

2. Fetal echocardiography (Ultrasound of the fetal heart)

The fetal echocardiography is an additional investigation, which examines the fetal heart (size, position in the thorax, valves, contraction force, rhythm) and blood vessels leading to and from the heart.

Heart malformations constitute the most frequent fetal malformations. They affect 6-8 of 1000 newborns. **Approximately 90% of all congenital heart malformations may be detected by the fetal echocardiography.**

Since most heart malformations can be corrected surgically, an early detection is important to avoid complications.

3. Doppler ultrasound

Doppler and color coded doppler depict the direction and velocity of fetal and maternal bloodstreams in placental blood vessels.

This observation **provides inside into the wellbeing of the fetus, cardiac functioning, supply with nutrients etc.** Furthermore, the doppler allows to estimate the **risk for pregnancy-associated complications** like gestosis/HELLP-syndrome.

4. 3D/4D-ultrasound

In general, the conventional two-dimensional ultrasound pictures allow a thorough investigation of all fetal organs. In certain cases, a three-dimensional (3D) delineation may help gain additional information about surface structures (i.e. face), the positioning of hands and feet or malformations of the spine or brain and other structures.

4D-ultrasound simply means making a movie from ultrasound pictures, which is especially helpful for echocardiography.

Surname: _____

Name: _____

PC-Number: _____

Date: _____

■ Information on Extended Ultrasound Scan

■ Pränatalmedizin, Gynäkologie und Genetik (MVZ)

Nürnberg ■ Bayreuth ■ Ansbach

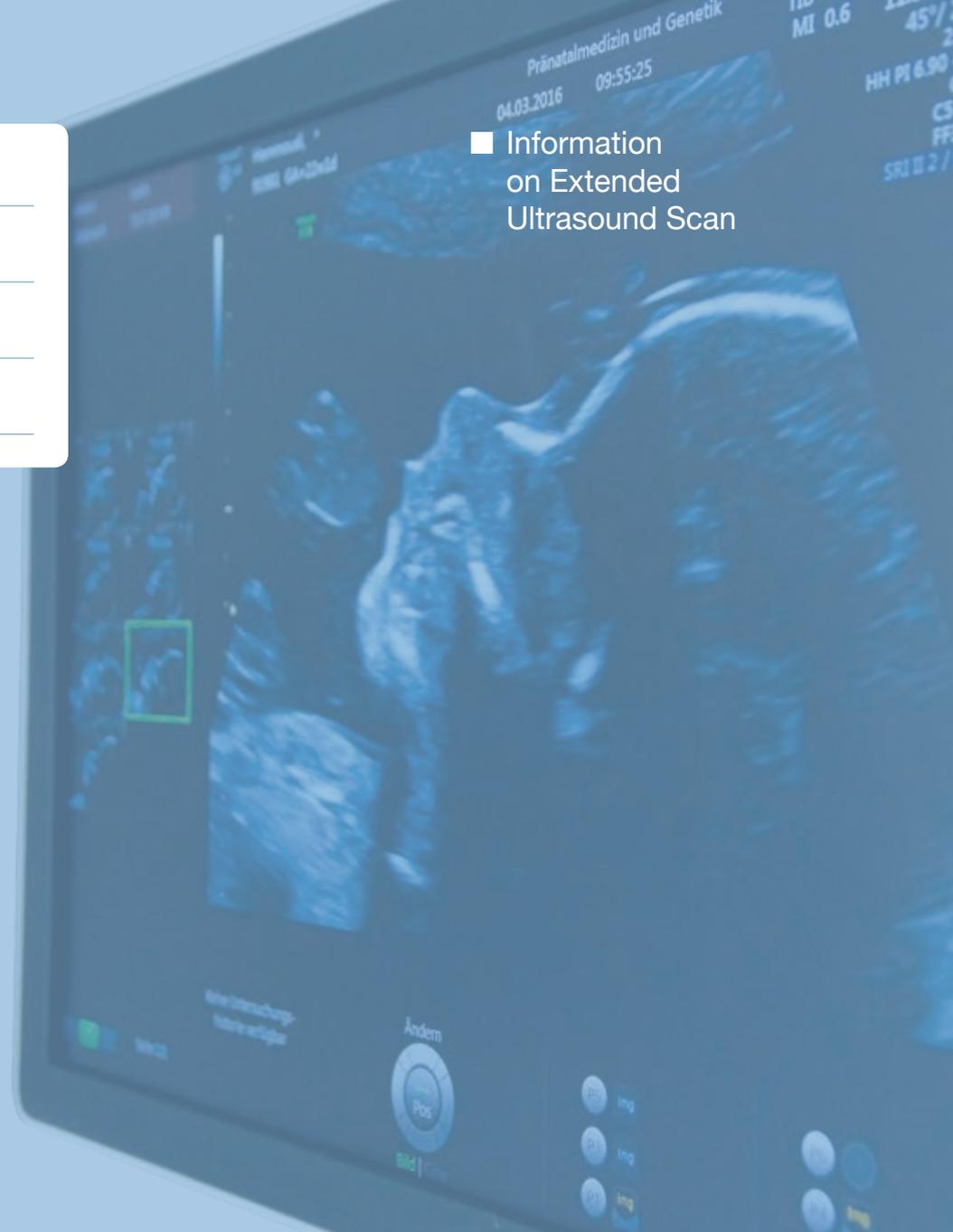
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■ Dear Patient,

You have been referred by your obstetrician for an extended ultrasound investigation or you independently requested this test.

Your informed consent is required for this. Please read the information below carefully. Any questions should be discussed with the doctor who is conducting the ultrasound.

What is ultrasound? Is it dangerous?

