Ultrasound Abdomen

Liver – The evaluation of the liver includes both long axis and transverse views. The liver parenchyma is evaluated for possible diffuse or focal abnormalities. The echogenicity of the liver compared to the right kidney should be performed whenever possible. The aorta in the region of the liver should be evaluated as well as the IVC where it passes through the liver. Evaluation should be done of the regions of the ligamentum teres, right hemidiaphragm, dome of the right lobe, and the right pleural space. The right and left portal vein branches and the hepatic veins should be seen within both lobes of the liver.

Gallbladder and Biliary Tree – Evaluation of the gallbladder includes both long axis and transverse views. The gallbladder is evaluated with the patient supine and in the left lateral decubitus positions, with additional patient positions as necessary. The gallbladder is evaluated for possible stones, polyps, or other masses and the mobility of these if found. The intrahepatic and extrahepatic bile ducts are evaluated for possible dilatation or any other abnormalities. Evaluation of the common bile duct in the head of the pancreas is done whenever possible.

Pancreas – The head, uncinate process, and body of the pancreas are evaluated transversely. When possible the tail of the pancreas is also evaluated. In the head of the pancreas the distal common bile duct and the gastroduodenal artery are evaluated. The pancreas and peripancreatic region are assessed for any fluid collections, adenopathy, vascular abnormalities, or masses.

Spleen – The spleen is evaluated in both long axis and transverse views. It is measured in long axis, transverse axis, and anterior to posterior diameter. When possible the echogenicity of the left kidney compared to the spleen is performed as well as the left pleural space.

Kidneys – The kidneys are evaluated in long axis visualizing the cortex and renal pelvis. The maximum length of each kidney is recorded. Transverse views of both kidneys include the upper pole, midsection including the renal pelvis, and the lower pole.

Aorta and IVC – The aorta and IVC are evaluated in long axis and transverse views. Any aneurysmal dilatation of the aorta is measured in AP and transverse diameters.

Reviewed by Dr. Heggen 7/2017

Subject to change at the discretion of the radiologist due to clinical circumstances.

Abdomen Ultrasound Cont.

The following images represent a COMPLETE upper abdominal ultrasound exam. Additional images may be necessary for proper documentation.

Aorta

- Long – Measure
  - Proximal
  - Mid
  - Distal
- Trans – Measure
  - Proximal
  - Mid
  - Distal
  - Bifurcation
- Document any abnormality

Pancreas

- Document head, body and tail, if possible
- Document portal flow with color

IVC

- Long – with color – annotate as IVC

Liver

- Long
  - Left lobe lateral
  - Left lobe medial
  - Left lobe with caudate and IVC
  - Right lobe lateral with measurement to include image of right kidney
  - Right lobe mid
  - Right lobe medial to include color image of portal vein
- Trans
  - Left lobe superior
  - Left lobe mid
  - Left lobe inferior
  - Right lobe dome
  - Right lobe hepatic veins
  - Right lobe mid
  - Right lobe inferior

Gallbladder

- Supine
  - Document in long and transverse – several images

Reviewed by Dr. Heggen 7/2017

Subject to change at the discretion of the radiologist due to clinical circumstances.

Abdomen Ultrasound Cont.

- LLD
    - Document in long and transverse – several images
    - Measure gallbladder wall

CBD

- Measure - with color, if able

Right Kidney

- Long
    - Medial
    - Mid with measurement
    - Lateral
- Trans
    - Superior
    - Mid with measurement
    - Inferior

Left Kidney

- Long
    - Medial
    - Mid with measurement
    - Lateral
- Trans
    - Superior
    - Mid with measurement
    - Inferior

Spleen

- Long
    - Measure long and AP
- Trans
    - Measure

Document and measure all pathology
Annotate all images

Reviewed by Dr. Heggen 7/2017

Subject to change at the discretion of the radiologist due to clinical circumstances.

Abdomen Ultrasound Cont.

The following images represent a LIMITED (RUQ) upper abdominal ultrasound exam. Additional images may be necessary for proper documentation.

Aorta

- Long – measure
  - Proximal
  - Mid
  - Distal
- Trans – measure
  - Proximal
  - Mid
  - Distal
  - Bifurcation
- Document any abnormality

Pancreas

- Document head, body and tail, if possible
- Document portal flow with color

IVC

- Long – with color – annotate as IVC

Liver

- Long
  - Left lobe lateral
  - Left lobe medial
  - Left lobe with caudate and IVC
  - Right lobe lateral with measurement to include image of right kidney
  - Right lobe mid
  - Right lobe medial to include color image of portal vein
- Trans
  - Left lobe superior
  - Left lobe mid
  - Left lobe inferior
  - Right lobe dome
  - Right lobe hepatic veins
  - Right lobe mid
  - Right lobe inferior

Gallbladder

- Supine
  - Document in long and transverse – several images

Reviewed by Dr. Heggen 7/2017

Subject to change at the discretion of the radiologist due to clinical circumstances.

Abdomen Ultrasound Cont.

- LLD
    - Document in long and transverse – several images
    - Measure gallbladder wall

CBD

- Measure - with color, if able

Right Kidney

- Long
    - Medial
    - Mid with measurement
    - Lateral
- Trans
    - Superior
    - Mid with measurement
    - Inferior

Document and measure all pathology
Annotate all images

Reviewed by Dr. Heggen 7/2017

Subject to change at the discretion of the radiologist due to clinical circumstances.

Abdomen Ultrasound Cont.

The following images represent a LIMITED (LUQ) upper abdominal ultrasound exam. Additional images may be necessary for proper documentation.

Left Kidney

- Long
  - Medial
  - Mid with measurement
  - Lateral
- Trans
  - Superior
  - Mid with measurement
  - Inferior

Spleen

- Long
  - Measure long and AP
- Trans
  - Measure and color

Document and measure all pathology
Annotate all images

Reviewed by Dr. Heggen 7/2017

Subject to change at the discretion of the radiologist due to clinical circumstances.

Ultrasound Aorta

The following images represent an Aorta ultrasound exam. Additional images may be necessary for proper documentation.

Aorta - The abdominal aorta is imaged in long axis and transverse views. The aorta should be evaluated from the diaphragm to the bifurcation. Any aneurysmal dilatation of the aorta is measured in AP and transverse diameters. The common iliac arteries are also.

Longitudinal with Measurements

- Proximal
- Mid
- Distal
- Bifurcation
- Right Iliac
- Left Iliac

Transverse with Measurements

- Proximal
- Mid
- Distal
- Bifurcation
- Right Iliac
- Left Iliac

Color and Spectral Doppler of Proximal, Mid, Distal & both Iliacs with proper Doppler angle

All Doppler angles are to not exceed 60 degrees

Document and measure all pathology
Annotate all images

Reviewed by Dr. Hurlbut 7/2017

Subject to change at the discretion of the radiologist due to clinical circumstances.

Ultrasound Breast

The following images represent a Breast ultrasound exam. Additional images may be necessary for proper documentation.

Breast - The breast sonogram should be correlated with clinical signs and/or symptoms and with mammographic and other appropriate breast imaging studies. A lesion or any are of the breast being studied should be viewed in 2 perpendicular projections, and real-time scanning by the interpreter is encouraged.

Images should be labeled, and the location of the lesion should be recorded using:

- Laterality
- Clock-face notation
- Distance from the nipple, measured from the nipple itself
- Orientation of the transducer with respect to the breast (i.e. transvers or longitudinal, radial or antiradial)

The size of the lesion should be determined by recording its maximal dimensions in at least 2 planes:

- Orthogonal planes are recommended
- At least 1 set of images of a lesion should be obtained without calipers
- A set of images of the lesion with color/power Doppler to assess/document vascularity of the lesion is also recommended

Sonographic features are important in accurately characterizing breast masses.

- Shape
- Orientation
- Margins
- Echo pattern
- Posterior acoustic features
- Special characteristics
- Vascularity
- Surrounding tissue

For patients with a palpable lump > 2 cm or any mass suspicious for CA:

- Scan the axilla on diagnostic ultrasound
- Findings required to be dictated in report

Document and measure all pathology
Annotate all images

Reviewed by Dr. Westercamp 3/2018

Subject to change at the discretion of the radiologist due to clinical circumstances.

Ultrasound Carotid

The following images represent a carotid artery ultrasound exam. Additional images may be necessary for proper documentation.

All images are to be performed on both carotids

Transverse

Carotid

- Proximal
- Mid
- Distal
- Bulb / Bifurcation

Longitudinal

Carotid

- Proximal
  - Color
  - Spectral Doppler & Max peak systolic velocities
    - Angle correction to not exceed 60 degrees
- Mid
  - Color
  - Spectral Doppler & Max peak systolic velocities
    - Angle correction to not exceed 60 degrees
- Distal
  - Color
  - Spectral Doppler & Max peak systolic velocities
    - Angle correction to not exceed 60 degrees
- Bulb / Bif
  - Color
  - Spectral Doppler & Max peak systolic velocities
    - Angle correction to not exceed 60 degrees

ICA

- Proximal
  - Color
  - Spectral Doppler & Max peak systolic velocities
    - Angle correction to not exceed 60 degrees
- Mid
  - Color
  - Spectral Doppler & Max peak systolic velocities
    - Angle correction to not exceed 60 degrees

Reviewed by Dr. Hurlbut 7/2017

Subject to change at the discretion of the radiologist due to clinical circumstances.

Carotid Ultrasound Cont.

- Distal
    - Color
    - Spectral Doppler & Max peak systolic velocities
        - Angle correction to not exceed 60 degrees

ECA

- Color
- Spectral Doppler & Max peak systolic velocities
    - Angle correction to not exceed 60 degrees

Vertebral

- Color
- Spectral Doppler & Max peak systolic velocities
    - Angle correction to not exceed 60 degrees

If abnormalities are found, additional images need to be obtained:

- Plaque - location, extent and characteristics documented in both transverse and longitudinal views
- Other vascular or perivascular abnormalities should be documented

If stenosis is found / suspected:

- Color / PW at site of maximum velocity of stenosis
- Color / PW distal to stenosis to document presence or absence of disturbed flow

Stents:

- Color and Doppler proximal, within and distal to stent
    - Record highest velocities

Annotate all images

Reviewed by Dr. Hurlbut 7/2017

Subject to change at the discretion of the radiologist due to clinical circumstances.

Ultrasound Hernia

Definitions:

Indirect inguinal hernia:

A hernia protruding through the abdominal wall via the deep inguinal ring and passes down the inguinal canal lateral to the inferior epigastric artery. In male patients, follow the spermatic cord – spermatic cord runs in the inguinal ring and plunges down into the abdomen at the deep inguinal ring – which is where the indirect inguinal hernias originate from.

Direct inguinal hernia:

A hernia protruding through the abdominal wall via the superficial inguinal ring (Hesselbach's triangle) medial to the inferior epigastric artery and lateral to the rectus muscle.

Femoral hernia:

A hernia through the femoral canal. Extends at least half way over the superior pubic ramus compressing the femoral vein in the cross sectional view.

