

# Prenatal Ultrasound: For Prevention or Intervention?

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## **Abstract**

In the United States, the use of ultrasound has remained controversial only to a small percentage of expectant parents and health care providers. The majority of city obstetricians and a minority of midwives utilize this technique as a routine part of prenatal screening. Reliance on ultrasound for determining the delivery date has resulted in further testing and, occasionally, unnecessary intervention. But when used appropriately, this can be an invaluable diagnostic tool. Experts have found at least twenty-seven different ways in which ultrasound is helpful during pregnancy. The needs that are filled include observing fetal and placental development and position, a good growth pattern, fetal movement, the amount of amniotic fluid and visible congenital abnormalities. The conclusion is that the benefits of ultrasound appear to outweigh any theoretical risks to mother or fetus.

## **Zusammenfassung**

In den Vereinigten Staaten ist die Ultraschalluntersuchung nur noch bei ganz wenigen umstritten. Die Mehrzahl der Geburtshelfer in der Stadt und ein Teil der Hebammen nutzen diese Technik routinemäßig bei den Schwangerschaftsuntersuchungen. Die Bestimmung des Geburtstermins auf Grund der Ultraschalluntersuchung hat zu weiteren Untersuchungen geführt und gelegentlich zu unnötigen Interventionen. Aber wenn die Ultraschallmessung in der richtigen Weise angewandt wird kann sie ein wertvolles diagnostisches Hilfsmittel sein. Fachleute haben wenigstens siebenundzwanzig ver-

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schiedene nützliche Anwendungen gefunden. Wichtig sind folgende Beobachtungsmöglichkeiten: Entwicklung und Lage von Foet und Plazenta, das Wachstum, die foetalen Bewegungen, die Menge des Fruchtwassers und die sichtbaren Mißbildungen. Die Schlußfolgerung ist, daß der Nutzen der Ultraschallmessung irgendwelche theoretisch denkbaren Risiken für Mutter und Foet überwiegt.

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Ultrasound examination was once reserved only for women whose age, health status, family history or other factors placed their pregnancy in a high-risk category. Now in the United States more than two-third of all pregnant women undergo this procedure.

The use of ultrasound both endovaginal (transvaginal) and abdominal has increased dramatically over the past few years. This has been influenced by changes in the medical concept of what is considered a risk to mother and baby, advances in perinatal treatment, the number of primiparas in their thirties and forties and the rise in medical malpractice claims and costs.

Statistically speaking, a fetal defect occurs in approximately two percent of all pregnancies. In many of these cases, information obtained through prenatal diagnosis may be the basis for important decisions. These may include surgery or treatment in utero, changes in the location, time and type of delivery and planning for a baby who may have special needs.

But, there are parents who prefer not to have prior knowledge of maternal-fetal conditions or complications. This may be because of their religious beliefs, or they may feel the situation could overwhelm them with guilt or other emotions. They may reason that there is the stress in waiting for a test appointment, then the time factor involved in obtaining the results. There are parents and practitioners who do not want the responsibility of making a decision when there is the possibility of a "false-positive" or a "false-negative" finding. There are those who feel there is an increase in the risk of having a cesarean because of the possibility of incorrect diagnosis. Lastly, there is the question of safety.

Regarding its safety, one should recognize the fact that ultrasound has been used for over thirty years. It is considered to be non-invasive. The main reason is that it uses non-ionizing radiation as opposed to the ionizing radiation of x-rays. There have been no substantiated harmful effects to the mother or baby associated with ultrasound examination.

There is no agency that issues guidelines regarding either the machinery or the dose of ultrasound used. The output is of a frequency of vibrations above the range audible to the human ear. That means more than 20,000 vibrations per second!

Since the machines are not regulated, they do not have to be standardized. As with anything mechanical, there may be inadequate functioning. Of most concern is that the energy output should be adequate. Therefore, theoretically, side effects could be cell changes as well as slowed fetal growth from high intensity absorption.

Numerous long-term studies have been done in the past. New ones continue the pattern of monitoring exposed babies from infancy through adulthood. Although no problems have been proven, one should still exercise caution when ordering an ultrasound: use the best machinery available in one's area; personnel should be well-trained, caring individuals; ideally a consent should be signed; the patient and any observers should be prepared beforehand. Explanations, if warranted, given during the procedure; costs and payments need to be discussed, if necessary; most important, the need for a test may be established, but can the desired information be obtained through ultrasound?

The fact is that there is an ever-growing role for ultrasound examination in prenatal monitoring. As time goes by there will be even greater accessibility to this procedure. And as technology advances, there will be increasing capability in and dependence on its role as diagnostic ultrasound.

