – usually four contractions in 10 minutes. Both amniotomy and oxytocin have been shown to increase the frequency and intensity of uterine contractions, but are not without risk – that of uterine hyperstimulation, fetal heart rate abnormalities and fetal hypoxia. The Cochrane review of early amniotomy and early oxytocin, published in 2013, looked at 14 different trials involving over 8000 women. Eleven of these trials were “prevention” trials where women were randomised to treatment versus expectant management, regardless of whether labour progression to that point was normal or abnormal. The remaining three were “therapy” trials – in which only women in whom a diagnosis of abnormal labour had been reached were included. The results showed that the length of labour overall was reduced by an average 1.3 hours with a policy of early intervention, however, this led to only a modest reduction in the caesarean section rate, and the 95% confidence interval included the null effect. Furthermore, it was the prevention trials, rather than the therapy trials, that showed the more clinically significant effects.

While the evidence for amniotomy alone for augmentation of labour is lacking, amniotomy continues to be recommended as a pre-requisite before commencing oxytocin. Few randomised studies have examined oxytocin as an isolated intervention.

## Case 2

NK is a 28 year old Gravida 1 Para0 at 40 weeks gestation, who presented to hospital with reduced fetal movements and history suggestive of pre-labour rupture of membranes. On examination clear liquor was draining, the CTG was normal, and she had

## Practice points 1

### First stage practice points (established labour)

Acceptable progress is minimum cervical dilation of 0.5 cm/hour

Measures to address abnormal first stage:

- Hydration with IV fluids
- Amniotomy
- Oxytocin infusion

started to contract spontaneously. On speculum examination rupture of membranes was confirmed, however, the cervix looked to be still long and closed. Given her report of reduced fetal movements she remained in the unit for observation while labour established. Induction of labour was not immediately offered due to staffing constraints. At 14 hours post-rupture of membranes, the contractions had increased to a rate of three in 10 minutes, and vaginal examination revealed the cervix to be 4 cm dilated and fully effaced, with the fetus in left occipito-transverse (LOT) position, at station 2 cm above the ischial spines. She was transferred to delivery suite for labour care, and 2 hours later had progressed to 7 cm cervical dilatation, and was requesting epidural analgesia. An epidural was sited with good effect. She continued with regular contractions three in 10 minutes, and 4 hours later findings on vaginal examination indicated 9 cm dilatation, station 1 cm above spines, LOT position. After a further 2 hours of similar contractions, the cervix was still 9 cm dilated, and an oxytocin infusion was commenced. Two hours later she was re-examined and the cervix was found to be fully dilated, station at the level of the ischial spines. After a further hour she commenced active pushing, and after an hour and a half of pushing she was exhausted. On examination the head was at station +1 below the spines, and was still in LOT position, therefore she was transferred to theatre for operative vaginal delivery. After epidural top-up, a posterior ventouse cup was placed on the flexion point and with two pulls the head rotated and descended to the introitus. A right mediolateral episiotomy was performed, and the head was delivered with the next contraction. A live male infant was born in good condition.

The duration of the second stage in labour is largely determined by the station and position of the presenting part at the diagnosis of full cervical dilatation, as well as frequency of contractions, and maternal expulsive effort. Epidural analgesia contributes, typically doubling the duration of the second stage, in both nulliparous and parous women. The NICE guidelines recommend that for active second stage, up to 3 hours be allowed in nulliparous women with an epidural, 2 hours in nulliparous women without an epidural, or in multiparous women with, and 1 hour in multiparous women without epidural analgesia. However, if there is no progress being made within the first hour of active pushing (or 30 minutes in a multiparous women), review for obstruction should be undertaken sooner, in order to implement strategies (such as amniotomy or oxytocin) to facilitate ongoing progress in a timely fashion.

It is well-recognised that malpresentation (occipito-posterior (OT) or occipito-transverse (OT)) in early second stage labour is

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