

Quick Reference Guide



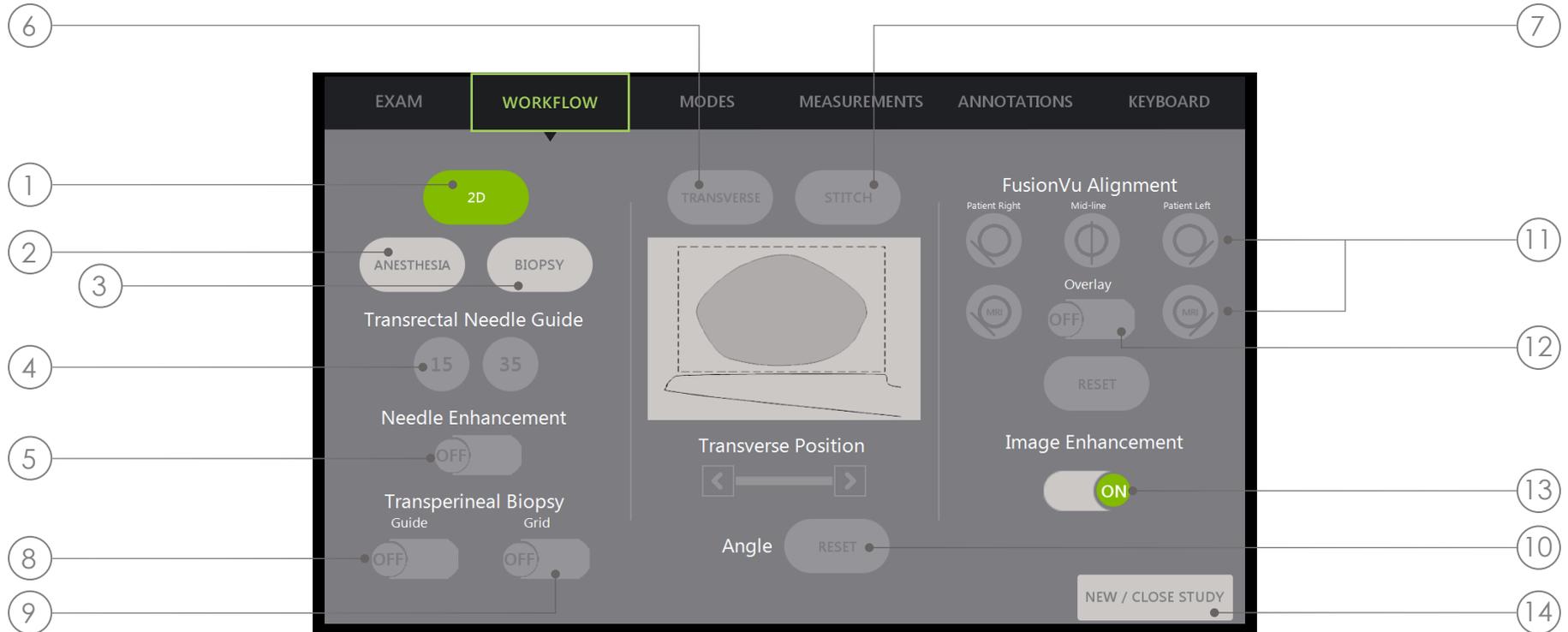
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EXACT⁺VU™

micro-ultrasound system
for targeted prostate biopsies

- Monitor
- Touch Screen
- TGC Sliders
- Control Panel
- Ergonomics Controls
- Thermal Printer (optional)
- System Power Control
- Transducer Connector Slots
- Castor Locks





1. **2D:** The “default” imaging mode. Allows the user to quickly go back to this imaging mode (and imaging settings) from the **Biopsy/Anesthesia** Sub-modes. In Transperineal, allows user to go back and activate **Transverse** and **Angle Reset**.
2. **Anesthesia:** Optimizes settings for anesthesia delivery.
3. **Biopsy:** Optimizes settings for biopsy.
4. **Needle Guide:** Switches between **15°** and **35°** needle guide overlays.
5. **Needle Enhancement:** Toggles visualization of biopsy needle on/off.
6. **Transverse:** Allows a transverse image to be constructed in real time.
7. **Stitch:** Allows images to be combined for measurement of large prostates.

