



Preterm Birth | Preterm Labour

Courtesy of Prof. Shane Higgins' website

Preterm Birth | Preterm Labour

This article is an introduction about preterm birth. Below are some of the more commonly asked questions about preterm birth.



1. What is Preterm Birth?

Preterm birth, also called preterm labour, are the terms used to define neonates who are born earlier than normal. In 1976, the **International Federation of Gynecology and Obstetrics (FIGO)** and the **World Health Organisation (WHO)** promulgated the definition of preterm birth as "infants who were delivered before 37 completed weeks, that is, ≤ 36 weeks plus 6 days."

The American College of Obstetricians and Gynaecologists, and the American Academy of Paediatrics define preterm labour as "regular contractions before 37 weeks that are associated with cervical changes." A study in 2005 said that infants born between 34 weeks and 36 weeks plus 6 days experience characteristics of morbidity and mortality of premature neonates.

Due to this, preterm births were subdivided into those before 33 weeks plus 6 days, which are labelled as early preterm, and those occurring between the completed weeks 34 and 36, which are labelled as late preterm.

Preterm Birth | Preterm Labour

But the previous definition lacks a functional basis and should be distinguished from the definition of prematurity, which is the incomplete development of several organs and/or systems at birth. Usually, the lungs are the most affected organs, leading to respiratory distress syndrome.

2. Antecedents and Contributing Factors of Preterm Labour

Threatened Abortion: bleeding through external genitalia in early pregnancy (before 20 weeks) is associated with increased adverse outcomes later. It can lead to preterm labour, placental abruption and pregnancy loss before the 24 weeks of gestation.

Lifestyle Factors: tobacco smoking, abnormal maternal weight gain and illicit drug consumption have important roles in the incidence and outcome of low birth-weight infants. Overweight and obese mothers also have an elevated risk of early labour. Other maternal factors include pregnancy at young or advanced maternal age, low socioeconomic level, short stature and vitamin C deficiency.



Preterm Birth | Preterm Labour

Psychological factors such as depression, anxiety and chronic stress have been related with preterm labour. Physical abuse is also related. Studies found that there is a relation between working long hours and hard physical labor, and increased risk of preterm birth.

Genetic Factors: genetics may play a causal role due to the recurrent, familiar and racial nature of preterm labour. Several studies have also implicated immunological genes in generating chorioamnionitis in cases of preterm birth due to infection. Birth defects were associated with preterm birth and low birthweight.

Periodontal Disease: gum inflammation affects as many as 50% of pregnant women in the USA. Studies have shown a relation between this pathology and preterm labour.

Interval between Pregnancies: short intervals between pregnancies have been known for some time to be associated with adverse perinatal outcomes. In a 2006 study, it was shown that intervals minor to 18 months and major to 59 months were associated with increased risks for preterm labour and small-for-gestational age neonates.

Prior Preterm Birth: this is a major risk factor. Statistics show that preterm labour risk for women whose first labour was preterm is three times major than women whose first child was born after 37 weeks of pregnancy. Importantly, the causes of prior preterm birth also recurred.

Infections: the relation between infections and preterm birth seems irrefutable. Intrauterine infections are believed to trigger labour before 37 weeks of pregnancy by activation of the innate immune system.

It is believed that microorganisms release inflammatory cytokines like interleukins and TNF- α , which stimulates production of prostaglandins, which at the same time stimulate uterine contractions and/or enzymes that degrade matrix in the fetal membranes and produce preterm membranes rupture. Statistically is estimated that 25-40% of preterm labour comes from intrauterine infections.

Many studies demonstrated that antimicrobial treatment in pregnant women with intrauterine infections prevent preterm births. On the other hand, many studies also showed that this type of treatment may be harmful or did not reduce rates of preterm labour.

Bacterial vaginosis has been associated with spontaneous abortion, preterm labour, premature rupture of membranes, [chorioamnionitis](#) and amniotic fluid infection. Environmental factors (chronic stress, ethnic differences and frequent or recent douching) have been associated with this condition. Also, a gene-environment interaction has been described. Screening and treatment have not been shown to prevent preterm birth.

3. What are the Causes of Preterm Labour?

Direct main reasons include:

- Spontaneous preterm labour with intact membranes (40-45%).
- Preterm premature rupture of membranes (30-35%).
- Maternal or fetal indications (30-35%).

