

# Ultrasound in Pregnancy

## What is ultrasound?

During an ultrasound scan, high frequency sound waves are produced by a transducer (the part of the machine which is placed on the body). The sound waves are passed into the body where they encounter structures (like your baby!). When this happens, the waves reflect back, and the sound (or echo) is detected electronically and transmitted onto a screen as a dot. This results in a picture being formed, with strong echoes creating white dots (representative of bone), weaker echoes creating grey dots (tissue) and no reflection creating black dots (fluid).

## What are the benefits of having an ultrasound in pregnancy?

**Dating:** When performed in early pregnancy, ultrasound is considered a reliable method of predicting the estimated due date, especially for women who have irregular menstrual cycles, or are uncertain of when their last period was. Dating ultrasounds have been shown to reduce the number of pregnancies considered to be “post-term” and to decrease the rate of inductions for pregnancies extending far past the due date.

**Number of Babies:** Ultrasound can detect multiple (i.e. twin) pregnancies early on, which allows women access to specialized care sooner (multiple pregnancies can be associated with a higher rate of complications). Early detection also allows more time to prepare physically and psychologically for the birth of multiples.

**Finding Birth Defects:** Approximately 35--50% of serious defects are diagnosed during a detailed ultrasound at 18-21 weeks. Ultrasound may also detect “soft markers”--- characteristics of the fetal anatomy which are in themselves normal but can be associated with an increased chance of genetic anomalies. Detection of soft markers or true abnormalities allows women the chance to consider options to further diagnose or rule out a condition (i.e. genetic testing), as well as the opportunity to consider termination of the pregnancy or the ability to engage resources/prepare for the birth of a special needs baby. In many cases, this can also be considered a disadvantage or limitation, as many initial findings cause much worry and concern but turn out to be benign or non-existent.

**Uterine Formation:** Although rare, some women have a uniquely shaped uterus that increases the likelihood of complications such as postpartum hemorrhage. More commonly, many women (30% over the age of 30) have uterine fibroids; in rare cases, they are large enough and low enough in the pelvis to make vaginal birth difficult or impossible. Detection by ultrasound may aid women and their caregivers in making birth plans, e.g. hospital instead of home.

**Placental Location:** Ultrasound can rule out placenta previa (a condition affecting 0.5% of the population where the placenta grows over top of the cervix; cesarean birth is indicated). For the small number of women affected by placenta previa, early detection may result in healthier moms and babies.

**Parents' Experience of Ultrasound:** Many parents say that they are happy to see their baby move and swim around on screen. While the mother has often been feeling the baby move for a few weeks, a number of partners report that this is the first time the baby seems "real" and that this allows them to feel "more connected" to the pregnancy.

## What are the limitations of ultrasound in pregnancy?

In general, routine scans do not seem to be associated with reductions in adverse outcomes for babies.

**Dating:** While some research shows ultrasound to be more effective in determining a due date than simply calculating based on a woman's last menstrual cycle, the difference detected in most cases would be unimportant and not impact the outcome for mother or baby. (The exception to this would be in cases of preterm/post-term pregnancies)

**Placental Location:** There is no evidence that routine screening ultrasounds at 18-21 weeks improve outcomes for mother or baby in the case of placenta previa.

**Finding Birth Defects:** At least 50% of fetal malformations will not be detected via ultrasound. Additionally, some malformations will be "diagnosed," but in reality not be present, causing undue stress to the parents.

**Estimated fetal size:** Ultrasound only gives a rough estimate of fetal size. It is especially difficult to accurately estimate the size of very large or very small babies at term, when the margin of error is +/- 1lb.

**Parents' Experience of Ultrasound:** While an ultrasound has the potential to be a happy experience, real or mistaken diagnosis of abnormalities of the fetus can be very upsetting for parents. If soft markers are noted (e.g. echogenic foci, choroid plexus cysts), some parents have a hard time accepting even after further testing shows these markers are variations of normal, that their pregnancy or their baby is not abnormal.

Like choosing any test, families choosing ultrasound screening should consider the positive, negative or equivocal findings that could be revealed so as to be prepared for unexpected results, and the potential for further testing options to be offered.