8. **Transperineal Biopsy Guide:** Activates needle guides on the screen for sagittal plane when using the EV29L Sterile Transperineal Needle Guide.
9. **Transperineal Biopsy Grid:** Activates needle guides on the screen for transverse plane when using the template.
10. **Angle Reset:** Allows user to reset the rotation angle to zero in lithotomy and right left decubitus positions.
11. **FusionVu™ Alignment:** Used to align edges of the prostate in ultrasound and MRI when using FusionVu features.
12. **Overlay:** Turns on/off scouting image (FusionVu)
13. **Image enhancement:** Turns on/off image post-processing
14. **New/Close Study:** Adds new study or closes and saves current study.

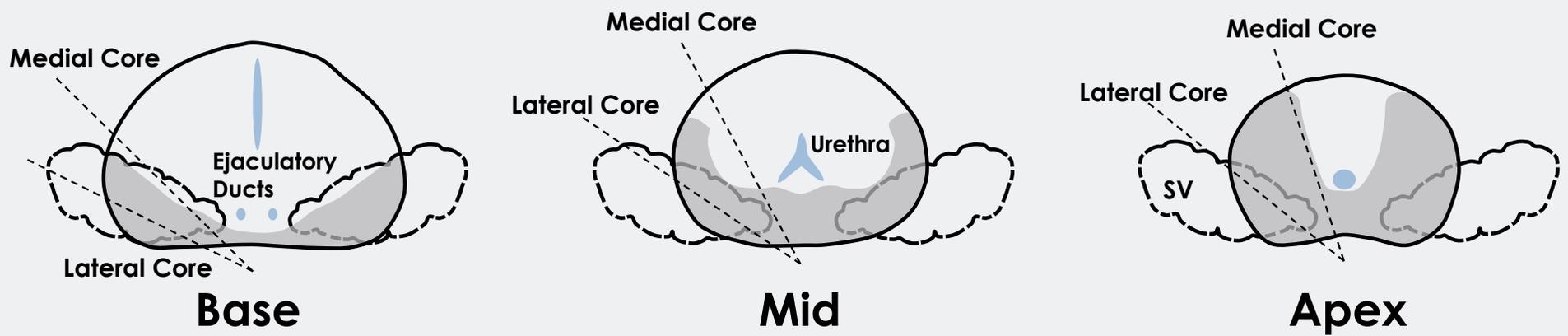
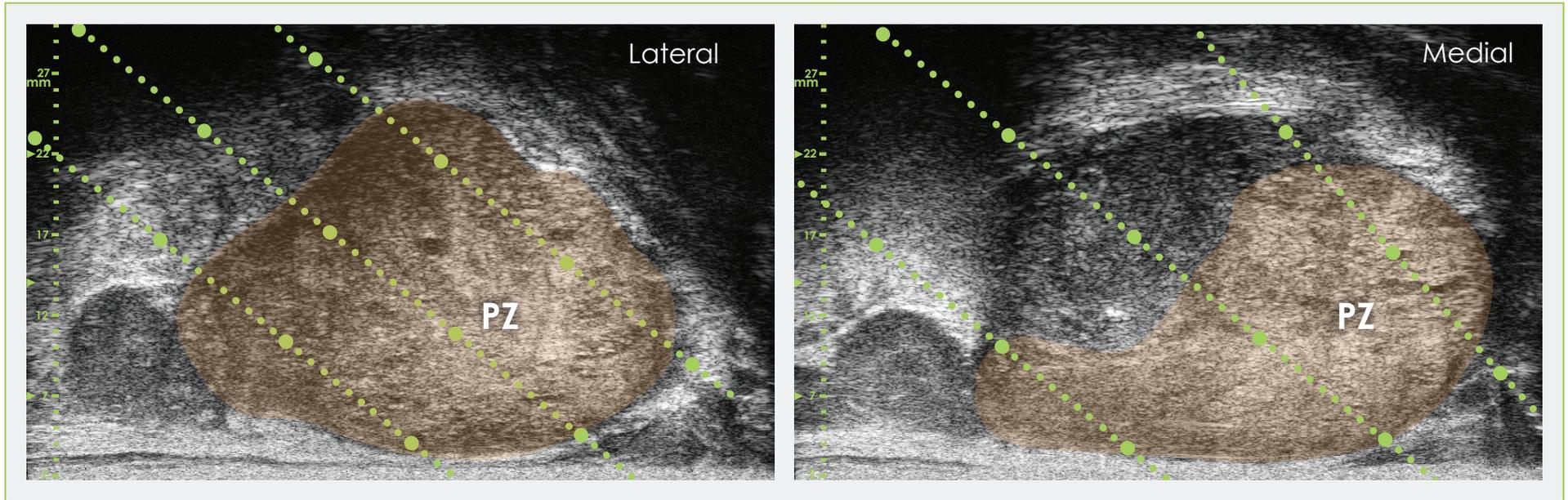