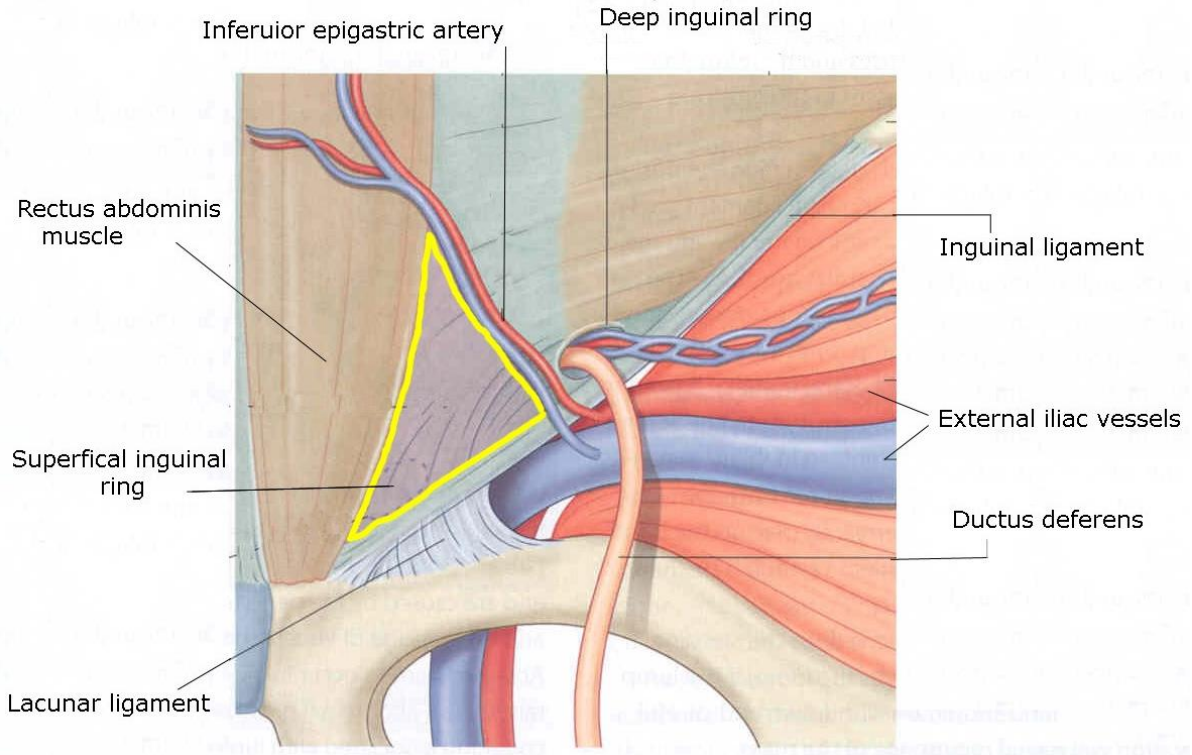


Figure 1. Pelvic anatomy of inguinal area

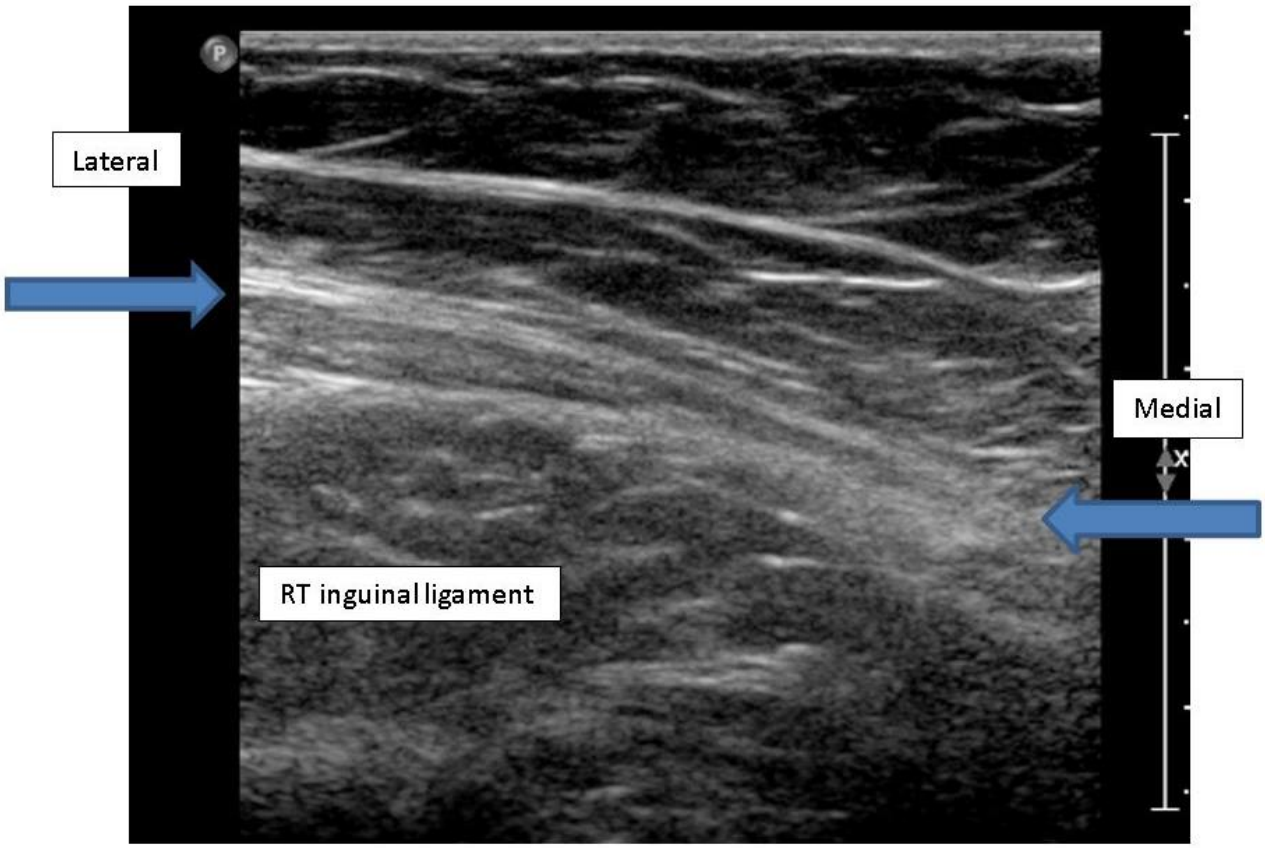


Figure 2. Sonographic appearance of the inguinal ligament

Ultrasound Imaging Documentation:

Provide imaging to rule out indirect, direct and femoral hernias on both sides of the lower abdomen. Images should be obtained in the supine and standing positions.

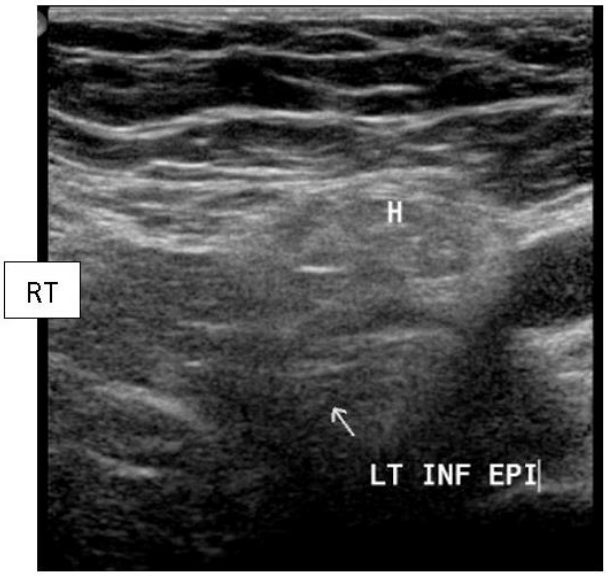
Indirect area documentation:

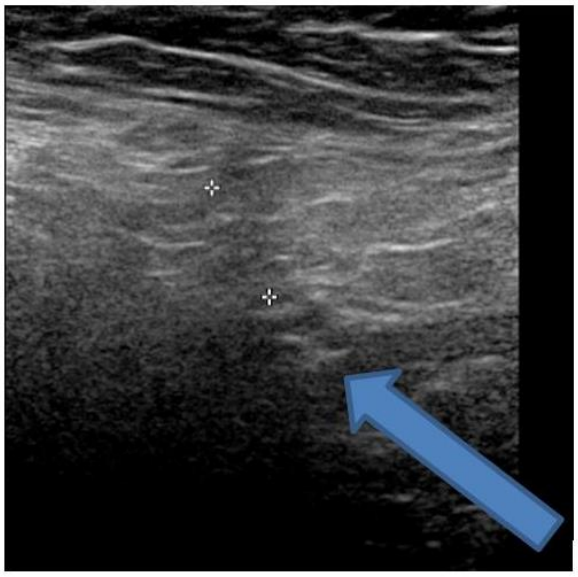
XS images: cross section to the inguinal canal at the level of the inferior epigastric artery

1. At least 2 still images. One with valsalva and one without valsalva.
2. At least one cine clip with valsalva

Sagittal images: sagittal with the inguinal canal at the level of the inferior epigastric artery. Document from the deep inguinal ring to below the inferior epigastric artery.

1. At least 2 still images. One with valsalva and one without valsalva.
2. At least one cine clip with Valsalva





Figures 3a and *Figure 3b*

Figure 3a shows a left indirect inguinal hernia in cross section. The indirect inguinal hernia is located anterior and lateral to the inferior epigastric vessels.

Figure 3b shows a sagittal view of an indirect inguinal hernia exiting the abdominal cavity through deep inguinal ring anterior to the inferior epigastric vessels during valsalva. The white cursors indicate where the indirect hernia enters the deep inguinal ring. The arrow indicates the inferior epigastric vessels.

Direct area documentation:

XS images: cross section to the inguinal canal at the level of the inferior epigastric artery

1. At least 2 still images. One with valsalva and one without valsalva.
2. At least one cine clip with valsalva

Sagittal images: sagittal with the inguinal canal at the level of the inferior epigastric artery. Document from the deep inguinal ring to below the inferior epigastric artery.

1. At least 2 still images. One with valsalva and one without valsalva.
2. At least one cine clip with Valsalva

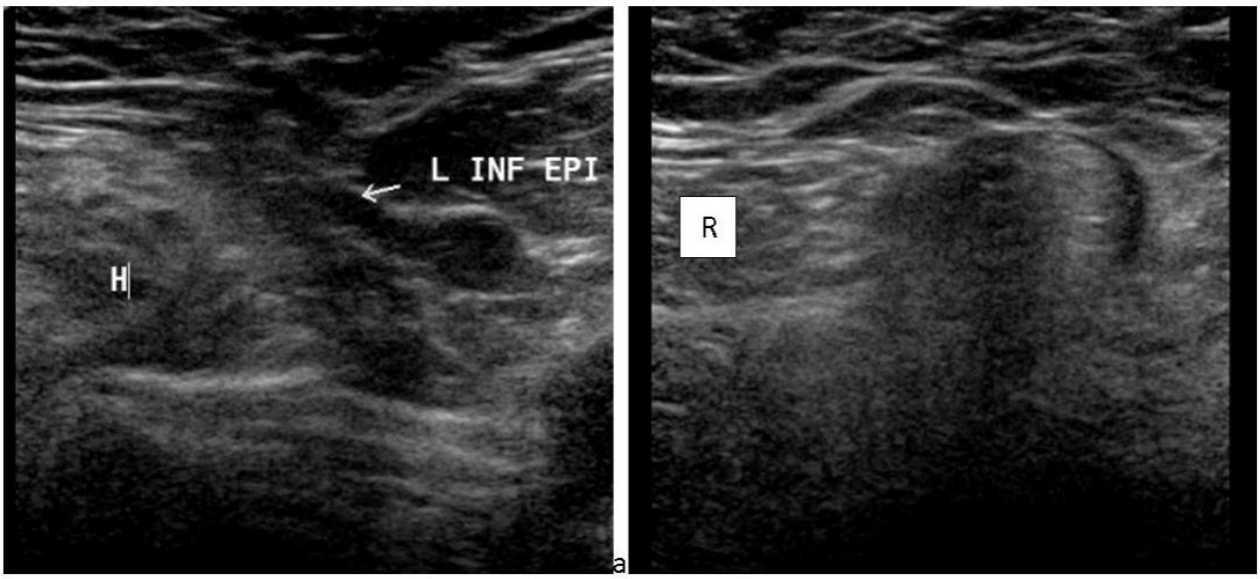


Figure 4a. left direct inguinal hernia, and Figure 4b. left direct inguinal hernia

Figure 4a shows direct inguinal hernia medial/posterior to the inferior left epigastric vessels during valsalva. (h) hernia

Figure 4b shows direct hernia displacing left rectus muscle medial and posterior during valsalva. (R) left rectus muscle

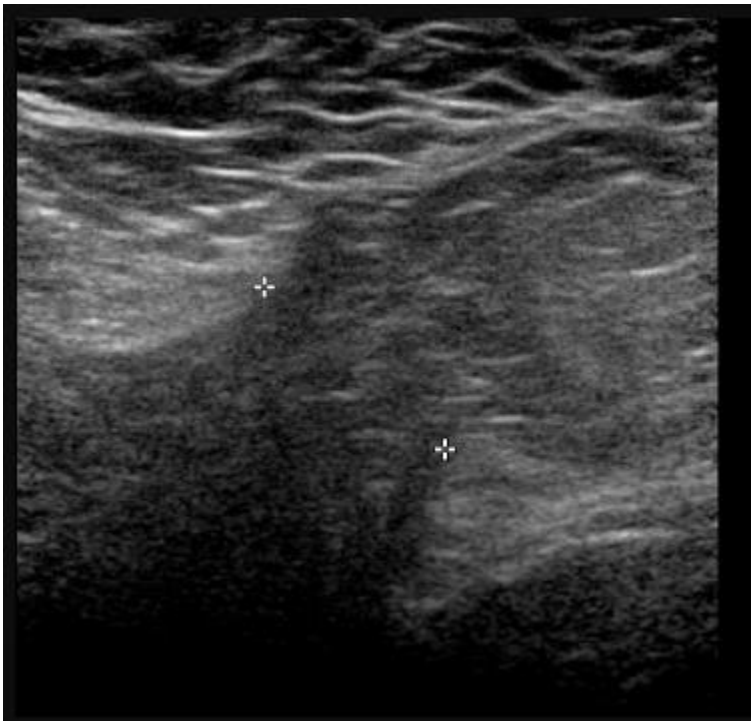


Figure 5.

Figure 5 shows a sagittal view of a direct inguinal hernia during valsalva. The cursers indicate the broken plane of the superficial inguinal ring by the direct inguinal hernia during valsalva.

Femoral area documentation:

Cross sectional images: cross sectional images at the level of the femoral artery and vein just over the superior pubic ramus just medial to the femoral vein.

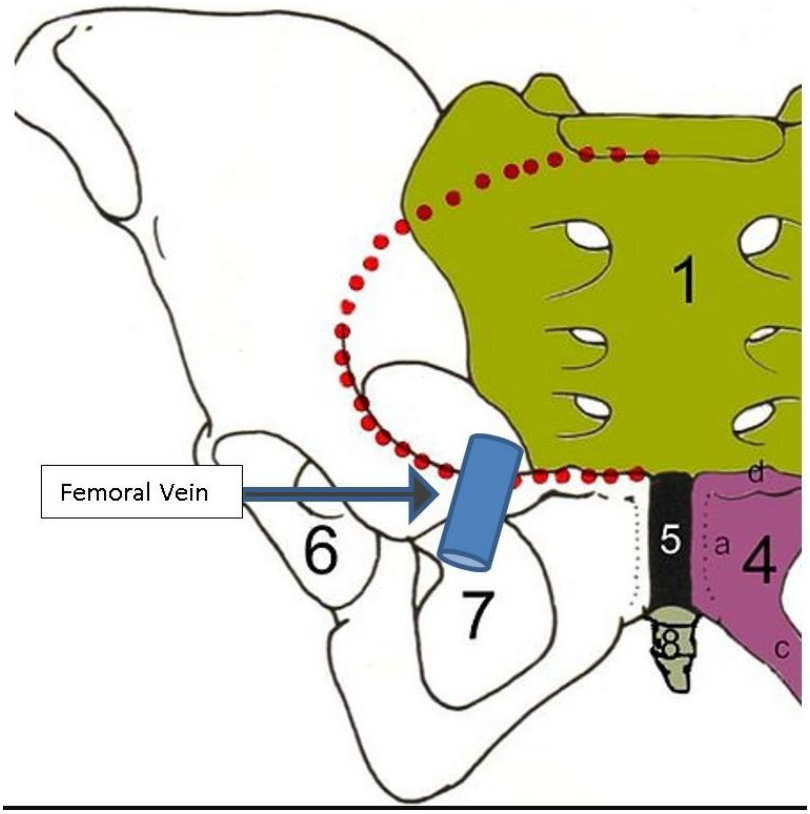
Sagittal images: Scan parallel to the medial margin of the femoral vein just inferior to the pubic ramus.

