

2 **Anatomy and Ultrasound of the Normal Infant Hip Joint**



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2.1 Explanation of Terminology Used in Describing the Ultrasound Anatomy

Echo hole:

(“Sound hole”) anechoic or hypoechoic area caused by tissues with low echogenicity (reflectivity), e.g. hyaline cartilage

Echo shadow or acoustic shadow:

anechoic area caused by total reflection of the ultrasound beam, e.g. bone

2.2 Ultrasound Characteristics of the Different Tissues in the Region of the Hip Joint

Bone: Seen as a bright echo with an acoustic shadow behind it. This is because bone is highly reflective and blocks the through transmission of the ultrasound beam, preventing structures deep to the bone being seen by ultrasound.

Relevant structures in the region of the hip joint are where the bone meets cartilage:

- The ilium immediately above the acetabulum.
- The lower limb of the os ilium in the floor of the acetabular fossa.
- Femoral head ossific nucleus (when present)
- The bony ischium.

Collagenous Connective Tissue and Fibrocartilaginous Structures: These are highly echogenic but echolucent allowing through transmission of the ultrasound beam so that structures deep to them can be seen.

These are:

- The joint capsule and the synovial (capsular) fold.
- The perichondrium of the cartilaginous acetabular roof and of the greater trochanter.
- The acetabular labrum.

- The ligamentum teres and the fovea in the femoral head.
- The intermuscular septa and the tendons of the reflex head of the rectus femoris muscle.
- The transverse acetabular ligament.

Ossification Within Hyaline Cartilage: Developing blood vessels and the condensation of cells that precede ossification give bright echoes but are sonolucent. These occur within the femoral head and at the chondro-osseous junction in the acetabular roof. These must be differentiated from the echoes that can occur in the hyaline cartilage roof of decentred hip joints when fibrocartilaginous degeneration caused by pathological pressure and shearing occurs.

Fat and Fibrous Connective Tissue: Usually give few or weak echoes, sometimes fat may be anechoic. In the infant hip fatty tissue may be seen as a hypoechoic zone in the acetabular fossa between the lower limb of the os ilium and the ligamentum teres or between the insertion of the joint capsule and the reflex head of the rectus femoris muscle.

Hyaline Cartilage: Is hypoechoic or anechoic (depending on machine settings). The sinusoidal vessels may be seen as faint serpiginous echoes.

Hyaline cartilage is found in:

- The femoral head, proximal femoral neck and greater trochanter of the femur.
- The cartilaginous portion of the acetabular roof.
- The lunate surface of the acetabulum.
- The triradiate cartilage.

2.3 The Proximal Femur in Hip Ultrasound

At birth the femoral head, greater trochanter and “hat-shaped” proximal portion of the femoral