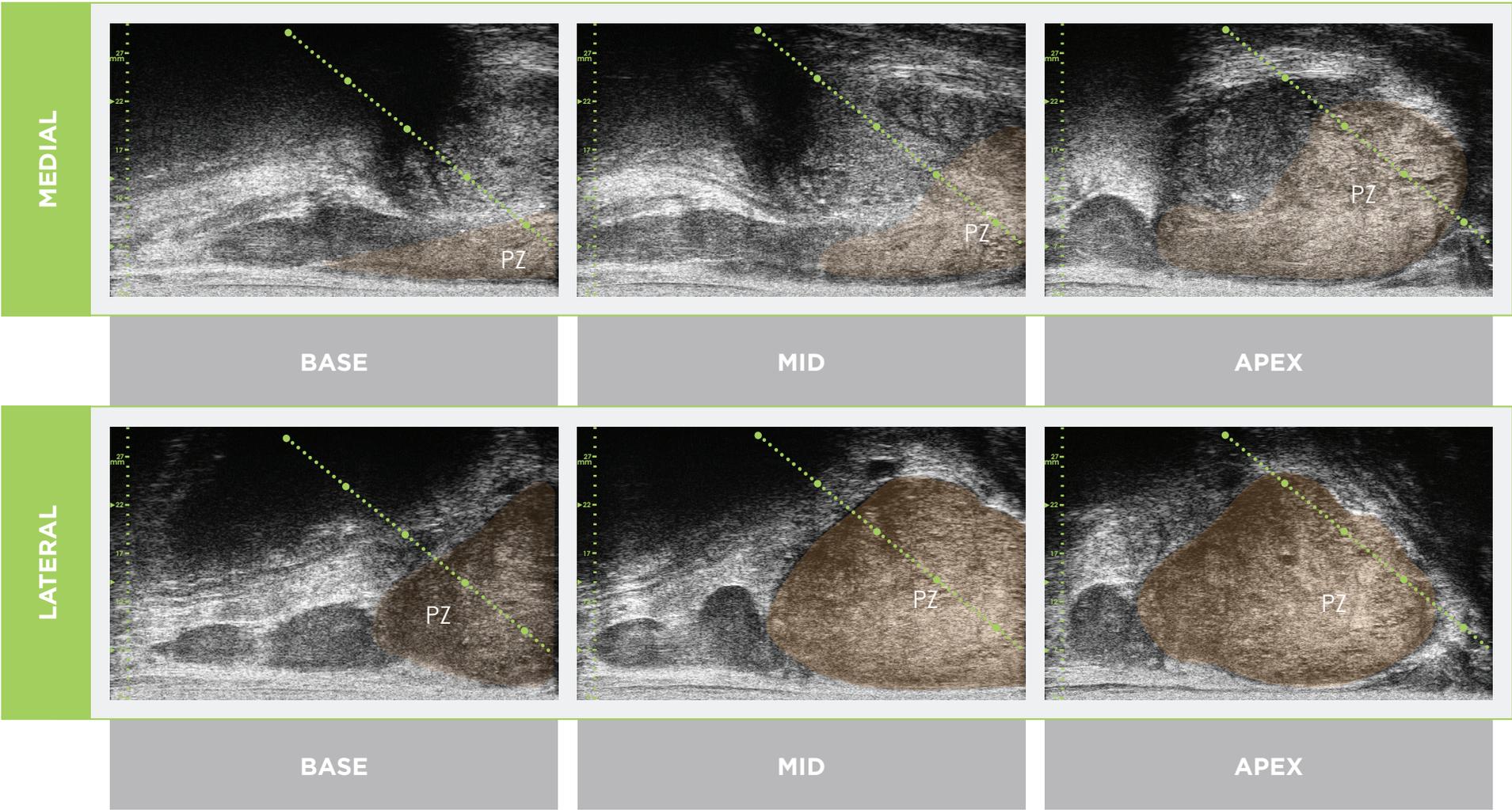
1. **Gain:** Increases/decreases the **intensity of the image**.
2. **Image:** Cycles through **image presets**.
3. **Dynamic Range:** Increases/decreases the **contrast** of the ultrasound image.
4. **Annotate:** Opens the **Annotations** touch screen.