XS images:

1. At least 2 still images. One with valsalva and one image without valsalva
2. At least one cine clip with valsalva

Sagittal images:

1. At least 2 still images. One with valsalva and one image without Valsalva
2. At least one cine clip with valsalva



Superior pubic ramus red dots

XS images:

1. At least 2 still images. One with valsalva and one image without valsalva
2. At least one cine clip with valsalva

Sagittal images:

1. At least 2 still images. One with valsalva and one image without Valsalva
2. At least one cine clip with valsalva

Ultrasound Hip

INDICATIONS (Harris, 2014 and AIUM, 2013):

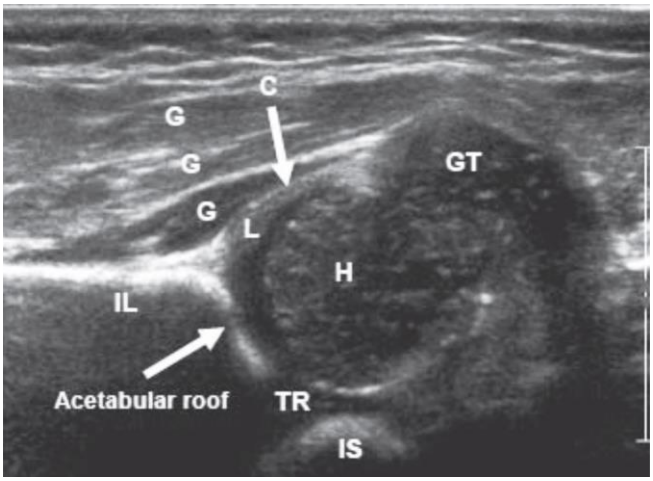
1. Hip Click
2. Limited Abduction
3. Asymmetrical crease
4. Family history of DDH
5. Breech presentation regardless of sex
6. Multiple Gestation
7. Oligohydramnios and other intrauterine causes of postural molding
8. Neuromuscular conditions
9. Monitoring patients with DDH being treated with a Pavlik harness or other splint device
10. Deformities of the foot

*Two of the strongest risk factors for DDH are a female newborn with a frank breech presentation at birth and a family history of a parent and/or sibling with DDH.[3] (AIUM, 2013). **DDH** "results from an abnormal relationship of the femoral head to the acetabulum" (Harris, 2014).

WHEN TO PERFORM THIS ULTRASOUND:

- **Optimally between 6 weeks and 6 months.** Hips are more mature / not as lax by the time the infant reaches 6 weeks and become too ossified after 6 months to adequately assess with ultrasound, may need x-ray (Harris, 2014).
- If ordered for screening for developmental dysplasia of the hip, the exam should not be completed until the child is 6 weeks of age. Performing on children younger can lead to false positive results.
- If the clinical history is solely family history of breach, the child was breach or a screening exam, the child needs to be 6 weeks of age after a term pregnancy at 40 weeks.
- If the order is from an orthopedic surgeon or the child has a documented hip click and the ordering physician documents hip instability, the ultrasound can be performed as ordered.

ANATOMY



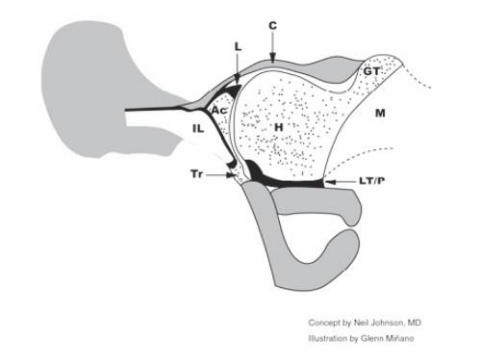
IL – ILIUM
TR – TRIRADIATE CARTILAGE
IS – ISCHIUM
H – HEAD OF FEMUR
L – LABRUM
GT – GREATER TROCHANTER
G – GLUTEUS MUSCLES
C – CAPSULE

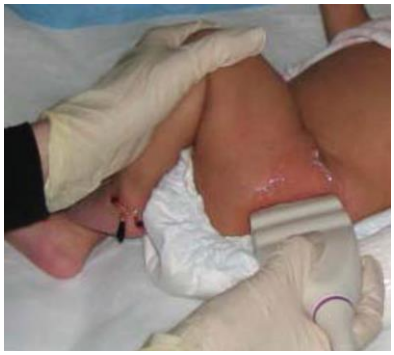
Reviewed by Dr. Steinberg 12/2017

Subject to change at the discretion of the radiologist due to clinical circumstances.

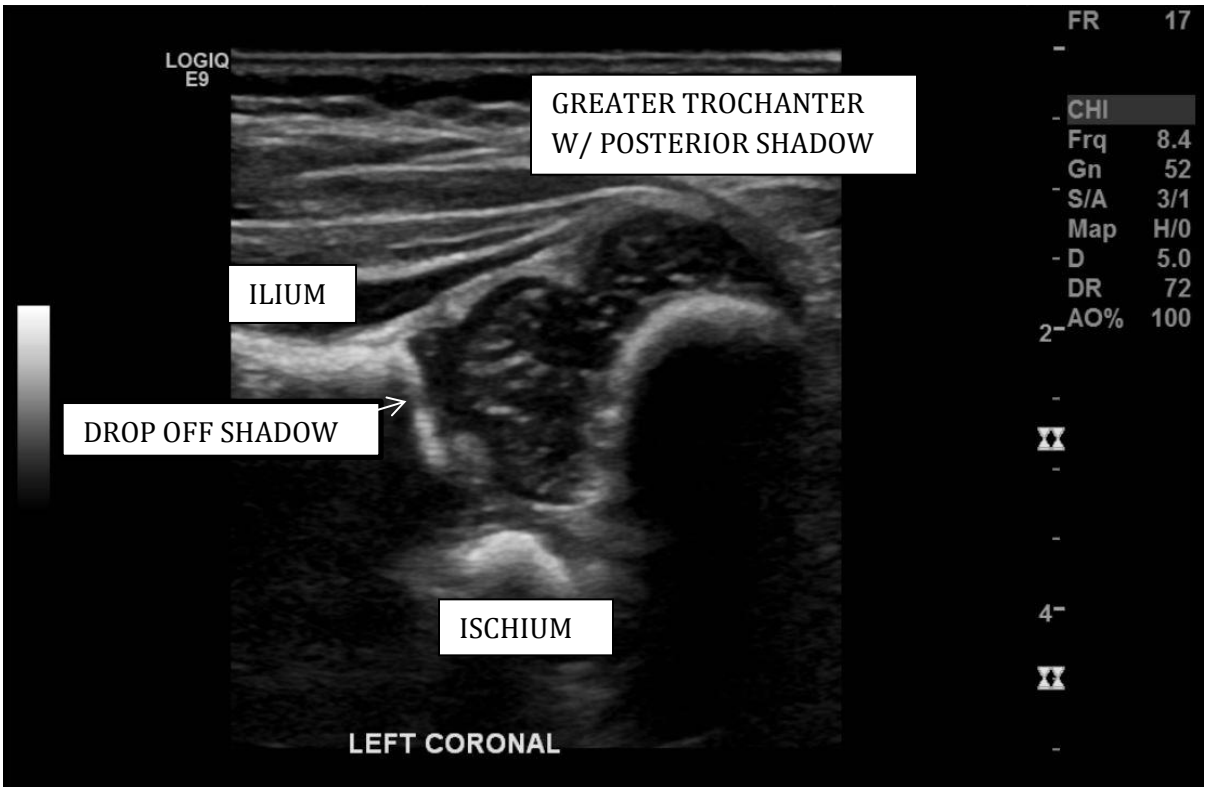
Hip Ultrasound cont.

CORONAL VIEW (AIUM, 2013)

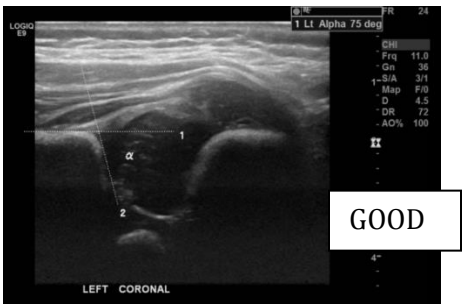




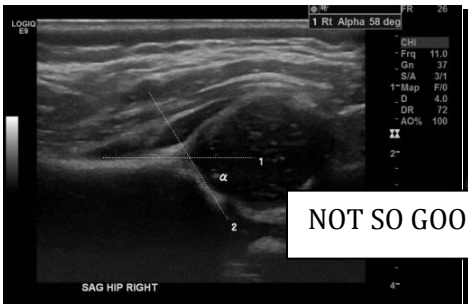
IDEAL CORONAL IMAGE W/ LANDMARKS



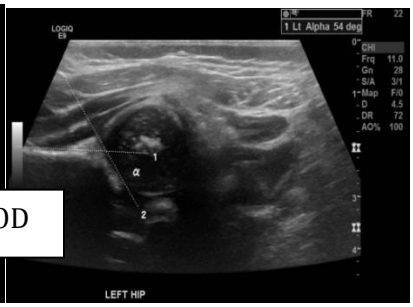
*Try to straighten the ilium, get a nice sharp beta angle, demonstrate the drop off shadow in the acetabular roof if possible (IF YOU SEE THIS, THE HIP WILL BE NORMAL) and show the ischium and the greater trochanter w/ posterior shadow .** Images below show correct vs incorrect imaging techniques.



GOOD



NOT SO GOOD

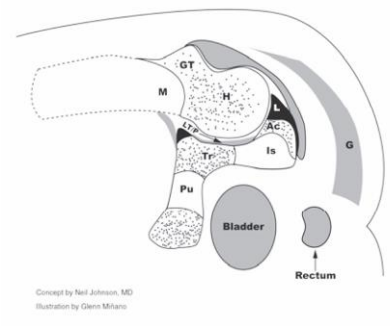


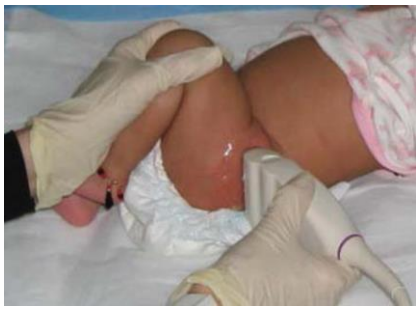
Reviewed by Dr. Steinberg 12/2017

Subject to change at the discretion of the radiologist due to clinical circumstances.

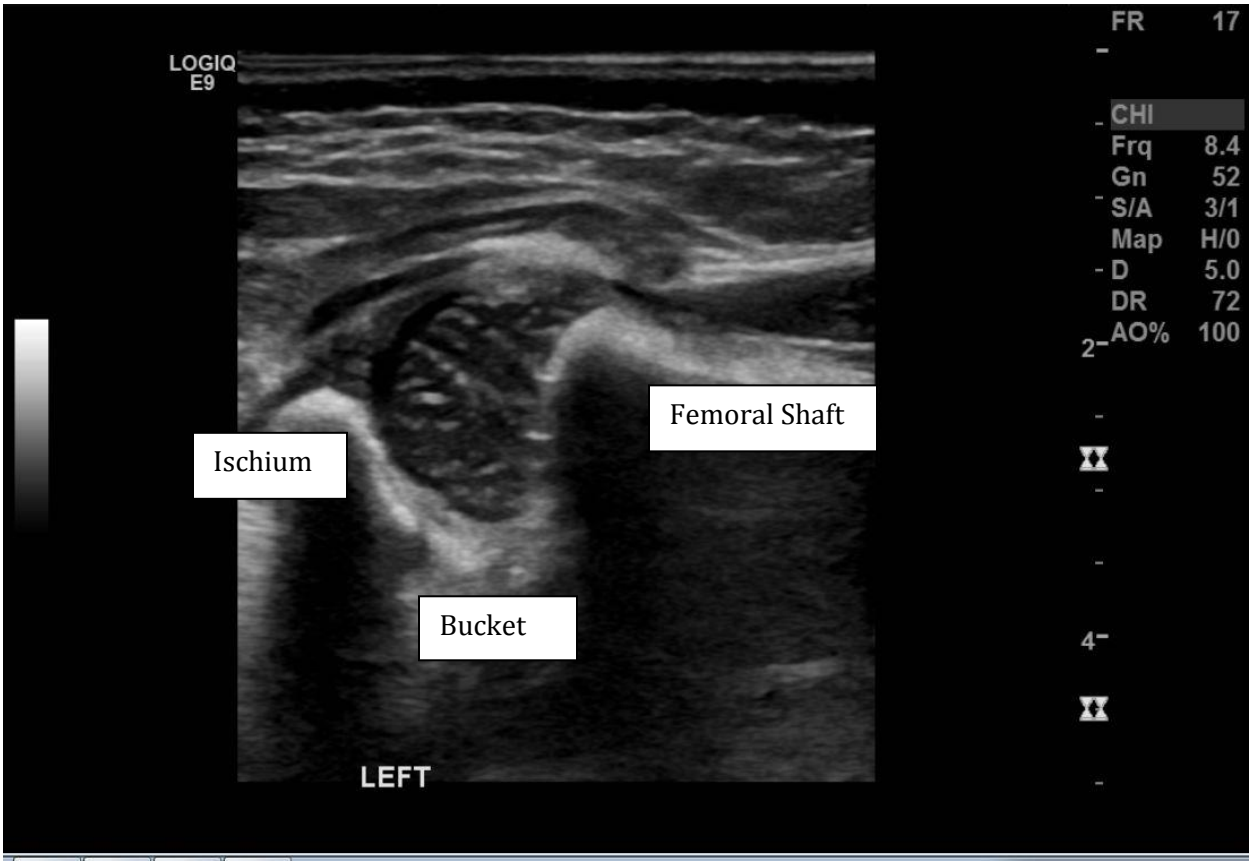
Hip Ultrasound cont.

