

**Ultrasound – Evaluation for Penile Abnormalities**

**PURPOSE:**

To evaluate for rupture of the corpus cavernosum, identify a retained foreign body, or characterize other focal abnormalities or collections of the penis and surrounding soft tissues.

**SCOPE:**

Applies to all penile ultrasound studies performed in:

- UT Southwestern University Hospitals and Clinics, Imaging Services (UTSW)
- Parkland Health and Hospital System, Department of Radiology (PHHS)

**INDICATIONS:**

- History, clinical signs (examples: ecchymosis, swelling), or symptoms (example; pain) associated with penile trauma; penile pain, priapism, evaluation for Peyronie’s disease
- Abnormal findings on other imaging studies

**CONTRAINDICATIONS:**

- No absolute contraindications.
- **Erectile Dysfunction (E.D.) – A complete assessment typically requires intra-cavernosal prostaglandin injection, which is not offered in Radiology. These requests should be referred to Urology.**
  - In rare cases, young patients with E.D. may undergo a penile Doppler in Radiology to confirm blood flow in the cavernosal arteries.

**EQUIPMENT:**

High-frequency linear array transducer with a frequency range of at least 7-18 MHz

**PATIENT PREPARATION:**

- None

**EXAMINATION:**

**GENERAL GUIDELINES:**

A complete examination includes evaluation of the entirety of the penile shaft, penile base, glans penis, both corpora cavernosa and central arteries, and corpora spongiosum.

**EXAM INITIATION:**

- Introduce yourself to the patient and family
- Verify patient identity using patient name and DOB
- Explain test
- Obtain patient history including symptoms. Enter and store data page
- Place patient in supine position with a towel covering the scrotum. The penis should be orientated toward the feet, placed over the towel, for imaging of the dorsal penile surface. For imaging of the ventral surface, the penis should be oriented toward the head, positioned on the abdomen over a towel.

**TECHNICAL CONSIDERATIONS:**

- Review any prior imaging, making note of associated abnormalities requiring evaluation.

## UT Southwestern Department of Radiology

- The ventral penis is the anterior surface when the penis is erect. The dorsal penis is the surface positioned posteriorly (toward the abdomen) when the penis is erect.
- The paired corpora cavernosa, along the dorsal penis, constitute the erectile tissue of the penis and extend from the penile base to the glans penis (tip) on either side.
- The cavernosal arteries are located centrally within each corpus cavernosum. Use low-flow Doppler parameters.
- The single corpus spongiosum, along the ventral penis, contains the penile urethra and distally expands to form the glans penis.
- Grayscale and cine images should be annotated with the position of the penis and the surface being imaged.
- **Rule out Penile Fracture.**
  - Evaluate corpora for disruption as denoted by discontinuity of echogenic ring of tunica at periphery of corpora.
  - Location of any penile hematoma will lead you to area of fracture.
  - Key images are gray-scale images in area of hematoma/tunical disruption.
  - Longitudinal color and spectral Doppler images of cavernosal arteries required to charge for US Penile Doppler (don't typically help in diagnosis).
- **Evaluate for Peyronie's disease.**
  - Evaluate corpora cavernosa for regions of peripheral tunical thickening, echogenic and often calcified plaques. Most commonly seen dorsally at base of penis.
  - Key images are transverse and gray-scale images of any tunical plaques with size and location.
  - Strain elastography, or linear-transducer shear wave elastography, may help identify areas of increased, asymmetric tunical stiffness.
  - Longitudinal color and spectral Doppler images of cavernosal arteries required to charge for US Penile Doppler (don't help in diagnosis).
- **Evaluate Priapism.**
  - Most cases not evaluated with ultrasound. Urologist obtains blood gas from corpus cavernosum.
  - Our job would be to differentiate if priapism is low-flow (most cases) or high flow.
  - Key images are color Doppler images of corpora using low-flow settings. Low flow priapism will have little if any flow in the corpora. High flow priapism is from a traumatic injury and will demonstrate a focal region of high flow in the corpus cavernosum due to an arteriovenous fistula, with corresponding low-resistance waveforms in the corresponding cavernosal artery.
  - Longitudinal color and spectral Doppler images of cavernosal arteries needed.
- **Evaluate Penile swelling.**
  - Diffuse swelling often infectious/inflammatory.
  - Key images are gray-scale and color Doppler. Longitudinal color and spectral Doppler images of cavernosal arteries required to charge for US Penile Doppler.
  - **Balanitis** – inflammation of foreskin/glans penis. Gray-scale and color Doppler show thickening and hyperemia of foreskin and glans penis. Evaluate for any abscess.

## UT Southwestern Department of Radiology

- **Penile Abscess** – rare, can be due to fistula from perianal region. Gray-scale and color Doppler images of any fluid collections or any fistula tracts extending to scrotum/perineum. Evaluate corpora for any internal abscess.
- **Penile mass** – penile cancer usually at glans penis or involving foreskin. Evaluate area of any palpable mass. Gray-scale and color Doppler images of any mass. If mass dorsal, evaluate superficial dorsal vein for thrombosis.

### DOCUMENTATION:

- Ventral penis
  - Transverse images:
    - Proximal without and with color Doppler
    - Mid without and with color Doppler
    - Distal, near glans penis without and with color Doppler
    - Glans
    - Cine sweep images of each corpus cavernosum, base to glans
  - Longitudinal images:
    - Right corpus cavernosum with and without color Doppler
    - Midline/corpus spongiosum with and without color Doppler
    - Left corpus cavernosum with and without color Doppler
    - Cine sweep images of each corpus cavernosum
- Dorsal penis
  - Transverse images:
    - Penile base without and with color Doppler
    - Proximal without and with color Doppler
    - Mid without and with color Doppler
    - Distal, near glans penis without and with color Doppler
    - Glans without and with color Doppler
    - Cine sweep images of each corpus cavernosum, base to glans
  - Longitudinal images:
    - Right corpus cavernosum with and without color Doppler
    - Midline/corpus spongiosum with and without color Doppler
    - Left corpus cavernosum with and without color Doppler
    - Right cavernosal artery, prox, mid and distal, with color Doppler and spectral Doppler
    - Left cavernosal artery, prox, mid and distal, with color Doppler and spectral Doppler
    - Midline superficial dorsal vein
    - Cine sweep images of each corpus cavernosum
- Measure any hematoma or other collection, mass, or any plaque visualized
- Data page(s)

### PROCESSING:

- Review examination images and data
- Export all images to PACS
- Document relevant history and any study limitations

# UT Southwestern Department of Radiology

## **REFERENCES:**

J Ultrasound Med 2005; 24:993–1000

Penile Doppler Ultrasound for Erectile Dysfunction: Technique and Interpretation. AJR 2019

## **REVISION HISTORY:**

<b>SUBMITTED BY:</b>	David T. Fetzer, MD	<b>Title</b>	Medical Director
<b>APPROVED BY:</b>	David T. Fetzer, MD	<b>Title</b>	Medical Director
<b>APPROVAL DATE:</b>	11-09-2015		
<b>REVIEW DATE(S):</b>	09-24-2018		Jeffrey Pruitt, MD
<b>REVISION DATE(S):</b>	11-15-2015	<b>Brief Summary</b>	
<b>REVISION DATE(S):</b>	09-24-2018; Pruitt	<b>Brief Summary</b>	Changed exam title from Penile Trauma to Penile Abnormalities; Added additional indications for exam; added cavernosal artery evaluation info; added info on tunical plaques
	02-10-2020	<b>Brief Summary</b>	Updated indications/contraindications; added illustrations; updated image order

## **APPENDIX:**





