
About developmental dysplasia of the hip
- 1 to 2 babies in 1000 will have hip dysplasia.
- 20 in 1000 will have unstable hips or some sort of risk factors. Most of these will resolve by 9 weeks of age.
- Developmental dysplasia may progress over a period of time:
  - It may not be present at birth, but develops as the baby grows.
  - In 75% of cases the left hip is affected, due to the position of the hip in relation to the mother’s spine in utero.

Assessment
1. DDH can usually be detected by careful clinical examination, investigations, and a high level of suspicion based on risk factors.

Risk factors
- Breech delivery or presentation.
- Family history of DDH, especially if in a parent or sibling
- Female baby (DDH is four times more likely to occur in a female infant)
- Large baby (> 4 kg)
- Overdue > 42 weeks
- Oligohydramnios: Associated with plagiocephaly, torticollis, and foot deformities.
- First born baby or multiple pregnancies

If breech, family history, or a total of 4 or more of any risk factors refer for ultrasound at 6 weeks.
  - Reliability of the physical examination changes as the child grows, so examination techniques vary depending on the age of the child.
  - Perform the examination when the child is calm and relaxed. If the child is crying or not sufficiently relaxed, then the test result may be false negative, due to resistance of the child to the passive movement.

2. If age 0 to 3 months:

- **Ortolani test (reduction test)**
  1. Place the infant supine.
  2. The baby’s thighs are held with the thumbs medially and the fingers resting on the greater trochanters
  3. The hips are flexed to 90 degrees and gently abducted
  4. Normally there is smooth abduction to almost 90 degrees
  5. If the hip is dislocated the movement is usually impeded, but if pressure is applied to the greater trochanter there is a soft ‘clunk’ as the dislocation reduces, and then the hip abducts fully (the ‘jerk of entry’).
  6. If abduction stops halfway and there is no jerk of entry, there may be an irreducible dislocation.
  7. Repeat the test on the opposite hip.
This test usually becomes negative after 2 months of age.

Education resource: The Royal Children's Hospital Melbourne - Developmental Dysplasia of the Hip video (3:10 click on Education module, then click on Instability and dislocation to locate the demonstration of Ortolani & Barlow tests). Note: Video may not play on Apple devices.

- **Barlow test (stress test)**
  - Flex the hips and knees of the supine infant to 90°.
  - Barlow’s test is performed in a similar manner to Ortolani’s test, but here the examiner’s thumb is placed in the groin and, by grasping the upper thigh, an attempt is made to lever the femoral head in and out of the acetabulum during abduction and adduction.
  - If the femoral head is normally in the reduced position, but can be made to slip out of the socket and back in again, the hip is classed as ‘dislocatable’ (i.e. unstable). It will be felt as a palpable clunk or sensation of movement. The test is considered positive.

Education resource: The Royal Children's Hospital Melbourne - Developmental Dysplasia of the Hip video (3:10 click on Education module, then click on Instability and dislocation to locate the demonstration of Ortolani & Barlow tests). Note: Video may not play on Apple devices.

Note: After 3 months of age, the Ortolani and Barlow tests may be difficult to elicit. Therefore, the additional screening techniques (outlined below), used in combination with the Ortolani and Barlow tests, are necessary. These techniques may also be used with infants 0 to 3 months of age.

3. **Check for:**
   - **Restricted abduction at the hips**
     Limited unilateral abduction is the most sensitive sign associated with DDH in the older infant.
     1. Place the infant supine, on a firm, flat surface.
     2. With the pelvis stabilised, and hips and knees at 90°, gently abduct and adduct the hips to check for restricted range of motion.
        - Perform this manoeuvre gradually. It may need to be repeated a number of times to ensure an accurate result.
        - Normal range of motion at the hip is abduction to 60° or more. A range less than this suggests DDH.
   
   - **Leg length discrepancy**
     Assess total leg length discrepancy in prone with hips and knees extended. Also perform the Galeazzi test:
     - Place infant supine, on a firm, flat surface with the pelvis stabilised and level.
     - Flex hips to 90° and place in neutral adduction/abduction, with knees in flexion.
     - In this position, assess the vertical level of the knees for asymmetry.

   - **Asymmetrical thigh and gluteal skin folds**
     - With the infant in prone, check for asymmetrical thigh or gluteal folds.
     - Note that asymmetrical skin folds alone do not constitute a diagnosis of DDH however, this information can be used in combination with other physical signs during assessment.
4. If older walking children:
   o May see a limp or the child may toe-walk on the affected side.
   o Increased lumbar lordosis, prominent buttocks, or a waddling gait may indicate DDH is present in both hips.

Management
1. If normal hips on examination and no risk factors, monitor following the Blue Book recommendations or equivalent.
   o Assess hips at birth then check at 1 to 4 weeks, at 6 to 8 weeks, then at 6 months.
   o Evaluate gait at 18 months and 2 years.

2. If normal hips with risk factors, refer for ultrasound at 6 weeks, or as below.
   Risk factors
   o Breech delivery or presentation.
   o Family history of DDH, especially if in a parent or sibling
   o Female baby (DDH is four times more likely to occur in a female infant)
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   If breech, family history, or a total of 4 or more of any risk factors refer for ultrasound at 6 weeks.