TRANSVERSE VIEW (AIUM, 2013)

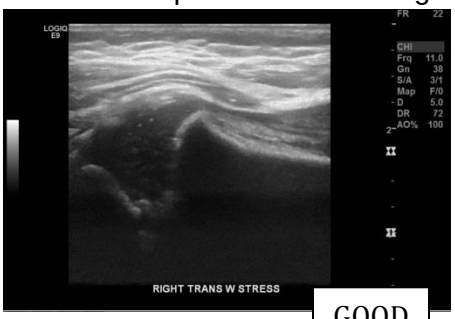




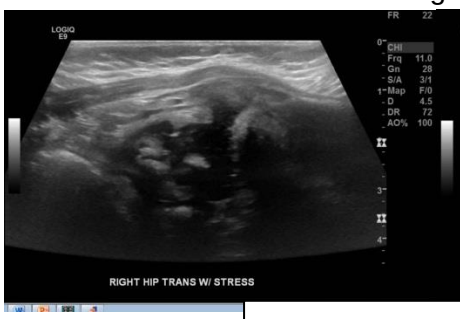
IDEAL TRANSVERSE IMAGE W/ LANDMARKS WITH AND WITHOUT STRESS

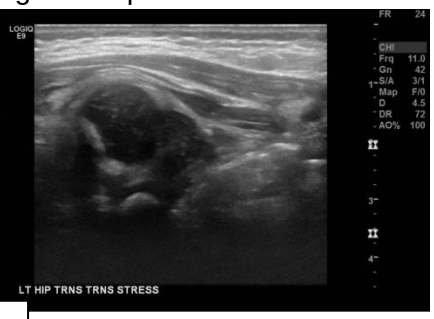


LOOK FOR ICE CREAM CONE APPEARANCE / bucket should be fully formed. FEMORAL HEAD SHOULD STAY "WELL-SEATED" IN BUCKET W/ STRESS. TRANS W/ AND W/O STRESS SHOULD LOOK VERY SIMILAR if hip is normal! Images below show correct vs incorrect imaging techniques.



GOOD





NOT SO GOOD

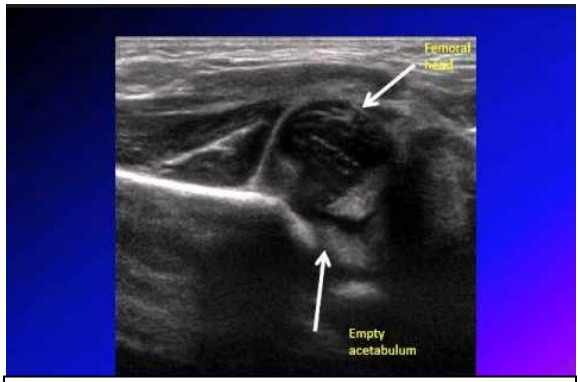
Reviewed by Dr. Steinberg 12/2017

Subject to change at the discretion of the radiologist due to clinical circumstances.

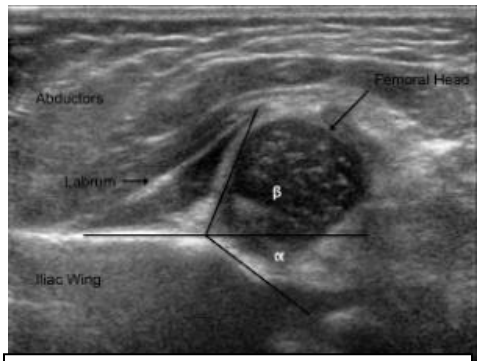
Hip Ultrasound cont.

ABNORMAL HIPS

Subluxation of hip. In the majority of cases (90%), the femoral head is displaced forward and above the acetabulum. Partial dislocation of the **hip** joint (**subluxation**) can occur and is typically associated with joint degeneration as with **hip** dysplasia (www.acvs.org/small-animal/hip-luxation).

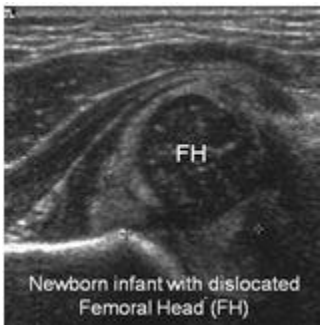


https://www.youtube.com/watch?v=wUCHi0tUQl8



http://www.orthopaedicsone.com/pages/viewpage.action?pageId=30507335

Femoral Head > 50% coverage if you are to follow the ilium straight across the femoral head. Beta angle < 60 degrees



With stress, femoral head displaced anteriorly.

PROTOCOL

2 X COR RT HIP + 1 WITH MEASUREMENT
2 X COR LT HIP + 1 WITH MEASUREMENT
TRANS LT HIP
TRANS LT HIP W/ STRESS
TRANS RT HIP
TRANS RT HIP W/ STRESS

REFERENCES

Ultrasound Examination for Detection and Assessment of Developmental Dysplasia of the Hip. The Association for Medical Ultrasound, AIUM, 2013. Laurel, MD http://www.aium.org/resources/guidelines/hip.pdf

Evaluation of Neonatal Hips for DDH. Michelle Harris, Ann and Robert Lurie Children's Hospital, 2014. Chicago, IL.

DDH, developmental dysplasia of hip, congenital hip dislocation, CHD. July, 2013. Amr Abdelgawad, MD. Texas Tech University. https://www.youtube.com/watch?v=wUCHi0tUQl8

Unity Point Methodist, Infant Hip Ultrasound Images 11/2015 – 11/2016.

http://www.orthopaedicsone.com/pages/viewpage.action?pageId=30507335

*Questions: Contact Abbie Anderson Unity Point Methodist Ultrasound x13381 or abbie.anderson@unitypoint.org

Reviewed by Dr. Steinberg 12/2017

Subject to change at the discretion of the radiologist due to clinical circumstances.

Ultrasound Kidney Transplant

The following images represent a kidney transplant ultrasound exam. Additional images may be necessary for proper documentation.

Transplant Kidney with Doppler

- Long
  - Medial
  - Mid with measurement
  - Mid with Color Doppler
  - Lateral
- Transverse
  - Superior
  - Mid with measurement
  - Inferior
- Intrarenal
  - Spectral Doppler waveforms in the interlobar or segmental arteries in superior, mid and inferior poles
    - Measure RI and acceleration times at each site
- Main Renal Artery (MRA)
  - Color Doppler demonstrating entire course of MRA (transplant to anastomosis), if possible
  - Spectral Doppler at renal hilum, mid, anastomosis and any areas of color-flow aliasing suggestive of high-velocity flow
    - Measure PSV and EDV
- Main Renal Vein (MRV)
  - Color Doppler demonstrating entire course of MRV (transplant to anastomosis), if possible
  - Spectral Doppler mid and anastomosis
- External Iliac Artery (EIA) and Vein (EIV)
  - Color and Spectral Doppler obtained proximal/cephalad to MRA and MRV anastomosis
    - Measure PSV

Bladder

- Grey-scale
  - Long
  - Transverse
    - Color Doppler to show ureteral jet if possible
  - Ureter (if visualized) with sent location (if present)

Angle correction is needed for all velocity measurements and should use an angle of ≤ 60 degrees

Document and measure all pathology, including any surrounding fluid collections of present
Annotate all images

Reviewed by Drs. Rizzi and King 12/2019

Subject to change at the discretion of the radiologist due to clinical circumstances.

Liver Doppler

The following images represent a liver doppler exam. Additional images may be necessary for proper documentation.

Images should be sent to PACS and organized in the following manner:

Main Portal Vein

Right Anterior Portal Vein

Right Posterior Portal Vein

Left Portal Vein

Recannalized Umbilical Vein, if present

Main Hepatic Artery

Right Hepatic Artery

Left Hepatic Artery

Left Haptic Vein

Middle Hepatic Vein

Right Hepatic Vein

IVC

Aorta

Portosplenic Confluence

Splenic Vein

Splenic Vessels at Splenic Hilum

Relevant varices in LUQ or other

Annotate all images

Reviewed by Dr. King 12/2020

Subject to change at the discretion of the radiologist due to clinical circumstances.

Ultrasound
Lower Extremity
Venous Duplex

The following images represent a lower extremity venous duplex ultrasound exam. Additional images may be necessary for proper documentation.

Gray scale images should be recorded *with* **and** *without* compression at each of the following levels:

(Transverse presentation)

- CFV
- CFV/ GSV
- PROX SFV/ PROFUNDA V JUNCTION
- PROX SFV
- MID SFV
- DIST SFV
- PROX POP V
- DIST POP V
- PROX PTV/PERO V
- MID PTV/ PERO V
- DIST PTV/ PERO V

Color flow / pulsed wave images should be recorded at each of the following levels:

When performing the pulsed wave, distal augmentation should also be performed in a normal study.
If thrombosis is suspected, do NOT perform any augmentations.

(Longitudinal presentation)

- CFV
  - Color
  - PW w/ distal augment
- GSV
  - Color
  - PW
- PROFUNDA V
  - Color
  - PW
- PROX SFV
  - Color
  - PW w/ distal augment

Reviewed by Dr. Hilpipre 12/2024

Subject to change at the discretion of the radiologist due to clinical circumstances.

Lower Ext. Venous Ultrasound Cont.

- MID SFV
    - Color
    - PW w/ distal augment
- DIST SFV
    - Color
    - PW w/ distal augment
- MID POP
    - Color
    - PW w/ distal augment
- CALF VEINS (PTV & PERO)
    - MID
        - Color

Abnormal findings and normal variants (i.e.: Bakers Cyst, hematomas, duplicated SFV) require additional images to document the complete extent of the abnormalities and variants.

The extent and location of sites where the veins fail to compress completely should be clearly recorded and generally require additional images.

If thrombus is noted in the great saphenous vein (GSV), measure distance from the saphenofemoral junction to the thrombus and also measure the length of the thrombus itself up to 5 cm (if greater than 5 cm in length, simply measure what is visible on the image and annotate “>5cm”).

Annotate all images

Reviewed by Dr. Hilpipre 12/2024

Subject to change at the discretion of the radiologist due to clinical circumstances.

Mesenteric Doppler

The following images represent a mesenteric doppler exam. Additional images may be necessary for proper documentation.

NPO ("pre") images only. No longer performing POST-ENSURE evaluation.

Aorta

- Long
- Trans
- Aorta with color
- Doppler spectral trace above the CA with velocity

Celiac Artery (CA)

- CA with color
- CA spectral trace with velocity
    - At rest
    - With inspiration
    - With expiration

Superior Mesenteric Arter (SMA)

- Long
    - At proximal, mid and distal, if visualized
- SMA with color
    - At proximal, mid and distal, if visualized
- SMA spectral trace
    - At proximal, mid and distal, if visualized

Inferior Mesenteric Artery (IMA)

- IMA, if visualized
- IMA with color
- IMA spectral trace with highest velocity

If NPO velocities are abnormal, we will recommend the patient gets an abdominal CTA.

Annotate all images

Reviewed by Drs. King/Becker 11/2022

Subject to change at the discretion of the radiologist due to clinical circumstances.

Ultrasound
OB < 14 Weeks

The following images represent an OB less than 14 weeks ultrasound exam. Additional images may be necessary for proper documentation.

Perform pelvic ultrasound protocol in addition to US OB less than 14 weeks protocol

Do transvaginal unless patient refuses or is far enough along to adequately visualize pregnancy

Adnexa's

- Measure, color and Pulse Wave of ovaries, if visualized

Gestational sac (GS)

- Document location
    - Measure in 3 dimensions if no embryo is present
- Evaluate for presence / absence of yolk sac and embryo
    - Measure yolk sac inner to inner

Fetal Pole / Embryo

- Measure CRL
- Document presence / absence of cardiac activity with M-mode or 2D video clip

Fetal Number

- Document amnionicity and chorionicity for all multiple gestations

Anatomy

- Document appropriate first trimester fetal anatomy

Placenta

- Document presence when able to see it

Document any abnormal findings
Annotate all images

Reviewed by Dr. Waddell 7/2017

Subject to change at the discretion of the radiologist due to clinical circumstances.

Ultrasound
OB > 14 Weeks

The following images represent a OB 2nd Trimester (Morphology) ultrasound exam. Exam may be done between 18 weeks – 20 weeks 6 days with a strong preference towards 20 weeks. Additional images may be necessary for proper documentation.

Adnexa
- Measure, color and Pulse Wave of ovaries, if visualized

Cervix
- Measure length
  - Transabdominal
  - Transvaginal can be performed if there is a separate TV cervix order
- Document/measure relationship between cervix and placenta

Placenta
- Location, appearance and relationship to internal cervical os
- Umbilical cord insert documented
  - With color flow
- Umbilical cord vessels (3 vessel view)

Measurements
- Biparietal diameter
- Head circumference
- Femoral length
- Abdominal circumference

Fetal anatomic survey
- Head, face & neck
  - Lateral cerebral ventricle
    - Measure at the level of the atrium
  - Choroid plexus
  - Midline falx
  - Cavum septi pellucidi
    - At level of frontal horns – Do not include cerebellum/cm
  - Cine through head to include CSP – Label as “Head”
  - Cerebellum / CM
    - Measure
  - Face
  - Profile
  - Nose / Upper Lip
    - If inadequately visualized, do a cine of nose/lips

Reviewed by Dr. Hilpipre 9/2023

Subject to change at the discretion of the radiologist due to clinical circumstances.

OB > 14 Weeks Cont.

- Chest
    - Heart
        - Fetal heart beat using M-mode
        - Four chamber
            - With color flow
                - May image dual screen or separate
        - Left ventricular outflow tract
            - With color flow
                - May image dual screen or separate
        - Right ventricular outflow tract
            - With color flow
                - May image dual screen or separate
        - Cine clip of four chamber and outflow tracts
            - Cine clip to include stomach and heart
        - Cine clip of four chamber and outflow tracts with color flow
        - Aortic arch
            - Long with color flow
        - Diaphragm
            - Coronal showing both hemidiaphragms
        - Situs evaluation
            - Heart and stomach on dual screen
            - Annotate fetal position at time of this image
            - Ensure maternal right/left are accurately shown
- Abdomen
    - Stomach
    - Kidneys
        - Renal arteries in coronal
    - Umbilical cord insert into fetal abdomen
        - With color flow
    - Urinary bladder
        - With color flow – Document 2 umbilical arteries
- Spine
    - Cervical, thoracic, lumbar and sacral
        - Long and transverse views
        - Cine clip of transverse lumbar to sacral spine
- Extremities
    - Legs
        - Long bones of both Right and Left side
            - Feet of both Right and Left side
            - Document 5 digits per extremity whenever possible

Reviewed by Dr. Hilpipre 9/2023

Subject to change at the discretion of the radiologist due to clinical circumstances.

