European Society of Paediatric Radiology’s  
Task force group on DDH  
Recommendations on hip screening

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Although there is no statistically significant evidence that ultrasound screening may reduce the number of late DDH and the need for surgery, different strategies have been introduced in several European countries during the last 10-15 years. Graf’s method or a modification of this including assessment of both hip morphology and stability has been shown to be feasible and accurate, and there is an increasing bulk of knowledge on the significance of the different ultrasound findings for the later hip-development. However, at present there is no consensus on ultrasound technique, screening strategies or indications for treatment, although there is a substantial amount of knowledge upon which crude guidelines could be given.

The DDH task force group has therefore set out to- based on available literature - provide recommendations on

1. a standard ultrasound technique for the assessment of DDH
2. a standardised report form
3. a feasible screening strategy
4. training and accreditation schedules

1. **Ultrasound technique.** A combined technique assessing both acetabular morphology and hip stability is advised (1). Although there is a strong association between hip morphology and stability, morphologically normal hips may be unstable and vice versa (2). Hip morphology should be assessed using Graf’s coronal standard section through the acetabulum (3;4), while hip stability may be assessed using different views (coronal, axial) (5;6). If alternative techniques are to be used, such as the pubo-femoral distance (Dr. C.Treguier, personal communication), appropriate validation should be performed.

2. **Standardised report form.** Should include indications for the examination, nosological data, including gestational age and age at both clinical and ultrasound examination, clinical findings (if possible), ultrasound findings for each of the hips separately and recommendations for further management (**Appendix1**). The information will allow for future research (multicentre studies).

3. **Screening strategy.** Based on soft evidence that ultrasound screening tends to reduce the rate of late DDH and the need for surgical interventions, different screening strategies including universal or selective ultrasound screening have been established in several European countries and centres during the last decade (1;7-9). For a screening test to be clinically valid the results have to be comprehensive and applicable for further decision-making. During the last 25 years, the significance of acetabular dysplasia as described by Graf has been examined in a substantial number of studies. From population based studies we have learned that around 75-85% of newborns have morphologically normal hips, 13-25% have immature while 2-4% have dysplastic hips (2;10-13). One study reports a high
association between hip morphology and stability, with only 0.1% of morphologically hips being discocatable, vs. 0.6% of immature, 62% of slightly dysplastic and almost 100% of severely dysplastic hips (2). Several studies show that morphologically normal hips tend to remain normal with or without a coexisting instability, 97% of sonographically immature hips tend to normalize spontaneously within 3 months and that there is a similar pattern for mildly dysplastic but stable hips (14-17). A recent 6-year follow-up of mildly dysplastic and potentially unstable hips showed no difference in radiographic outcome at six years of age between children allocated to initial splintage for six weeks and those offered active sonographic surveillance. The delayed acetabular ossification or persistent dysplasia seen in a third of infants from both groups at one year of age had completely resolved in all but one of the females from the treatment group (18).

Thus, in areas with a high prevalence of late DDH, we recommend selective ultrasound screening, given a high quality US screening can be provided. If selective screening has no effect on the prevalence of late cases, universal screening should be considered.

Selective screening should include newborns with risk factors for DDH, namely
1) a family history of DDH (confined to at least one first degree relative or two second degree relatives treated for DDH)
2) breech presentation, foot deformities
3) positive/equivocal clinical findings

By using the above mentioned risk factors, between 12-16% of all newborns will be defined as “at risk”.

An algorithm for selective ultrasound screening has been proposed (Appendix 2). The first examination of those clinically unstable should be performed at birth, or before 2 weeks of age, to diagnose those most severely affected – thus in need of immediate treatment. Based on the initial findings, different actions are suggested - see Appendix 2.

4. Training and accreditation schedules. Those performing hip ultrasound should undergo practical and theoretical teaching and training:
   a. Performed 200 hip examinations under direct supervision
   b. Performed 200 examinations under indirect supervision

Competency audits to be performed annually.

Reference List


## Appendix 1. Proposed DDH SCREENING ULTRASOUND REPORT FORM

<table>
<thead>
<tr>
<th>Patient name:</th>
<th>Date of birth:</th>
<th>Date of scan:</th>
<th>Referrer:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gestational age (completed weeks):</td>
<td>Clinical findings at birth; right hip:</td>
<td>left hip:</td>
<td></td>
</tr>
</tbody>
</table>

**Indication for scan:** Breech / Family History (if yes - WHO: ………………………………. / Clinical / other)

### HIP

<table>
<thead>
<tr>
<th><strong>Bony Acetabular Morphology</strong></th>
<th><strong>RIGHT</strong></th>
<th><strong>LEFT</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Good</td>
<td>A. Good</td>
<td></td>
</tr>
<tr>
<td>B. deficient / Rounded</td>
<td>B. Deficient / Rounded</td>
<td></td>
</tr>
<tr>
<td>C/D. Mild/Severe Dysplasia</td>
<td>C/D. Mild/Severe Dysplasia</td>
<td></td>
</tr>
</tbody>
</table>

- **alpha angle =**

### Position / Stability

**Dynamic assessment**

<table>
<thead>
<tr>
<th>Stable</th>
<th>Unstable</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Subluxable</td>
</tr>
<tr>
<td></td>
<td>Dislocatable</td>
</tr>
<tr>
<td></td>
<td>Dislocated (reducible)</td>
</tr>
<tr>
<td></td>
<td>Dislocated (irreducible)</td>
</tr>
</tbody>
</table>

- **β angle (optional) =**

### Category

<table>
<thead>
<tr>
<th>Normal (A, and α ≥ 60°)</th>
<th>Immature (B, and 50° ≤ α &lt; 60°)</th>
<th>Mild Dysplasia (C, and 43° ≤ α &lt; 50°)</th>
<th>Severe Dysplasia (D, and α &lt;43°)</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Graft Type (optional)</th>
<th>I</th>
<th>IIa,b</th>
<th>IIc,D</th>
<th>III</th>
<th>IV</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>I</td>
<td>IIa,b</td>
<td>IIc,D</td>
<td>III</td>
<td>IV</td>
</tr>
</tbody>
</table>

### Management plan

**Manage according to worst hip**

- **Refer for expert opinion:** (open for local adjustments)
  1. All babies with any degree of hip instability
  2. All babies with hips showing a severely dysplastic acetabulum and / or an alpha angle <43°
  3. All babies older than 6 weeks of age with deteriorating hips or an alpha angle ≤55°

- **Arrange follow up at 6 weeks:** (open for local adjustments)
  1. All babies with mildly dysplastic, but stable hips

- **Discharge babies:** (open for local adjustments)
  Hips are stable and morphologically normal, with alpha angles ≥ 58

### Comments