3. If subluxateable hips or soft signs for DDH, and ongoing concerns, refer for imaging as below.

   Babies with soft signs for DDH
   These soft signs were previously thought to be indicators of abnormality, but more than 95% of babies with these findings will have normal hips:
   o Asymmetric thigh or buttock creases.
     ▪ These are not pathological in themselves and are common but may point to a dislocated hip.
     ▪ Limb length difference better indicator than asymmetrical creases and can be an indicator of DDH.
   o Hip clicks (high pitched).
   o Slight differences in limb lengths that may be difficult to detect on repeat examination. They are best examined with hip and knee flexed at 90° looking at knee height.

   With these soft signs, general practitioners may confidently feel that the hip joints are stable, and no referral is necessary.
   If the examination was sub-optimal or there are any ongoing concerns, re-examine in one week and/or refer for imaging, as below.

4. If a dislocated or dislocatable hip on Ortolani or Barlow’s test with a distinct hip ‘clunk’ reduction, refer to a Paediatric Orthopaedic Specialist urgently.
   Note: It is recommended that all useful ultrasounds for the diagnosis of subluxation are done between 6 to 16 weeks of age (corrected).

Imaging
   Practice Point!
   Between 4 and 6 months of age, bone maturity may make an ultrasound unreliable, so an X-ray may be required depending on ultrasound result. Be mindful to minimise any unnecessary radiation.
If < 6 weeks old (corrected age), ultrasound is not always recommended as hips are immature, giving false positive results.

1. If risk factors, soft signs for DDH, or positive Ortolani or Barlow’s test, refer for imaging:
   Referral for imaging
   - Private radiology providers
   - Imaging and Radiology Diagnostic Services (public)
   - For age 6 weeks to 6 months, refer for an ultrasound.
   - For age ≥ 6 months, refer for an X-ray.

2. Imaging results:
   - If age < 6 months, manage with the assistance of ultrasound results.
     Management according to ultrasound result

<table>
<thead>
<tr>
<th>Ultrasound classification</th>
<th>Alpha angle</th>
<th>Recommended treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ia</td>
<td>≥ 60°</td>
<td>Normal, no treatment. Follow-up as per Blue Book</td>
</tr>
<tr>
<td>Ib</td>
<td>≥ 60°</td>
<td>Normal, no treatment. Follow-up as per Blue Book</td>
</tr>
<tr>
<td>IIa</td>
<td>50 to 59°</td>
<td>Age ≤ 12 weeks, physiological immaturity. Requires follow-up at 12 weeks - repeat ultrasound and clinical examination.</td>
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<tr>
<td>IIb</td>
<td>50 to 59°</td>
<td>Age &gt; 12 weeks, delayed ossification. Abnormal hips, refer to paediatric orthopaedic specialist, as below.</td>
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<tr>
<td>IIc</td>
<td>43 to 49°</td>
<td>Abnormal hips, refer to paediatric orthopaedic specialist, as below.</td>
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<tr>
<td>D</td>
<td>43 to 49°</td>
<td>Decentering - refer to pediatric orthopaedic specialist, via Children’s Health. Before sending a referral, phone and discuss with the Paediatric Orthopaedic Registrar urgently via John Hunter Hospital switch (02) 4921-3000.</td>
</tr>
<tr>
<td>IIIa</td>
<td>&lt; 43°</td>
<td>Decentering - refer to paediatric orthopaedic specialist, via Children’s Health. Before sending a referral, phone and discuss with the Paediatric Orthopaedic Registrar urgently via John Hunter Hospital switch (02) 4921-3000.</td>
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</tr>
<tr>
<td>IV</td>
<td>&lt; 43°</td>
<td>Grossly abnormal dislocated hip, bracing may not be effective. Refer to paediatric orthopaedic specialist, via Children’s Health. Before sending a referral, phone and discuss with the Paediatric Orthopaedic Registrar urgently via John Hunter Hospital switch (02) 4921-3000.</td>
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Adapted from Graf R. Hip Sonography – Diagnosis and Management of Infant Hip Dysplasia 2006, Page 41.

- If a normal X-ray rules out DDH as the cause of the limited hip abduction, short leg, or limp, there may be other causes for these findings:
  - If on re-examination there are ongoing concerns, refer to a Paediatric Orthopaedic Specialist, as below.
  - Include the X-ray results and specific abnormal findings with your referral.
Referral

- If abnormal x-rays, positive Ortolani or Barlow's test, or DDH soft signs, refer to a paediatric orthopaedic specialist:

Public

Paediatric Orthopaedic Specialists:

- Paediatric Orthopaedic Specialists:

  John Hunter Hospital General Paediatric Orthopaedic Clinics

Private paediatric orthopaedic specialists

Private

- All referrals require standard information.
  Referral to Children’s Health Information Required
  Include these details in your referral:
  - Specialist name
  - Child's full name, address, and date of birth
  - Phone and mobile number
  - Gender
  - Medicare number
  - Description of problem requiring opinion
  - For general paediatric non-specific referrals:
    Note: Recent consultation notes are not a suitable substitute for a referral letter. Please do not make simultaneous referrals to other departments for the same problem when referring to Child Health Services as this can lead to multiple appointments for the same condition.
  - Children, Young People, and Families Health Services provide a number of referral form templates.
  - For phone advice regarding referral contact Paediatric Orthopaedics GP Liaison.

Supported by EReferrals

Information

Clinical Resources

- Education resource: The Royal Children's Hospital Melbourne - Developmental Dysplasia of the Hip video (3:10 click on Education module, then click on Instability and dislocation to locate the demonstration of Ortolani & Barlow tests). Note: Video may not play on Apple devices.
- NHS - Screening Hips of Newborns in Scotland

Patient Information

Developmental Dysplasia of the Hip Fact Sheet – The Sydney Children’s Hospital Network