

## **PEDIATRIC HIP ULTRASOUND PROTOCOL**

**Purpose:** To evaluate the infant hip for developmental dysplasia and/or subluxation.

**Transducer:** L9-3, or L12-5

All transducers are to be cleaned after each patient.

A germicidal wipe is to be used after any infectious exposure.

**Preparation:** No patient prep necessary

**Technique and Patient Position:** Patient is in the supine or lateral position with the affected knee flexed.

### **Objectives:**

- Obtain patient history (gender, breech birth, family history, maternal oligohydramnios, etc.)
- Obtain any prior studies to use as comparison.
- Evaluate the infant hip for dysplasia.
- Evaluate for subluxation or dislocation of the femoral head utilizing non-stress and stress techniques (unless contraindicated).

### **Procedure:**

1. In the coronal plane, ensuring that the ilium is horizontal across the screen and there is visualization of the triradiate cartilage and the ischium.
2. Obtain coronal images of the hip joint without stress in a neutral (15-20° flexion) or flexed position to include the following with appropriate annotation on the screen:
  - Demonstrate the femoral head within the acetabulum.
  - Establish the base line: along the ilium, through the femoral head.
  - Establish the roof line: parallel to the acetabular roof intersecting the baseline
  - Establish the line of inclination: across the top of the femoral head, through the labrum and intersecting the 1st two lines.
  - Document the  $\alpha$  and  $\beta$  angles ( $\alpha > 60^\circ$  and  $\beta < 55^\circ$  is considered normal by Graf's Classification).
  - Measure the circumference of the femoral head (>50%).
3. Obtain coronal images of the hip joint with stress in a flexed position
  - Include a cine-loop to document stress maneuvers.
4. In the transverse plane with the hip flexed at 90°, obtain images of the femoral head within the acetabulum without and with stress and include appropriate annotation on the screen.
  - If the relationship of the femoral head and the posterior acetabulum changes with gentle stress, the hip is unstable.

**NOTE:** Stress maneuvers are only done after 40 weeks gestation and 2 weeks of age. If baby is born at 34 weeks, stress maneuvers would not be performed until baby is 8 weeks old (40 weeks + 2 weeks). Stress maneuvers will not be performed in the infant is in a corrective harness or brace.

The American Academy of Pediatrics official stance is to wait until six weeks (adjusting for prematurity) in almost all cases (with the exception of an Ortolani-positive test which should prompt an Ortho consult). When an imaging study is indicated, whether by risk factors or by suspicious physical examination, it is best to defer diagnostic hip ultrasound until age 6 weeks (adjust for prematurity) or plain anteroposterior pelvis radiograph at ages 4-6 months. Ultrasonography may be done earlier in guiding *treatment* of an Ortolani-positive hip. Initial diagnostic ultrasound usually is deferred until after age 6 weeks because of the high rate of false positives or immature hips, which spontaneously resolve most often by age 6 weeks. Six weeks is a very good cutoff with only rare exceptions when the test is ordered specifically by pediatric orthopedists claiming that it could alter treatment.

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### Required Images

Longitudinal/Coronal images with (unless contraindicated) and without stress to include:

- Femoral head within the acetabulum.
- Establish the base line, roof line and line of inclination
- Measure the  $\alpha$  and  $\beta$  angles
- Measure the circumference of the femoral head
- Cine-loop to document stress maneuvers in real time Transvers
- Image of femoral head within acetabulum with and without stress