## Is ultrasound safe?

The effects of ultrasound are difficult to study, due to the many variables that can affect the results, including age of the exposed fetus, different levels of exposure by different machines and different technicians, frequency of exposure, inherent genetic differences between fetuses, and a large variety of measurable outcomes.

So far there has been no well-designed study to date linking ultrasound to adverse outcomes for mom or baby. Ultrasound has been used on millions of pregnant women for more than 30 years without any clear adverse effects.

However, because there have never been any long-term, scientific studies on ultrasound, most experts agree that ultrasound exposure should be minimized and only be used during pregnancy for **medical indications**.

Private ultrasound clinics offering 3-D images or videos have become very popular. In 2004, the FDA (Food & Drug Administration in the USA) put out a caution discouraging women from obtaining “keepsake” ultrasounds during pregnancy. Their rationale for this cites studies that acknowledge ultrasound as a form of energy that can raise the temperature of tissue.

While there is no evidence that this could harm a baby, the FDA says that there is a potential that ultrasounds in pregnancy aren't entirely innocuous.

## At what point in pregnancy will I be offered an ultrasound?

- Ultrasound may be offered in first trimester if it is difficult to pinpoint an accurate due date.
- Women over 35 years of age that opt for genetic testing will be offered a nuchal translucency ultrasound, generally done between 12 and 13 weeks. This ultrasound looks at the amount of fluid around the baby's neck – the nuchal fold. Higher amounts of fluid are associated with Down Syndrome and the measurement is integrated with blood tests to obtain genetic screening results.
- All women in pregnancy are offered a “screening” or “detailed” scan at 18-21 weeks. At this point, ultrasound aims to verify that the baby is developing and growing normally.
- An ultrasound may be offered throughout your pregnancy for any of the following reasons: concern that the baby is not growing as expected, to investigate the source of vaginal bleeding, to diagnose cervical changes in cases of suspected preterm labour, to verify the position of a suspected breech baby, to follow-up previously discovered concerns, to monitor a pregnancy that extends far past the due date, or as a visual aid during invasive procedures such as amniocentesis.

## Can ultrasound confirm that my baby is “normal”?

Ultrasound has been used for many years to gain information about developing babies and is considered a *screening* rather than a *diagnostic* test. This means that there is a chance of false positives (the technician thinks they see something abnormal but your baby is normal) or false negatives (the technician thinks everything is normal when something is abnormal) when ultrasound is used as a diagnostic. However, ultrasound remains the method of choice for confirming the diagnosis of some conditions (i.e. spina bifida), and is considered a valuable tool to gain information about the developing baby.

The accuracy of an ultrasound is directly related to the skill of the technician performing the scan, and the quality of the equipment used.

## **Is there an alternative to having an ultrasound in pregnancy?**

While it is considered the standard of care for women to be offered a detailed scan from 18-21 weeks in pregnancy, some debate exists about whether or not routine ultrasound is necessary in normal pregnancies. There are some alternatives for detection of *some* fetal anomalies (i.e. maternal serum screening). The main alternative to having a routine ultrasound is simply to not have one.

## **Can I find out the sex of my baby?**

In BC, if discovered by ultrasound, the sex of the baby will not be disclosed until after 20 weeks. If you would like to know the sex of your baby, the clinic will need to schedule the appointment at an ultrasound location that will disclose the sex to you after 20 weeks.

## **What about Doppler use in the clinic?**

The Doppler that care providers in clinic settings use to listen to the fetal heart rate is a form of ultrasound. If you wish to minimize ultrasound exposure, your midwife can (occasionally or always) use a specially designed stethoscope called a fetoscope to listen to the heartbeat.

The limitations of using the fetoscope include:

- having to wait until the fetus is large enough to hear (usually after 20-24 weeks)
- sometimes it's hard for parents to hear without a trained ear
- it often requires the mother to be in a certain position i.e. lying on her back or side, which may be uncomfortable during labour

The advantages of using the fetoscope, besides minimizing ultrasound exposure, include:

- some parents feel there is something special in hearing the *actual* heartbeat of their baby and not an electronic representation produced by the Doppler technology
- helping to verify the position of the baby

## **Sources for Further Reading**

- **Society of Obstetricians & Gynecologists of Canada Guideline on Ultrasound – PDF file**
- **Cochrane Review of Research on Ultrasound in Early Pregnancy– PDF file**