Causes for preterm birth have multiple, often interacting, antecedents and contributing factors. Associated to other complex disease processes, coexistent genetic modifications and environment issues may lead to preterm labour.

There are several modifications in genes associated with inflammation and infection, and in genes related to collagen turnover. Inherited mutations in genes which regulates collagen assembly may predispose women to a cervical insufficiency or premature membranes rupture.

4. Spontaneous Preterm Labour with Intact Membranes

This does not constitute a simple group characterised only by early initiation of labour. Other associated findings are intrauterine infections, multifetal pregnancy, bleeding through external genitalia, infarction of the placenta, polyhydramnios, premature cervical dilation, cervical insufficiency, uterine abnormalities and fetal anomalies. Preterm labour risk may also be increased by autoimmune diseases, maternal illness and gestational hypertension.

Although there are unique characteristics to each cause of preterm labour, these different processes finish in a common point, which is the combination of premature cervical changes and activation of uterine contractions.

It is important to say that the actual process of preterm labour should be considered a final step, one that results from progressive changes that could be initiated days or even weeks before labour. Many studies say that preterm labour does not always mean the acceleration of the normal process.

Diverse initiation mechanisms exist and are related with the etiology of preterm labour. Uterine distention, maternal-fetal stress, premature cervical changes and infections are among the major causes of spontaneous preterm labour.

All points to the fact that multifetal pregnancy and polyhydramnios lead to an increased risk of preterm labour. Early uterine distention may act as an activation factor to initiate expression of specific proteins associated to contraction in the myometrium. It is clear that excessive uterine distention causes premature loss of its quiescence. Also, this distention leads to early activation of the placental-fetal endocrine cascade which enhance the expression of the previous named proteins.



Prematurely increased stretch and endocrine activity may start processes that change the timing of myometrial activation, including premature cervical changes, an important factor to consider. It is necessary to mention the Ferguson reflex, which is a neuroendocrine reflex that appears with the increase of pressure inside the uterus, at the cervix and vaginal walls, which at the same time enhance the liberation of oxytocin, increasing uterine contractions.

There is an obvious relation between maternal stress and preterm labour, being more specific, with the placental-adrenal endocrine axis that may help inducing preterm labour. This abnormal behavior of the axis results in the premature enhance production and liberation of cortisol and estrogens which leads to an early loss of uterine quiescence and accelerated cervical ripening.

The role of infections as a major cause of preterm labour in patients with intact membranes has a great interest. There have been cases in which histological evidence of inflammation of fetal membranes exists. It has been said that in term labour, amniotic fluid is infiltrated by bacteria as a consequence of labour, but in preterm labour, bacteria represent an important cause of labour.

In chorioamnionitis cases, the microbes could invade only maternal tissue and not amniotic fluid, stimulating cytokines secretion due to their endotoxins, leading in the same way to preterm labour. Bacteria can invade intrauterine tissues through systemic infections, using the fallopian tubes or ascending from the vagina and cervix (most common way). The pathogenesis of infected-induced preterm labour has been explained in previous paragraphs.

5. Preterm Premature Rupture of Membranes

The spontaneous rupture of fetal membranes before 37 completed weeks and before labour onset. Intrauterine infections are believed to be a major cause for this rupture.

Women with prior preterm premature rupture of membranes, low socioeconomic level, BMI ≤ 19.8 , nutritional deficiencies, polyhydramnios, multifetal pregnancy, tobacco smoking and/or illicit drug consumption during pregnancy, and cervical insufficiency are among the related risk factors.

The pathogenesis of this condition may be related to augmented apoptosis of membrane cellular parts (amniotic extracellular matrix and interstitial amniotic collages) and to increased levels of proteases in these membranes and amniotic fluid which leads to degradation and altered assembly of collagen bands, and cell death, which all lead to a weakened amnion.

Many studies showed that infections causes a significant amount of these cases. Latency period is the interval between the premature rupture of membranes and the beginning of labour. When this period exceeds 24 hours, the premature rupture of membranes is considered prolonged. The period between the rupture and labour is very important in relation to maternal-fetal morbi-mortality.

6. How Preterm Labour can be Diagnosed?

It is mainly based on the symptomatology of the pregnant woman. The true labour has to be differentiated from the false one through cervical changes (dilation and effacement). Uterine activity alone not always is a positive sign of positive labour due to Braxton-Hicks contractions (contractions variable in frequency, pain, rhythm and palpation which help develop the uterine segment, but does not trigger true labour).