The following are the present uses of prenatal ultrasound examination:

1. For in vitro fertilization.
2. Verify pregnancy.
3. Determine the baby's condition if there is no fetal heartbeat by the fourteenth week using a Doppler device or no fetal movement by the twenty-second week.
4. Determine causes for bleeding or spotting early in pregnancy – observable are fibroids, other uterine growths, cervical growths, an ectopic pregnancy or a blighted ovum. There may be a gestational sac in the uterus as well as an ectopic pregnancy.
5. When a dilatation and curettage or vacuum extraction is scheduled – In the past far too many viable fetuses were unintentionally evacuated because of what the physicians considered an obvious miscarriage: bleeding, clotting, contractions and a dilated cervix. With the use of ultrasound, surgical procedures have been canceled when it was determined that these signs and symptoms were caused by a partial loss of a multiple pregnancy and the remaining embryo was intact and viable.
6. To verify a due date – Most accurate before the eighteenth week of pregnancy. Later it may be one or two weeks off either way.
7. Locate the fetus prior to amniocentesis and during chorionic villi sampling.
8. Diagnose multiple gestation – Usually accurate. This is commonly requested when fertility drugs have been used or the uterus is larger than expected.
9. Determine the reason for rapid uterine growth – May be the result of hydatidiform mole, multiple pregnancy, excess of fluid or growths.
10. Previous problem pregnancy – Ultrasound may be routinely suggested.
11. Determine the amount of amniotic fluid – Polyhydramnios is an excess and could indicate that the fetus is having difficulty swallowing or has a possible kidney malfunction, or there may be other disorders. Excess fluid is also a possibility with gestational diabetes. Oligohydramnios is too little fluid. It could be the result of a malfunctioning placenta or an overdue pregnancy.

12. Determine the condition of the placenta – A deteriorating placenta which does not adequately nourish the fetus might be responsible for I.U.G.R – Intrauterine Growth Retardation. An early delivery may then be necessary.
13. Determine the cause for bleeding late in pregnancy – Causes include a low-lying placenta, placenta previa or placenta abruptio.
14. Diagnose neural tube defects – Anencephaly and spina bifida.
15. Detect structural abnormalities of the heart – Examples are pulmonary atresia, transposition of the great vessels and tetralogy of Fallot.
16. Diagnose kidney defects.
17. Cleft palate – Sometimes can be seen.
18. Verify neonatal demise.
19. Determine normal growth patterns – Accomplished by measuring the size of the baby's head abdomen and legs.
20. Detect abnormalities of the baby's head, abdomen and legs.
21. Weight determination – Late in pregnancy weight can be determined within a pound either way.
22. Evaluate the maturity of a fetus – When early delivery, either induced or by cesarean, is being contemplated, or to evaluate a fetus that is believed to be post-mature.
23. Position – Verify breech presentation or other uncommon fetal positions prior to delivery.
24. "Recreational Ultrasound" – This is a video made for memorable, not medical, reasons.
25. Biophysical Profile – To assess the health of the unborn baby. The non-stress test monitors the fetal heart rate and the ultrasound is used to check these four items:
  - A. The amount of amniotic fluid.
  - B. Physical activity.
  - C. Position of the baby.
  - D. Breathing – type of movements that change the shape of the chest or lungs.
26. Relieve emotional distress – Although this cannot always be accomplished, if using real-time sonography, parents are able to see their baby's movements.
27. Sex determination – Accurate with the newer machinery.
28. Initiate intrauterine bonding – Not of value if done after fetal movements are felt.
29. To guide or observe – During intrauterine fetal or maternal surgery or treatments.
30. Diagnose a hernia malformation – This defect can be fatal at birth because diaphragmatic pressure prevents the lungs from expanding. Successful intrauterine surgery is being performed in the United States at the University of California at San Francisco.
31. Advances – It is believed that ultrasound, along with other tests, will eventually replace amniocentesis and chorionic villi sampling. A Glasgow, Scotland study of 905 pregnant women was done. This was to determine if ul-

trasound could be used instead of amniocentesis to screen women with elevated alpha-fetoprotein levels. They found a 98 % accuracy for diagnosing the neural tube defect of spina bifida.

Pregnancy is basically a healthy experience. A pregnant woman ideally needs a supportive family and health team, financial stability, safe shelter, prenatal care, good nutrition and weight gain, a positive outlook and prenatal education. Not everyone wants, needs or is requested to have an ultrasound examination during pregnancy. But it is obvious that there is a time and a place for it. When it is necessary, then we can be reassured that the benefits of ultrasound appear to outweigh any theoretical risks.

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