OB > 14 Weeks Cont.

    - Arms
        - Long bones of both Right and Left side
            - Hands of both Right and Left side
            - Document 5 digits per extremity whenever possible
- Gender
    - When medically indicated and if patients want to know

Document any abnormalities
Annotate all images

Ultrasound OB Follow Up/Limited

The following images represent an OB follow up ultrasound exam. Additional images may be necessary for proper documentation.

OB Follow Up

- **Used to follow up morphology, growth, presentation, AFI**
    - **Used when more than one thing is imaged**

Adnexa's

- Measure, color and Pulse Wave of ovaries, if visualized

Cervix

- Measure length
    - Transvaginal (if ordered by OB physician)
    - Transabdominal (if patient refused TV)
- Document relationship between cervix and placenta

Placenta

- Location, appearance and relationship to internal cervical os
- Umbilical cord insert documented
- Umbilical cord vessels

Measurements

- Biparietal diameter
- Head circumference
- Femoral length
- Abdominal circumference
- Measure fetal heart rate using M-Mode

Amniotic fluid volume

- Measure in four quadrants

Cord Doppler's

- **To be done in the 3rd Trimester**
    - Measure RI & S/D
        - Take three measurements
            - 1: at placenta
            - 2: mid cord
            - 3: at umbilical cord insert into fetal abdomen

Document any abnormalities
Annotate all images

Reviewed by Dr. Waddell 7/2017

Subject to change at the discretion of the radiologist due to clinical circumstances.

Limited OB Ultrasound Cont.

The following images represent a OB limited ultrasound exam. Additional images may be necessary for proper documentation.

OB Limited

- **Used when only ONE thing is imaged**
    - IE. Provider orders:
        - Presentation – document adnexa's, placenta, heartrate, presentation

Adnexa's

- Measure, color and Pulse Wave of ovaries, if visualized

Cervix

- Measure length
    - Transvaginal (if ordered by OB physician)
    - Transabdominal (if patient refused TV)
- Document relationship between cervix and placenta

Placenta

- Location, appearance and relationship to internal cervical os
- Umbilical cord insert documented

Measurements

- Biparietal diameter
- Head circumference
- Femoral length
- Abdominal circumference
- Measure fetal heart rate using M-Mode

Amniotic fluid volume

- Measure in four quadrants

Document any abnormalities
Annotate all images

Reviewed by Dr. Waddell 7/2017

Subject to change at the discretion of the radiologist due to clinical circumstances.

Ultrasound OB Biophysical Profile

The following images represent an OB Biophysical Profile (BPP) ultrasound exam. Additional images may be necessary for proper documentation.

BPP consists of fetal breathing movements, discrete body movements, fetal tone and amniotic fluid volume**.**

BPP is performed until all 4 components are met or until 30 minutes have passed.

Fetal Breathing Movement

- 1 episode (minimum) continuing for ≥30 seconds within the 30-minute BPP

Discrete Body Movements

- 3 episodes (minimum) of discrete body or limp movements

Fetal Tone

- 1 or more episodes of active extension and flexion

Amniotic Fluid Volume

- 1 pocket of fluid measuring 2cm

Scoring

- Each component of BPP meeting the criteria receives a score of 2 – for a combined score of 8
- If the specified criteria are not met for an individual component, it is scored as 0

Document Fetal Heartbeat

Document any abnormal findings
Annotate all images

Reviewed by Dr. Waddell 7/2017

Subject to change at the discretion of the radiologist due to clinical circumstances.

Ultrasound Pelvic

The following images represent a Pelvic Transabdominal & Transvaginal ultrasound exam. Additional images may be necessary for proper documentation.

Transabdominal

- **Should be performed with a full bladder**
    - If the patient is under 18, not sexually active or refuses TV, only do transabdominal exam

Cervix

- Long mid
- Trans
- Document and measure any abnormalities

Uterus

- Long
    - Document from right to left
        - Measure long and AP mid
        - Measure Endometrium mid
            - Measure at thickest portion from echogenic border to echogenic border
            - If endometrial fluid is present - measure the two separate layers endometrium
- Trans
    - Document from inferior to superior
        - Measure at mid (widest) part
- Document any abnormalities
    - Masses / Fibroids need to be measured in 3 dimensions and location documented

Ovaries / Adnexa

- Measure ovaries in 3 dimensions (width, length, depth)
    - Obtain color and spectral Doppler
        - **For ER patients: Obtain arterial and venous waveforms whenever possible**
    - Document and Measure any abnormalities (cysts, dermoids, endometriomas, ect.)
- If unable to visualize ovaries document adnexa's in two planes
    - Document and measure any abnormalities

Cul-de-Sac

- Long image
- Document and measure any abnormalities

Reviewed by Dr. Hilpipre 10/2023

Subject to change at the discretion of the radiologist due to clinical circumstances.

Pelvic Ultrasound Cont.

Transvaginal

- **Should be performed with an empty bladder**

Cervix

- Sagittal
- Coronal
- Document and measure any abnormalities

Uterus

- Sagittal
    - Document from right to left
        - Measure long and AP mid
        - Measure Endometrium mid
            - Measure at thickest portion from echogenic border to echogenic border
            - If endometrial fluid is present - measure the two separate layers endometrium
- Coronal
    - Document from inferior to superior
        - Measure at mid (widest) part
- Document any abnormalities
    - Masses / Fibroids need to be measured in 3 dimensions and location documented

Ovaries / Adnexa

- Measure ovaries in 3 dimensions (width, length, depth)
    - Obtain color and spectral Doppler
        - **For ER patients: Obtain arterial and venous waveforms whenever possible**
    - Document and Measure any abnormalities (cysts, dermoids, endometriomas, etc.)
- If unable to visualize ovaries document adnexa's in two planes
    - Document and measure any abnormalities

Cul-de-Sac

- Sagittal image
- Document and measure any abnormalities

Annotate all images

For pelvic ultrasounds performed for IUD Placement or Rechecks and Postmenopausal Bleeding:

Uterus/Endometrium

- Include 3D images, if available

Reviewed by Dr. Hilpipre 10/2023

Subject to change at the discretion of the radiologist due to clinical circumstances.

Pelvic Ultrasound Cont.

The following images represent Pelvis for Fertility / Follicle Tracking ultrasound exams. Additional images may be necessary for proper documentation.

CPT 76830 US Pelvis Transvaginal: To be used at the first evaluation and when uterine structures (such as the endometrium) are requested in addition to the ovaries

For fertility exams, the following detail should be documented *in addition to the Pelvic Ultrasound Transvaginal protocol*:

Ovaries / Adnexa

- Document the number of follicles in each ovary and indicate
    - How many are less than 10 mm
    - How many are 10mm or greater
    - Measure, at minimum, the 3 largest follicles in at least 2 perpendicular dimensions

Uterus and Endometrium

- Describe the appearance of the endometrium

Document and measure all pathology
Annotate all images

CPT 76857 US Pelvis Limited: To be used for repeat follicle evaluation when the provider is requesting follicles/ovaries ONLY

Ovaries / Adnexa

- Measure ovaries in 3 dimensions (width, length, depth)
- Obtain color and spectral doppler
- Document and measure any abnormalities
- Document the number of follicles in each ovary and indicate
    - How many are less than 10 mm
    - How many are 10mm or greater
    - Measure, at minimum, the 3 largest follicles in at least 2 perpendicular dimensions

Document and measure all pathology
Annotate all images

Reviewed by Dr. Hilpipre 10/2023

Subject to change at the discretion of the radiologist due to clinical circumstances.

Ultrasound Pediatric Pylorus

The following images represent a pyloric stenosis evaluation ultrasound exam. Additional images may be necessary for proper documentation.

Patient Prep

- 2 hours NPO prior to exam

Probe and setting

- High frequency linear – ML4-20
- MSK Gen setting

Imaging Positions

- Supine
- RLD to displace stomach gas to better visualize the pylorus as fluid distends the gastric antrum

Landmarks

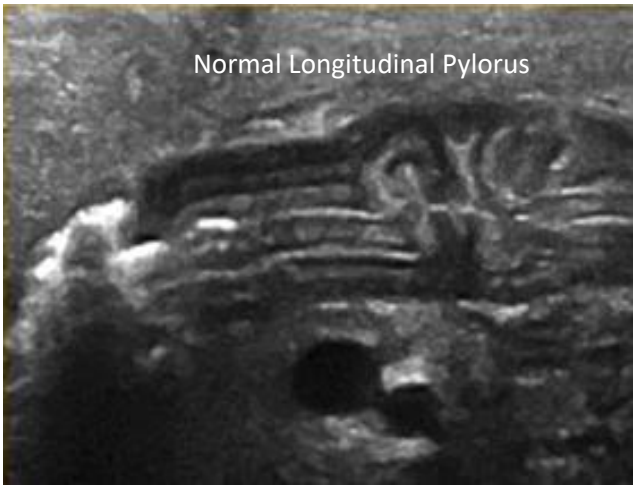
- Look For
  - Porta hepatis
  - Gallbladder
  - Just superior to the right kidney
- Avoid!
  - The gastro esophageal junction can be mistaken for pylorus
    - Found above the left lobe of the liver
    - Typically see the heart and/or aorta with this view

Images

- Longitudinal image of Pylorus **with the Gallbladder** in the same image

- Longitudinal images of Pylorus with and without measurements:
  - Channel length
    - Normal length of the pyloric canal is 11 – 14mm
  - Pyloric muscle wall
    - Normal width of the muscle thickness is <3mm

- Transverse measurement of the muscle wall thickness



Give the patient a small bottle of Pedialyte/glucose water

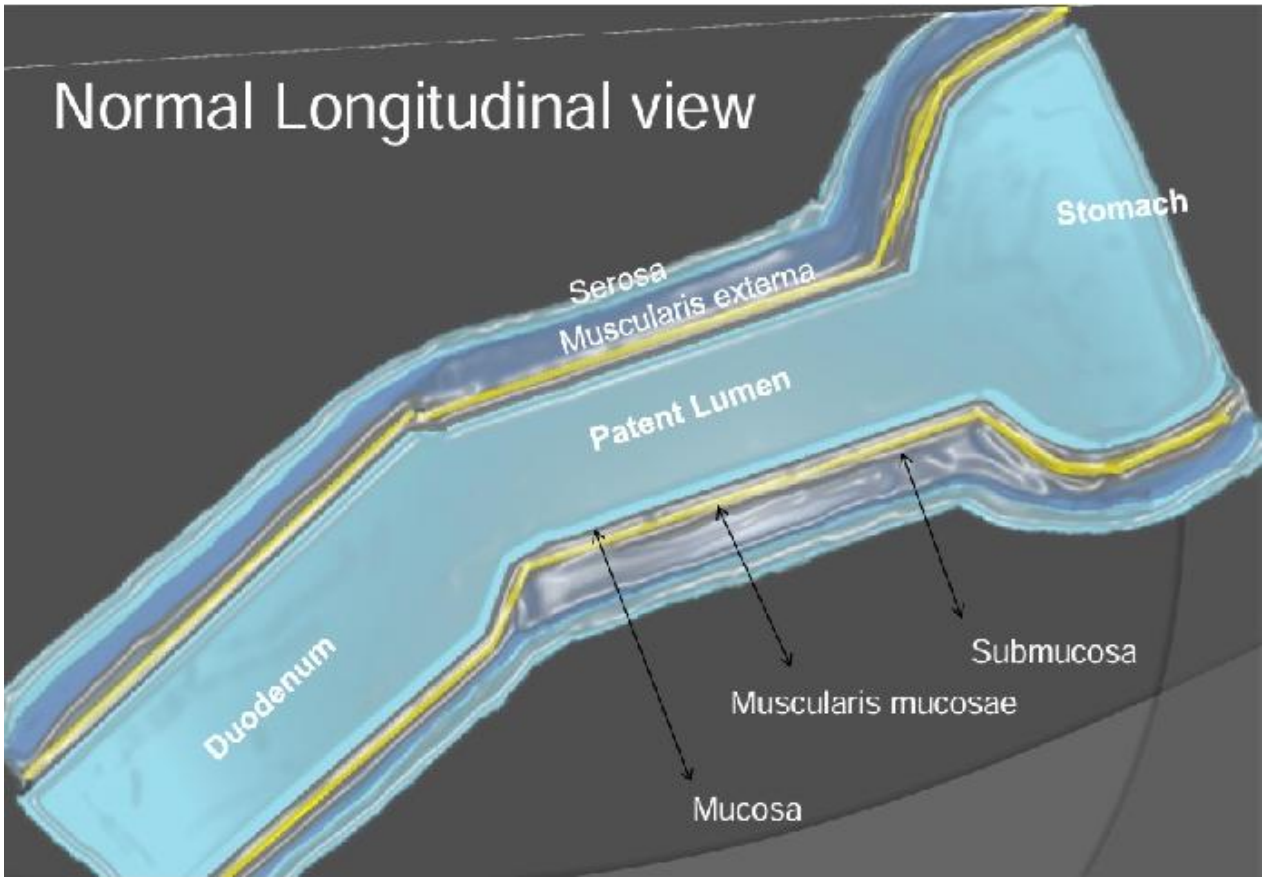
Longitudinal cine of fluid passing through the pyloric channel

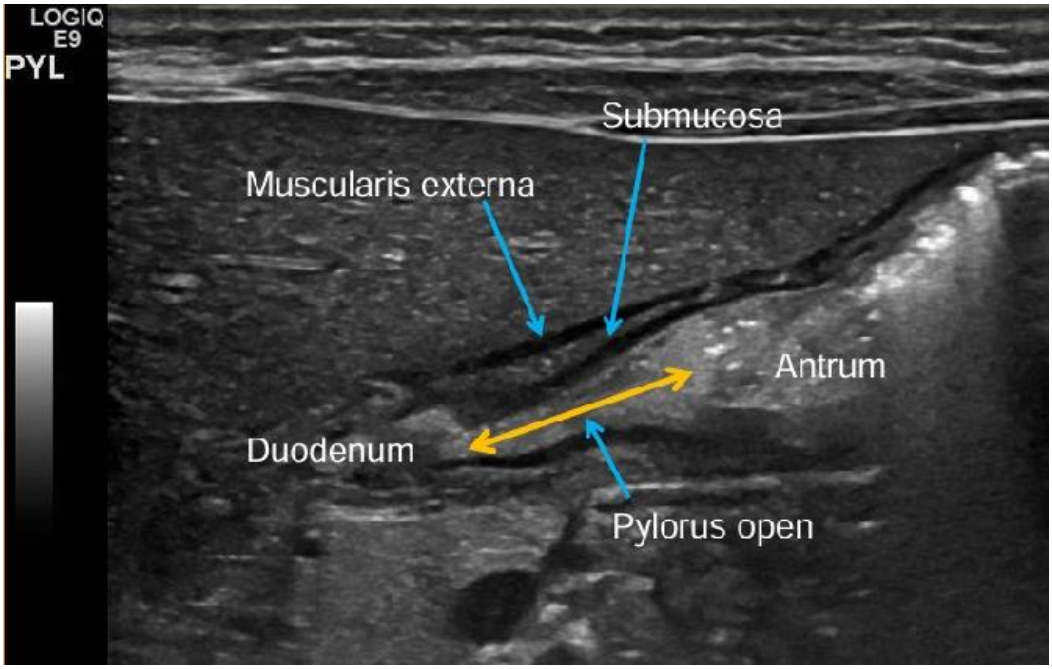
Annotate all images

Reviewed by Dr. Steinberg 11/2025

Subject to change at the discretion of the radiologist due to clinical circumstances.

