Ultrasound Screening for Hip Dysplasia of the Newborn

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The purpose of this sheet is to inform you about the pathology and to present the various treatment options, if available. Please note that this sheet is for informational purposes only; each case is different and a physician examination and instructions is obligatory.

1. What is Hip Dysplasia?

Developmental Dysplasia of the Hip (DDH) occurs approximately in 10 out of 1000 children. There are large variations within different ethnical groups and geographical regions. It includes a variety of conditions ranging from immaturity of the hip joint at birth, laxity or instability of the hip joint to complete dislocation of the joint. The condition is often clinically silent and might easily be missed.

2. Are there any risk factors for DDH?

The most important risk factors known to date are:
-positive family history
-female sex
-breech position
-tight conditions in utero

3. How can DDH be detected?

Clinical examination – every child should be examined clinically after birth. There are signs, which can be suspicious for DDH such as leg length discrepancy, limited range of motion of the hip, asymmetry of skin folds or hip clicking. However, those signs are uncertain and not specific.

Ultrasound – Ultrasound of the hip of the newborn is an excellent tool to investigate the hip joint. In the newborn larger parts of the hip are still cartilaginous and will ossify later on. Ultrasound waves can penetrate the cartilaginous structures and is able to produce an image of the baby´s hip joint.

Ultrasound does not hurt, has no risk of radiation and is commonly available. The strength of hip ultrasound is, that we can identify immature or dysplastic hips, also when no clinical signs are present.

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Immature hips, which are very common in babies, don´t need treatment but are observed by further ultrasound check-ups until the hips joint shows a full maturation in the ultrasound. Hip joints, which develop too slowly are at risk for persistent DDH and need treatment. Also unstable hip joints and dislocated hip joints need to be treated immediately.

4. How does hip ultrasound work?

There are several methods to investigate a newborn´s hip by ultrasound. A reproduceable and reliable method is the one by Graf (Reference), when performed by a well-trained examiner. It is carried out in a standardized procedure. The most important step is the correct positioning of the baby in a special positioning device (Figure 1). A guide arm for the ultrasound detector helps to avoid tilting of the detector which can compromise results. Both hips are examined and the anatomical structures of the hip are evaluated. The inclination of the bony and cartilaginous parts of the hip socket as well as the amount of coverage of the femoral head are measured and categorized.

Figure 1. The baby is examined using a guide arm and a special positioning device

According to Graf´s classification there are 4 types of hip joints. The type of possible treatment is directly related to the type of hip joint.

Type I – stable and mature hip joint, no treatment needed
Type II – immature hip joint – needs observation. Treatment is needed if instability is present or development is slower than it should be.
Type III – first stage of dislocation, needs treatment
Type IV – more severe stage of dislocation needs treatment

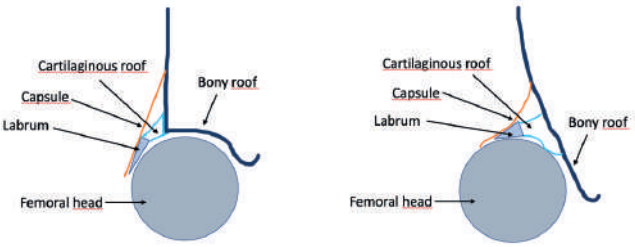

Figure 2. Schematic drawing of hip joints
Left image: Type I hip with a well-developed bony and cartilaginous roof, which sufficiently covers the femoral head and provides stability from above
Right image: Type III hip with a poorly developed flat bony roof, which does not provide stability. The femoral head slides in a upward direction and the cartilaginous roof is displaced, which results in dislocation of the hip joint.

5. When should the ultrasound be performed?

Early diagnosis is the key to prevent future problems in your baby´s hip. The hip joint has its greatest growth potential in the first six weeks of life. Ideally, every newborn should be screened by ultrasound of the hip. In Europe, many countries have implemented a general screening program for hip dysplasia. The screening ultrasound should be performed in the first 6 weeks of life. If risk factors are present, it is recommended to perform the ultrasound investigation earlier, ideally in the first week of life.

6. Who performs hip ultrasound?

It depends of the country and health care system which professionals perform hip ultrasound of the newborn. The examiner should be educated in the ultrasound method of Graf, as the quality of the result is very much dependent on the correct technique and interpretation of the images. Orthopedic surgeons, pediatricians, radiologists or qualified technicians like sonographers are offering the examinantion depending on the country´s health care system.

7. How can we treat DDH of the newborn?

The type of treatment depends on the type of DDH detected by ultrasound. Most of the cases are treated conservatively. Stable but immature hips need no treatment in the first six weeks. However, after six weeks, these immature hips (or unstable centered hips) are treated in an abduction brace, which supports the natural position of a newborn´s hip a frog position (Figure 3). In this position the femoral head is located in the center of the hip joint, there is no pressure on the roof and the immature socket can develop to a perfect shape. Dislocated hips need to be reduced, in other words the femoral head is positioned back into the socket. This can be

achieved gradually by a so called Pavlik harness or by manual manipulation of the hip. Then, the hip needs to be held in position until the socket develops and coverage of the femoral head is sufficient. In those cases a Pavlik harness or cast is used. The treatment is continued until the hip is fully mature (Type I according to Graf).

Figure 3.
Example of a brace (Tübinger BraceTM) which helps to position the hips joint in a frog position.

8. Do we need to follow-up on our patients after treatment?

Yes. It is very important to observe the further development of treated hip joints. Clinical examination and X rays (for severer cases) are recommended when the child starts to walk, in preschool age, just before puberty and at the end of growth. This is done, because sometimes those hip joints grow too slow and develop residual dysplasia which might require further treatment.

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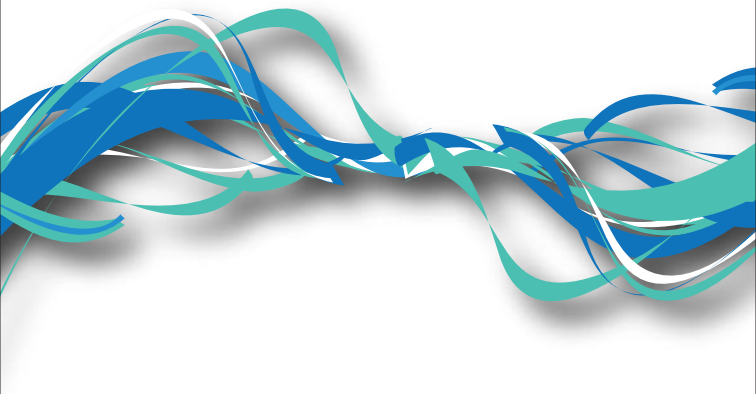

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