Ultrasound (sonography) represents the most widely used technique to obtain pictures from internal organs. Sound waves which have frequencies far beyond those audible for the human ear, are sent into the body, reflected by internal structures and gathered by a sensing device. The computer calculates pictures from these echoes. With over 40 years of experience, we know that there are **no health hazards** for you or the fetus associated with this technique.

What may be investigated?

1. "Organultraschall" (extended ultrasound)

With "Organultraschall" (extended ultrasound, often called organ scan in English) we refer to a specialized ultrasound investigation, in which a large set of biometric parameters are checked for each of the fetal organ systems (face, brain, thoracic and abdominal organs, extremities, skeleton, placenta, umbilical cord amniotic fluid). The scope of this investigation goes far beyond that of the ultrasound investigation, which your local obstetrician can provide. The extended ultrasound will be performed by specialized physicians on high resolution ultrasound machines.

Please keep in mind that most children are born healthy. Only 3-5% of all newborns show malformations (mostly minor, 1% show severe malformations). **The "Organultraschall" may discover 80% of these malformations, provided that the conditions for ultrasound are satisfactory** (i.e. amount of amniotic fluid, appropriate week of gestation).



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When and for whom should these investigations be done? And who are they for?

Extended ultrasound ("Organultraschall") and echocardiography are most informative between 20th (19+0) and 23rd SSW (22+6) week of gestation because at this time almost all fetal organs are fully developed.

In special circumstances an earlier investigation may be appropriate. Sometimes it is necessary to perform serial ultrasounds (i.e. every two weeks) to observe a development over time. This may even be extended into the third trimester.

A doppler ultrasound evaluates the perfusion of the umbilical arteries and the nutrition of the fetus, which is informative at any time of the pregnancy.

All of the above mentioned investigations are recommended in case of:

- Pregnant women 35 years or older
- Families with a history of congenital malformations
- Maternal diseases such as diabetes or high blood pressure
- The use of possibly harmful drugs or any other exposure to toxic substances
- Twins pregnancies or higher grade multiple pregnancies
- Suspicion of fetal malformations or disease
- Pregnancies following IVF treatment
- Complications in preceding pregnancies
- Suspicion of fetal infections, abnormal amniotic fluid
- Growth retardation

Aside from these medical reasons you may ask for the investigation as a personal (privately paid) request.

Limitations of the ultrasound

Even with most advanced ultrasound machines and performance by highly specialized and trained physicians, not all fetal diseases or malformations can be detected.

While structures can be investigated, the related functions may be impaired without any visible malformation, i.e. a mental retardation may occur without any structural defects of the brain. Usually metabolic diseases or enzymatic defects cannot be detected.

Very small malformations, such as small septal defects in the heart, may escape detection.

Generally, genetic conditions (chromosomal abnormalities, DNA mutations) cannot be diagnosed by ultrasound alone. However, these diseases often lead to anatomical abnormalities, which then suggest further specific investigations.

Finally, there are fetal diseases or malformations which only develop late in the pregnancy and hence cannot be seen in the organ scan in weeks 20/21.

Examples for this are stenosis of the gastrointestinal tract or some form of skeletal dysplasias.

Occasionally conditions for the ultrasound are difficult and thereby hinder a thorough investigation. Factors contributing to this are maternal adipositas, little amniotic fluid, twin gestation, unfavorable positioning of the fetus or a gestational week that is too early or too late.

Thus, even an ultrasound without any pathological findings will not guarantee a healthy child.

Which emotional or psychological consequences might arise from ultrasound findings?

It is important to mention that by far the most ultrasound investigations will show normal results and thus will reduce anxiety of the parents and give comfort for the further pregnancy.

However, if conspicuous results occur which raise the suspicion of a genetic disease or severe malformation, emotional stress and anxiety might arise. It is important to understand that most findings which induce such suspicion are unspecific, i.e. they may be seen as well in healthy fetuses and are just statistical overrepresented in affected fetuses. Thus, giving a final diagnosis may take some time until laboratory results are finished or a follow up ultrasound measurement was done.

Waiting for results while expecting a severe disease might be burdensome and emotionally stressful.

Please consider this early and decide whether you wish for this investigation to happen. None of the prenatal diagnostic tests are mandatory, every test will only be performed upon your request and only after you gave us your written consent.

Just as well you may opt "to not know" or to let investigate only specific aspects. It is up to you to decide, which test results you want to receive and who else (i.e. your local gynecologist) should be informed.

Should there be relevant findings in the ultrasound, we will discuss this with you in depth and will explain any further possibilities of genetic testing or any diagnostic options.

Usually a genetic counseling will take place to give you first hand information from our genetic experts.

Meetings with surgeons, pediatricians or any other specialists may be organized to inform you on any aspects of treatment and/or prognosis of the suspected disease. We will also assist you in receiving psychological and emotional support if deemed helpful by you.

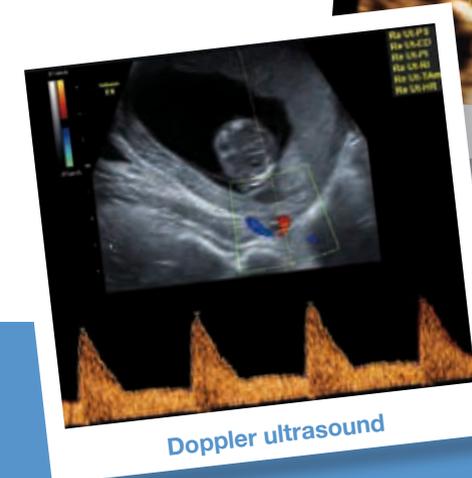
Please do not hesitate to ask our team any questions which have not been addressed here.



2D-ultrasound



Echocardiography



Doppler ultrasound