Pediatric Pylorus Ultrasound cont.

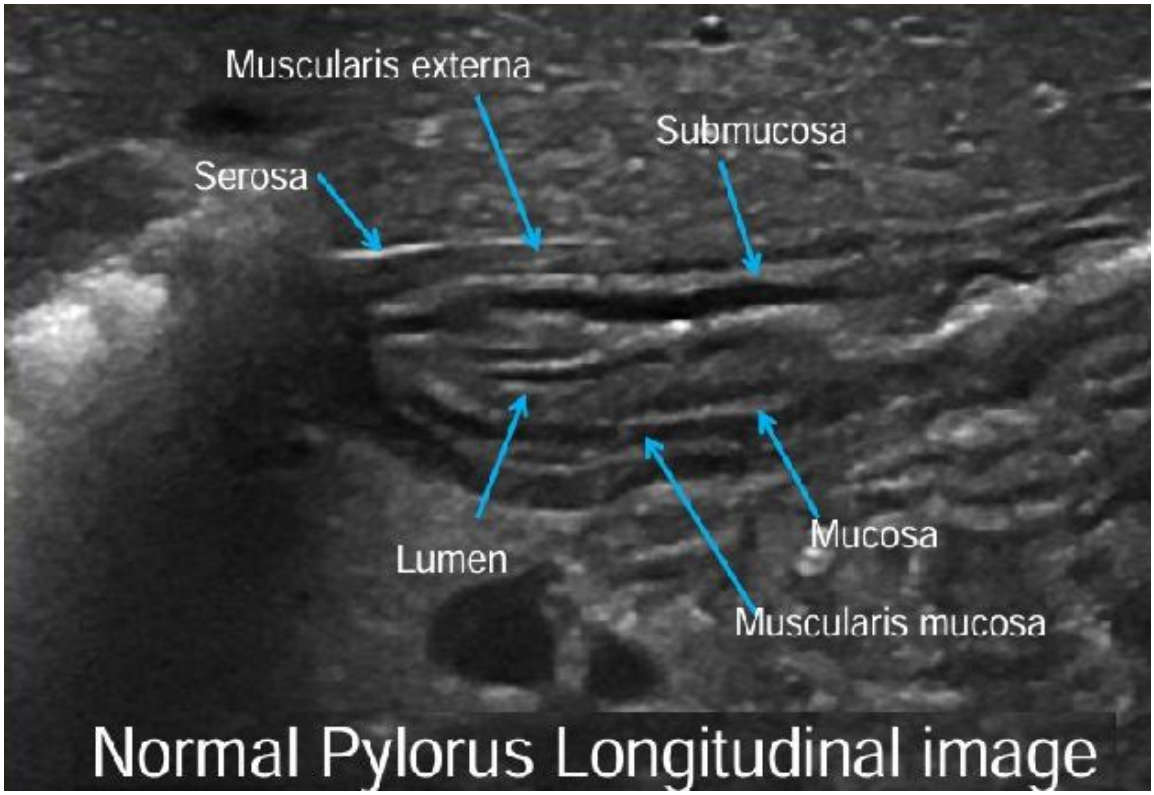


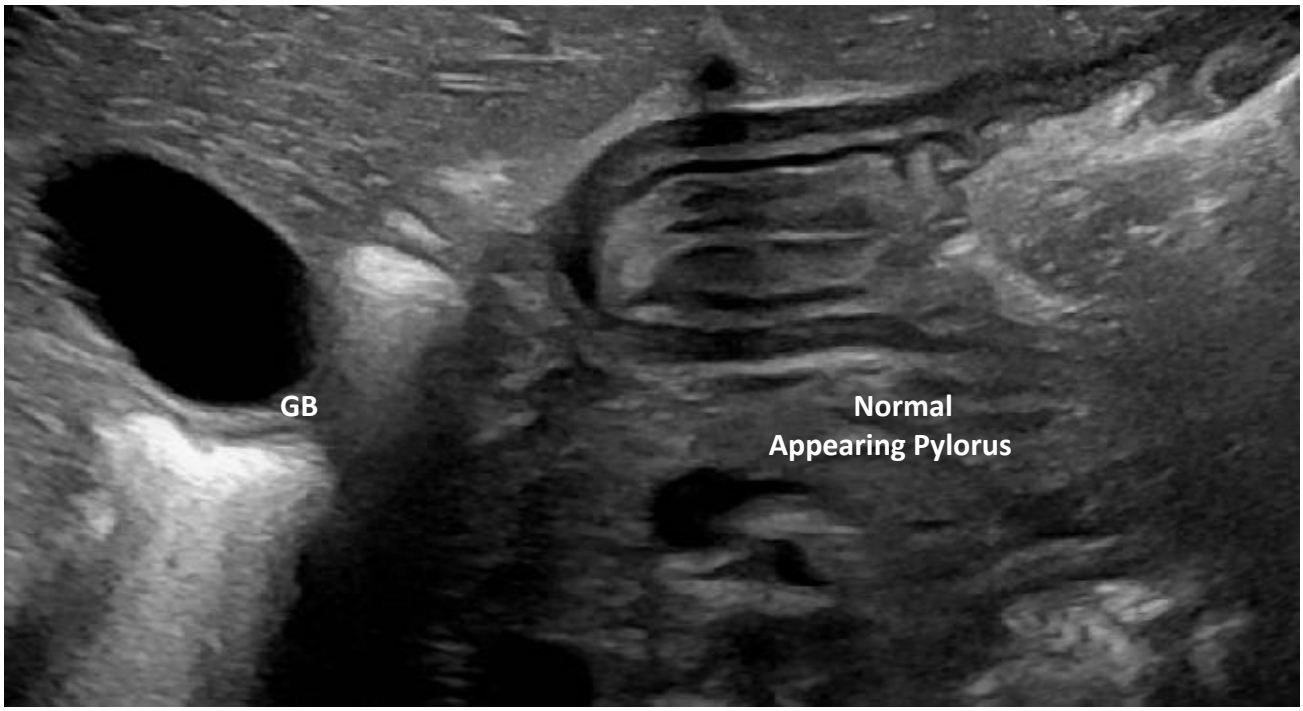


Reviewed by Dr. Steinberg 11/2025

Subject to change at the discretion of the radiologist due to clinical circumstances.

Pediatric Pylorus Ultrasound cont.

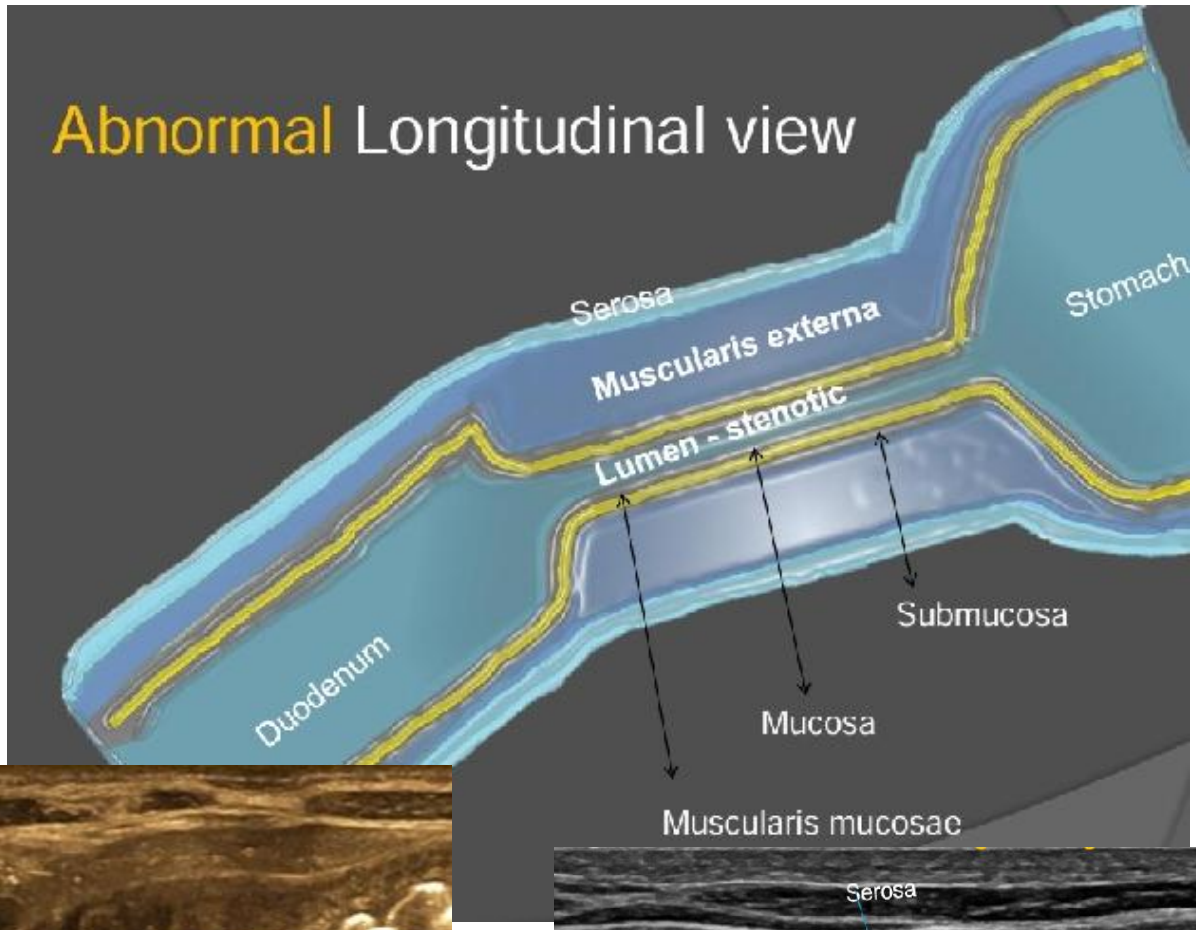


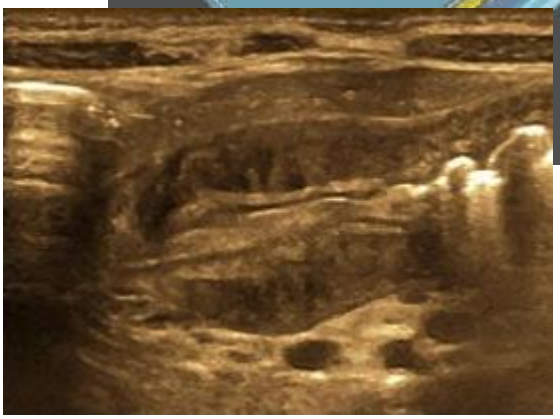


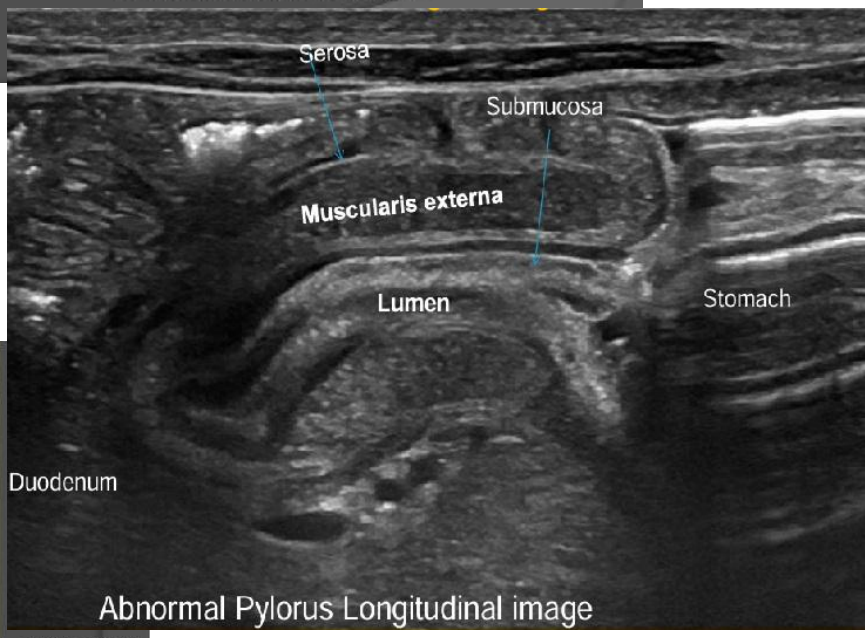
Reviewed by Dr. Steinberg 11/2025

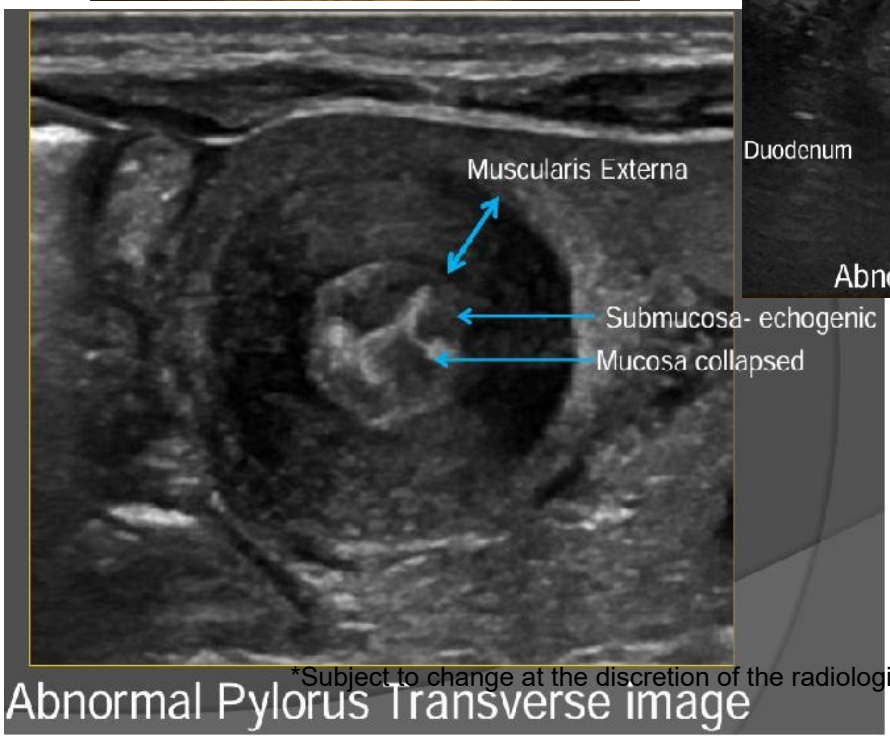
Subject to change at the discretion of the radiologist due to clinical circumstances.