As said at the beginning of this article, the American College of Obstetricians and Gynecologists, and the American Academy of Pediatrics define preterm labour as "regular contractions before 37 weeks that are associated with cervical changes." Other symptoms such as menstrual-like cramps, pelvic pressure, watery vaginal discharge and back pain have been associated with preterm labour.

Cervical changes are a very important factor for consideration. Asymptomatic cervical dilatation in the second half of pregnancy is suspected to be a risk factor for preterm birth, but part of the medical population consider this as a normal anatomical variant. However, the detection of this dilatation does not improve pregnancy outcome.

Cervical length analysis using transvaginal sonography is also used. Ambulatory uterine monitoring, a system based on a tocodynamometer tied around the pregnant woman abdomen and connected to an electronic recorder which transmit results digitally, allows a woman to ambulate while uterine activity is recorded.

Many studies showed that this system does not reduce preterm birth rates and the American College of Obstetricians and Gynaecologists does not recommend its use. Fetal **fibronectin** detection in cervicovaginal secretions before membrane rupture may be a possible marker for impending preterm labour, but the American College of Obstetricians and Gynaecologists does not recommend its use either.

7. How Preterm Labour can be Prevented?

Although of the great quantity of tocolytic available and the various advances and development in the intensive care units for neonates, preterm labour has remained as a major cause of perinatal morbi-mortality. Many developed countries have created education and prevention programs that show risky patients all they have to know in this area. These programs have the goal of an early detection of preterm labour risky factors.

These programs include:

Special education and strict vigilance of pregnant women with augmented risk of preterm labour.

Medical personal education about the importance that preterm labour has as a reproductive problem.

Early detection of patients with true uterine contractions.

Early treatment with **tocolytic** agents once diagnosis has been done.

Although this is a great prevention system, the results showed the diminution of perinatal morbi-mortality in patients with a high socioeconomic level, but not in women belonging to a population with less resources and a low socioeconomic level, so they are not recommended as a prevention measure for general population.

There are three major circumstances when cervical cerclage may be used to prevent preterm labour (two are done as prophylaxis and a third one is done for treatment).

The first cerclage of the prophylactic ones is used in patients who have history of recurrent second and third trimester losses and who have cervical insufficiency.

The second cerclage is for patients identified with a short cervix during sonographic examination.

The third indication of cerclage is used as a treatment measure, and it is done emergently when cervical incompetence exists in patients with threatened preterm labour.

Preterm Birth | Preterm Labour

Progesterone withdrawal is considered as a triggering event for labour mediated by diminution of progesterone activity of the progesterone receptors. So, it is thought that administration of progesterone may block preterm labour maintaining uterine quiescence. Prophylactic tocolysis before the initiation of cervix modifier uterine contractions may prevent preterm labour initiation.

However, due to the non-sufficient evidence that indicates its use and the possible side effects that these drugs may produce, its use before the beginning of preterm labour must be avoided. Bed rest and diminution of daily activity during the second half of pregnancy are always recommended for preterm labour prevention.

However, there are no existing studies that confirm this practice.

8. What are the Preterm Birth Complications?

Preterm labour is one of the major causes of neonatal mortality worldwide. Gestational age is the best factor to predict neonatal survival before 29 weeks. However, after this week, weight seems to represent the best factor to neonatal survival prediction.

After 36 weeks, respiratory distress syndrome rates diminish. Ductus arteriosus persistence, necrotizing enterocolitis and intraventricular hemorrhage rates diminish after 32 weeks.

A new born with a weight minor than 1,500g has, approximately, 200 times more possibility of death during the first year of age, than the ones who are born with a weight over 2,500g.

The underweight neonates that survive, have 10 to 20 times more possibility of suffering from severe and irreparable neurological damage, and severe mental deficiency.

Also, these can develop visual and auditory problems, pulmonary chronic diseases and seizures. Due to children issues, parents can develop psychological conditions that need to be evaluated by a specialized medical team with the goal of creating an environment that favors the neonate well-being.

In 2012, Dr. Shane Higgins established a stand-alone preterm clinic. To read more about this and some of his other work, please click on [Dr. Shane Higgins](#).

Books used to research this article:

Williams Obstetrics 24th Ed.

Obstetricia Moderna - Aller & Pagés - 3rd Ed.

Additionally below, you can read a full report about preterm births in Ireland.

[Prematurity in Ireland by Irish Premature Babies 2014](#)