Pediatric Pylorus Ultrasound cont.





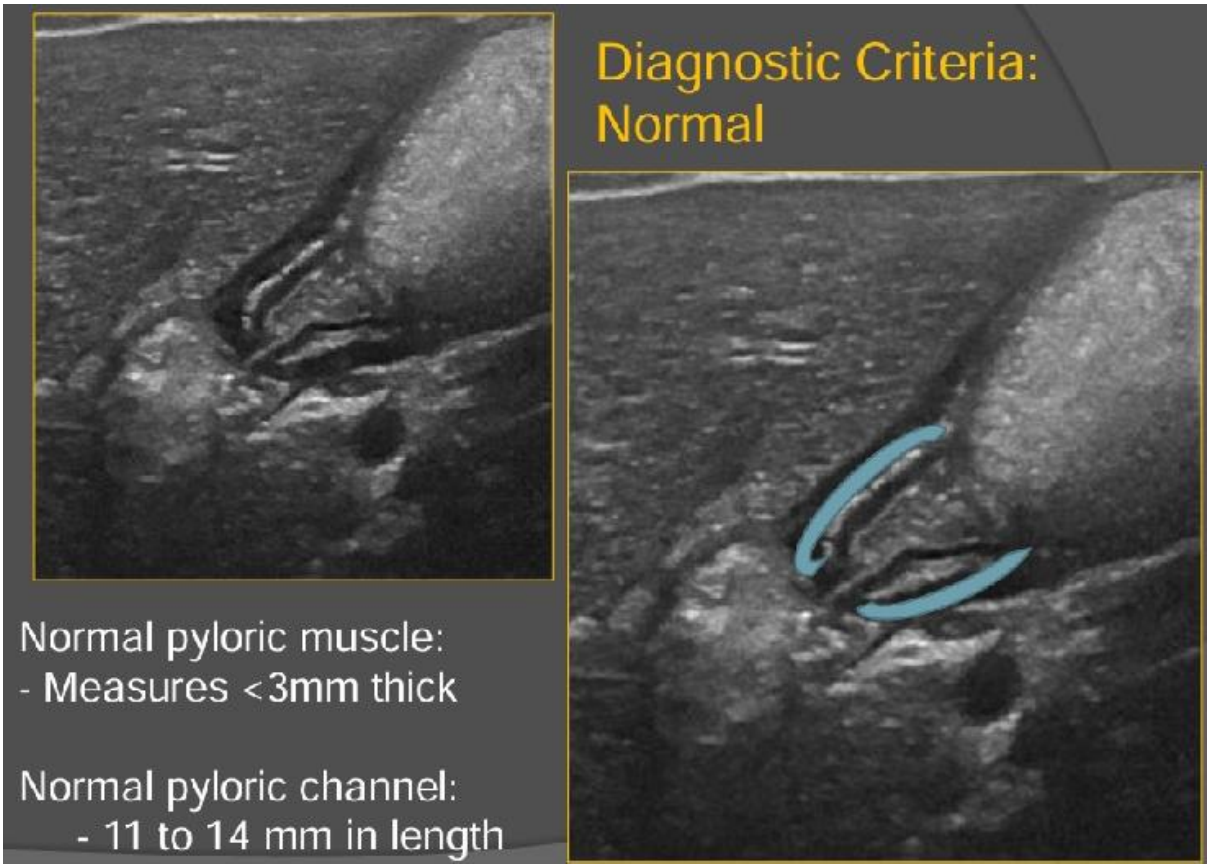


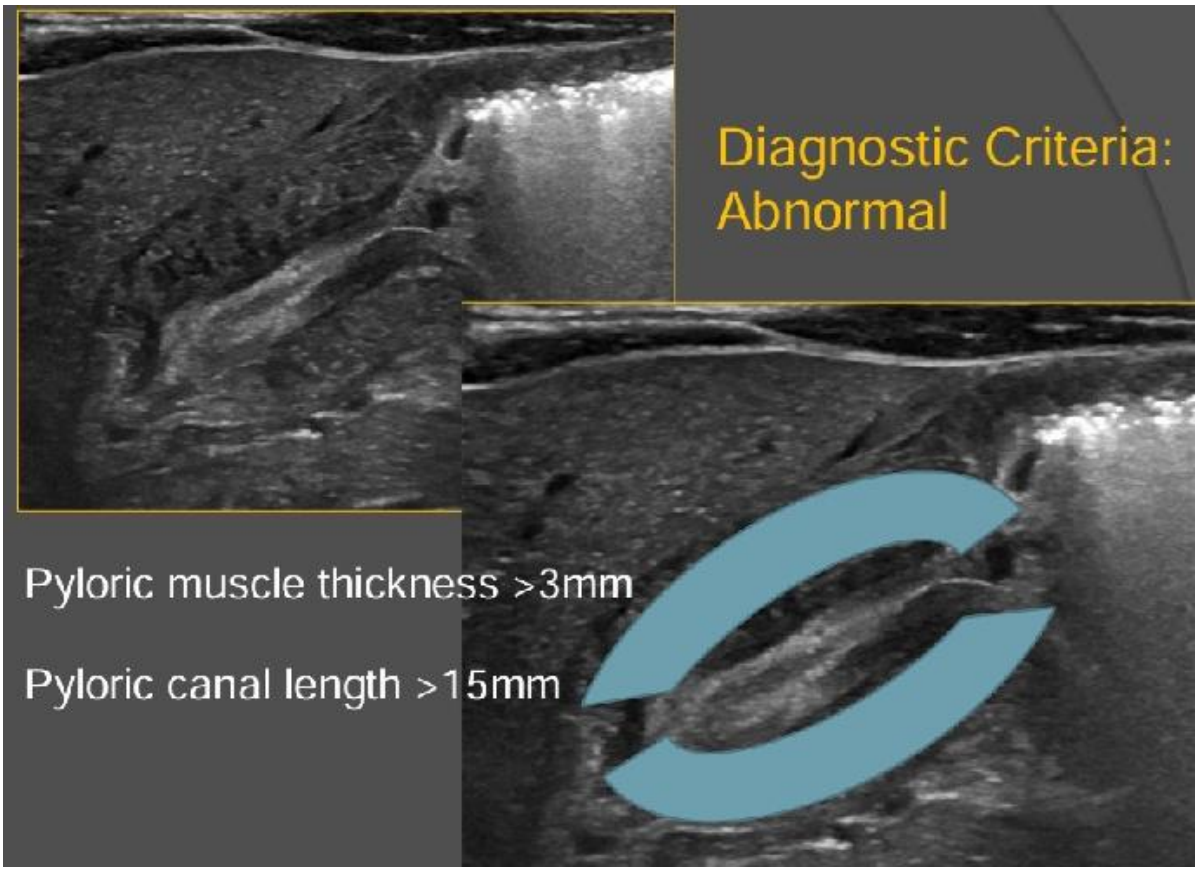


Reviewed by Dr. Steinberg 11/2025

Subject to change at the discretion of the radiologist due to clinical circumstances.

Pediatric Pylorus Ultrasound cont.

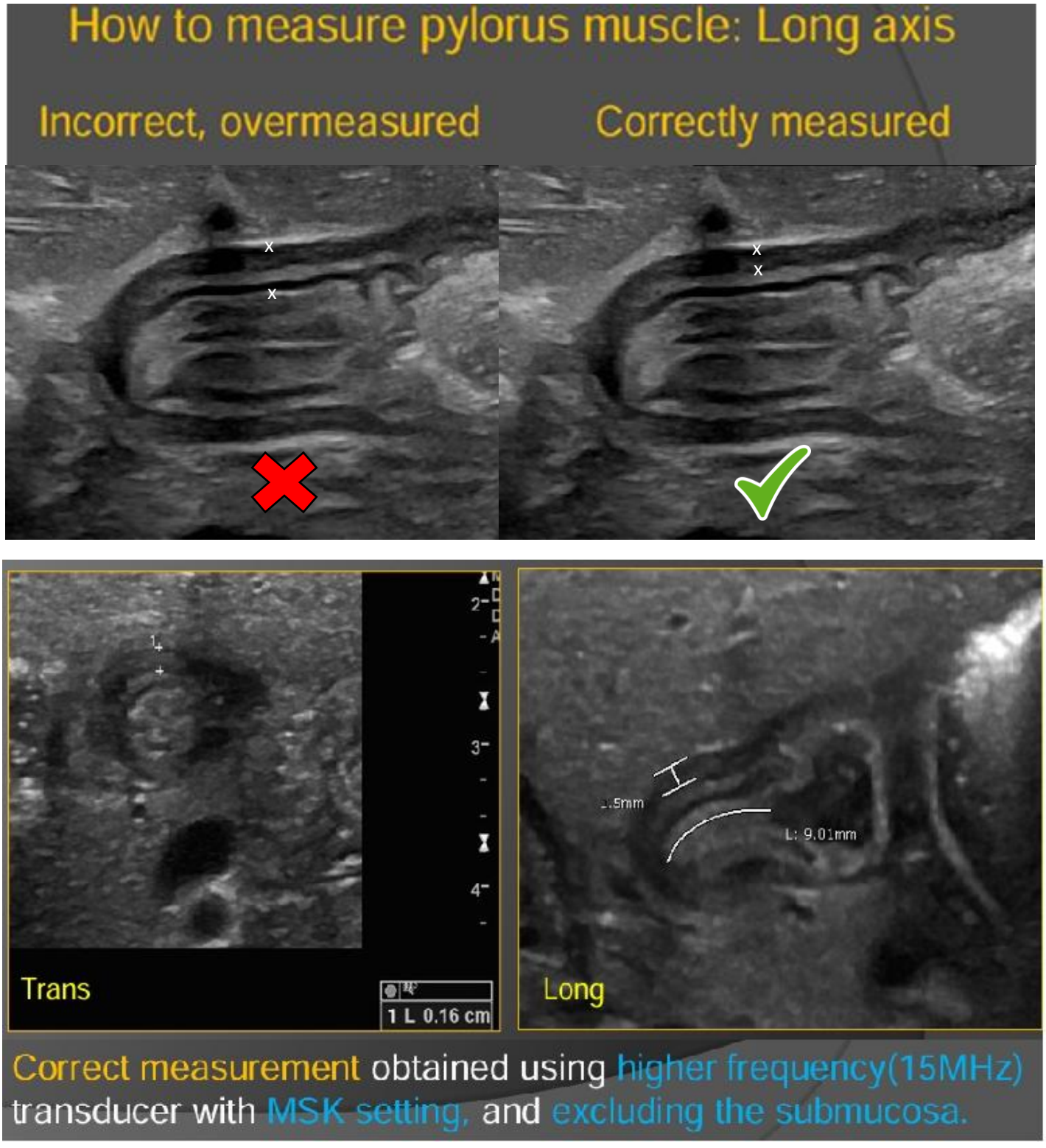




Reviewed by Dr. Steinberg 11/2025

Subject to change at the discretion of the radiologist due to clinical circumstances.

Pediatric Pylorus Ultrasound cont.



Cielma, T; Bandarkar, A; Adeyiga, A (2017)
A sonographic walk-through: infantile hypertrophic pyloric stenosis [PowerPoint slides]
https://wfpiweb.org/Portals/7/Education/2017%20Outstanding%20WFPI%20Radiographer%20Educational%20Poster%20Award.pdf

Reviewed by Dr. Steinberg 11/2025

Subject to change at the discretion of the radiologist due to clinical circumstances.

Ultrasound Renal/Bladder

The following images represent a renal ultrasound exam. Additional images may be necessary for proper documentation.

Right Kidney

- Long
  - Medial
  - Mid with measurement
  - Mid with Color Doppler
  - Lateral
- Trans
  - Superior
  - Mid with measurement
  - Inferior

Left Kidney

- Long
  - Medial
  - Mid with measurement
  - Mid with Color Doppler
  - Lateral
- Trans
  - Superior
  - Mid with measurement
  - Inferior

Bladder

- Long
- Trans
- Show ureteral jets

Vessels (With color Doppler, only measure diameter if abnormal in appearance)

- IVC
- Aorta
- Common iliac origins

Document and measure all pathology
Annotate all images

Reviewed by Dr. Hilpipre 9/2023

Subject to change at the discretion of the radiologist due to clinical circumstances.

Bladder Ultrasound Cont.

The following images represent a Pre- and Post-Void Bladder ultrasound exam. Additional images may be necessary for proper documentation.

Right Kidney

- Long mid

Left Kidney

- Long mid

Bladder

- Pre-Void
    - Long
        - With measurements
    - Trans
        - With measurement
        - Document ureteral jets
- Post-Void
    - Long
        - With measurements
    - Trans
        - With measurement

If hydronephrosis is present, contact ordering physician's office to obtain order to complete a renal ultrasound.

Document and measure all pathology
Annotate all images

Reviewed by Dr. Hurlbut 7/2017

Subject to change at the discretion of the radiologist due to clinical circumstances.

Ultrasound Renal Artery

The following images represent a renal artery ultrasound exam. Additional images may be necessary for proper documentation.

Aorta

- Long image with color and Spectral Doppler
    - Measure Peak Systole

Right Kidney

- Long
    - Medial
    - Mid with measurement
    - Mid with Color Doppler
    - Lateral
- Trans
    - Superior
    - Mid with measurement
    - Inferior
- Main Renal Artery (MRA)
    - Proximal, Mid, Distal with color and Spectral Doppler
        - Measure Peak Systole at each site
            - Peak Systole should also be recorded at any site of color aliasing or suspected stenosis
- Main Renal Vein (MRV)
    - Document patency with color and Spectral Doppler
- Intrarenal
    - Superior, Mid and Inferior Segmental arteries
        - Measure RI and Acceleration times at each site

Left Kidney

- Long
    - Medial
    - Mid with measurement
    - Mid with Color Doppler
    - Lateral
- Trans
    - Superior
    - Mid with measurement
    - Inferior

Reviewed by Dr. King 7/2017

Subject to change at the discretion of the radiologist due to clinical circumstances.

Renal Artery Ultrasound Cont.

- Main Renal Artery (MRA)
    - Proximal, Mid, Distal with color and Spectral Doppler
        - Measure Peak Systole at each site
            - Peak Systole should also be recorded at any site of color aliasing or suspected stenosis
- Main Renal Vein (MRV)
    - Document patency with color and Spectral Doppler
- Intrarenal
    - Superior, Mid and Inferior Segmental arteries
        - Measure RI and Acceleration times at each site

Bladder

- Long
- Trans
- Show ureteral jets

All Doppler angles are to not exceed 60 degrees

Document and measure all pathology
Annotate all images

Reviewed by Dr. King 7/2017

Subject to change at the discretion of the radiologist due to clinical circumstances.

Ultrasound Scrotum (Adult)

The following images represent a scrotum ultrasound exam. Additional images may be necessary for proper documentation.

Right Teste

- Trans
  - Superior
  - Mid – with measurement, color and Doppler
  - Inferior

- Long
  - Medial
  - Mid – with measurement and color
  - Lateral

Right Epididymis

- Document head, body and tail
- Color image of tail

Left Teste

- Trans
  - Superior
  - Mid – with measurement, color and Doppler
  - Inferior

- Long
  - Medial
  - Mid – with measurement and color
  - Lateral

Left Epididymis

- Document head, body and tail
- Color image of tail

Trans Mid

- Trans to show echo texture and compare color

Varicocele

- Image with measurement and Valsalva image with measurement

Measure and use color on all abnormal anatomy
Annotate all images

Reviewed by Dr. King 7/2017

Subject to change at the discretion of the radiologist due to clinical circumstances.

Ultrasound Spine

The following images represent a spine exam. Additional images may be necessary for proper documentation.

Spine exams should be performed with the patient in a prone position.

Images over area of concern

- Trans
- Long

Panoramic or dual image from T12 to S5 and each vertebrae labeled

Trans images

- T12
- L1
- L2
- L3

Long image at location where conus ends with each vertebrae labeled

Trans cine or m-mode showing movement of filum

Long image of filum with thickness measured

Annotate all images

Reviewed by Dr. Steinberg 3/2021

Subject to change at the discretion of the radiologist due to clinical circumstances.

Ultrasound Thyroid

The following images represent a thyroid ultrasound exam. Additional images may be necessary for proper documentation.

Right Lobe

- Trans
  - Superior
  - Mid – with measurement and color Doppler
  - Inferior
  - Cine – Superior to Inferior
- Long
  - Medial
  - Mid – with measurement and color Doppler
  - Lateral
  - Cine – Medial to Lateral

Isthmus

- Mid – with measurement

Left Lobe

- Trans
  - Superior
  - Mid – with measurement and color Doppler
  - Inferior
  - Cine – Superior to Inferior
- Long
  - Medial
  - Mid – with measurement and color Doppler
  - Lateral
  - Cine – Medial to Lateral

Nodule Evaluation

- 3-plane measure in Long and Trans on sequential images (or split screen) per nodule
  - AP & Trans measurements should be on the Trans image (easier to determine “taller-than-wide” or “wider-than-tall”)
  - Do not measure multiple nodules on the same image
- Color Doppler on each nodule
- Cine any nodule not fully included on standard cine images of each lobe
- Image nodules from Upper Pole to Lower Pole, annotate as “Upper” or “Superior”, “Mid”, and “Lower” or “Inferior”
  - If applicable, combo annotations such as “Mid/Inf” are also ok

Reviewed by Dr. Hilpipre 9/2023

Subject to change at the discretion of the radiologist due to clinical circumstances.

Thyroid Ultrasound Cont.

- Sequentially number nodules from Right to Isthmus to Left
    - For example, 2 nodules on Right ("Nodule 1" and "Nodule 2") and 1 nodule on the Left ("Nodule 3")
- Still images should show any calcification in a nodule (important for TI-RADS)
- Measure up to 2 of the most suspicious nodules per lobe on baseline
    - Most suspicious features: solid/nearly solid, hypoechoic, taller-than-wide, calcifications
    - Least suspicious: mixed cystic/solid, spongiform
    - If study is for a discretely palpable nodule or cyst, that should also be measured
- For follow up exams, measure all previously described TI-RADS 3/4/5 nodules in radiologist report and any new nodules meeting criteria in this protocol
- Do not measure any cyst or nodule 4mm or smaller
- For colloid cysts, only measure largest per lobe (if there are no solid nodules)

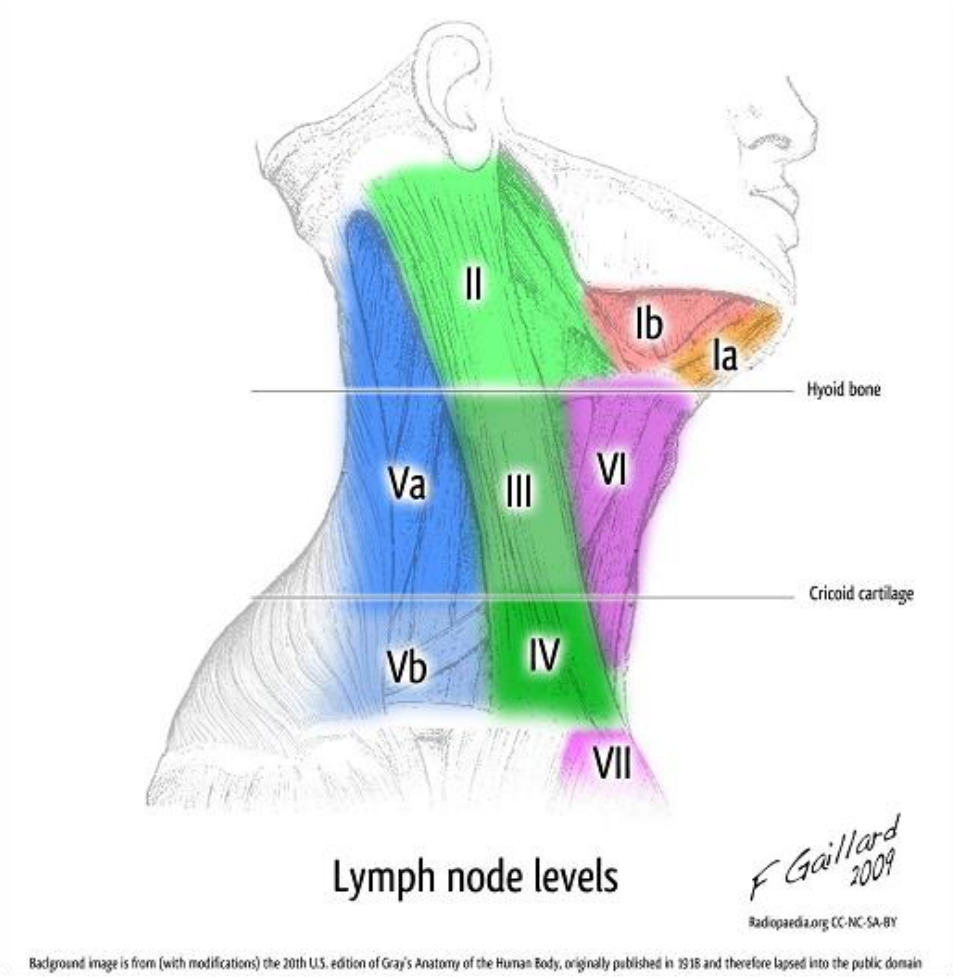
Post-Thyroidectomy Evaluation:

- Trans, Long & Trans Cine of thyroid bed(s) – 3-plane measure & color Doppler any residual thyroid tissue or nodularity
- Be familiar with Lymph Node Zones in attached illustration (see next page)
    - Anatomic boundary descriptions: https://radiopaedia.org/articles/lymph-node-levels-of-the-neck?lang=us
- Scan all bilateral neck zones
- Only image & measure suspicious nodes (unless previously recommended for follow up)
    - Suspicious node features include: round shape, loss of fatty hilum, irregular cortex, heterogeneity, calcifications, cystic spaces & flow outside of hilum
    - Lymph node size is less reliable, but image any node ≥ 1 cm on Trans images (≥ 1 cm in AP or Left-Right dimension)
    - If no borderline or suspicious nodes are identified, provide generic still images of bilateral neck at Zone 2 and document this in your notes
- Node images should include Trans, Long & Trans Cine with 3-plane measurements and Zone annotation
    - Do not routinely provide cine clips showing multiple Zones – clips should only be for individual nodes
- If a node is between Zones, for example it may be annotated as "Zone 2/3"
- Image up to 2 abnormal nodes per Zone

Reviewed by Dr. Hilpipre 9/2023

Subject to change at the discretion of the radiologist due to clinical circumstances.

Thyroid Ultrasound Cont.



Case courtesy of Assoc Prof Frank Gaillard, "https://radiopaedia.org/" Radiopaedia.org.
From the case "https://radiopaedia.org/cases/9618" ID: 9618

Reviewed by Dr. Hilpipre 9/2023

Subject to change at the discretion of the radiologist due to clinical circumstances.

Transcranial Doppler (TCD)

The following images represent a transcranial doppler exam. Additional images may be necessary for proper documentation.

TCD Exam should be performed with the patient in the supine position. The patient should be awake, quiet and calm.

Obtain color and spectral doppler images from each of the locations listed below:

Right Transtemporal Window

- RT MCA: Right Middle Cerebral Artery
- RT PCA, P1 and P2: Right Posterior Cerebral Artery, segments P1 and P2
- RT ACA: Right Anterior Cerebral Artery

Left Transtemporal Window

- LT MCA: Left Middle Cerebral Artery
- LT PCA, P1 and P2: Left Posterior Cerebral Artery, segments P1 and P2
- LT ACA: Left Anterior Cerebral Artery

Transforaminal Window

- RT VA: Right Vertebral Artery
- LT VA: Left Vertebral Artery
- BA: Basilar Artery

Right Submandibular Window

- RT ICA Distal: Right Internal Carotid Artery

Left Submandibular Window

- LT ICA Distal: Left Internal Carotid Artery

Thoroughly interrogate each vessel to identify any signs of stenosis, occlusion or other abnormality

Document the highest MFV (Mean Flow Velocity) for each site
Annotate all images

Reviewed by Dr. Steinberg 12/2019

Subject to change at the discretion of the radiologist due to clinical circumstances.

Ultrasound
Upper Extremity
Venous Duplex

The following images represent an upper extremity venous duplex ultrasound exam. Additional images may be necessary for proper documentation.

Gray scale images should be recorded *with* **and** *without* compression at each of the following levels:

(Transverse presentation)

- IJV
  - PROX
  - MID
  - DIST
- DIST SUBCLAVIAN V (IF ABLE)
- AXILLARY V
- BRACHIAL (TO LEVEL OF ANTECUBITAL FOSSA)
  - PROX
  - MID
  - DIST
- BASILIC V (TO LEVEL OF ANTECUBITAL FOSSA)
  - PROX
  - MID
  - DIST
- CEPHALIC V (TO LEVEL OF ANTECUBITAL FOSSA)
  - PROX
  - MID
  - DIST

Color flow / pulsed wave images should be recorded at each of the following levels:

When performing the pulsed wave, distal augmentation should also be performed in a normal study.
If thrombosis is suspected, do NOT perform any augmentations.

(Longitudinal presentation)

- IJV
  - PROX, MID, DIST
    - Color at all
    - PW at MID
- SUBCLAVIAN V
  - PROX, MID, DIST

Reviewed by Dr. Karibo 7/2017

Subject to change at the discretion of the radiologist due to clinical circumstances.

Upper Ext. Venous Ultrasound Cont.

        - Color at all
        - PW at all
- AXILLARY V
    - Color
    - PW w/ augment
- BRACHIAL V
    - PROX, MID, DIST
        - Color at all
        - PW w/ augment at MID
- BASILIC V
    - PROX, MID, DISTAL
        - Color at all
        - PW w/ augment at MID
- CEPHALIC V
    - PROX, MID, DISTAL
        - Color at all
        - PW w/ augment at MID

Abnormal findings and normal variants require additional images to document the complete extent of the abnormalities and variants.

The extent and location of sites where the veins fail to compress completely should be clearly recorded and generally require additional images.

Annotate all images

Reviewed by Dr. Karibo 7/2017

Subject to change at the discretion of the radiologist due to clinical circumstances.