5. **Dual/Transverse:** Begins imaging in **Dual** or **Transverse Mode**.
6. **2D:** Begins imaging in **2D Mode**.
7. **Depth:** Increases/decreases the **image depth**.
8. **Focus:** Increases/decreases the **depth of a single focal zone**.
9. **Measure:** Initiates **default measurement type** for current mode.

10. **Cine:** Saves up to the last 300 frames as a **cine**. 60 frames are saved in Biopsy Mode.
11. **Frame:** Saves a **single frame**.
12. **Print:** **Prints** the current Screen image on the (optional) thermal printer.
13. **Freeze:** Toggles between **live/paused imaging**.

- ① Dim room lights
- ② **TGC “J” shape** in center. Adjust **Gain**
- ③ **Large** Image setting
- ④ **Sweep** through prostate to the **lateral edges**
- ⑤ Save **“Cine”**
- ⑥ **Volume** Measurement:
 - I. Find **MIDLINE**
 - II. Decide if **Normal** or **Large** ProstateFor **Normal Prostate**:
 - + Press **“Dual/Transverse”****OR**For **Large Prostate**:
 - + **Pull out** to reach **APEX** on screen
 - + Press **“STITCH”**
 - + **Push in** to align **both** images
 - + Press **“Dual/Transverse”**
- III. **Slow Sweep** to the borders to build **“TRANSVERSE IMAGE”**
- IV. Press **“Freeze”** then **“Measure”**
- V. Press **“Next”** | x3 for the 3 measurements
- VI. Press **“Set”**
- VII. Press **“Print”** and **“Frame”**
- ⑦ Press **“2D”**
- ⑧ Press **“Image”** preset and change to **“SMALL”**
- ⑨ **Slow sweep** through prostate to the **left and right lateral edges**
- ⑩ Press **“Cine”** to save the **sweep in small**
- ⑪ **Interrogate** the gland for **suspicious areas**
- ⑫ Press **“ANESTHESIA”** (**white line**)
- ⑬ Press **“BIOPSY”** (**green line**)
- ⑭ Press **“CINE”** after each biopsy





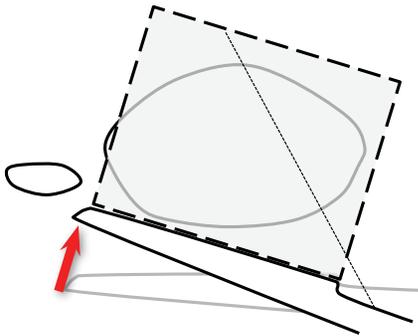
* The green dotted line (in the images above) is the needle guide overlay.

*The distance between each of the two “large” green dots is 1 cm.

Side-Fire Transducer Technique for Apical Horn Sampling

Step 1

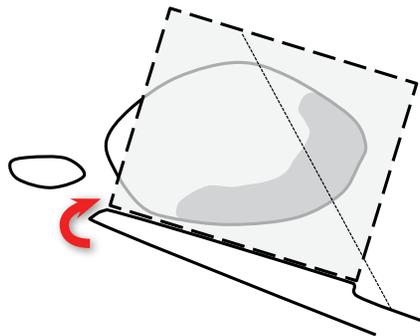
Tilt



Tilt the transducer to maximize the sample size

Step 2

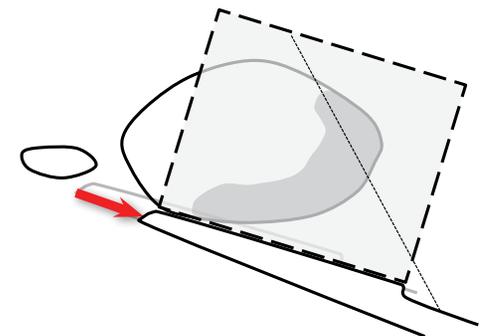
Rotate



Rotate the transducer to fully visualize the horn

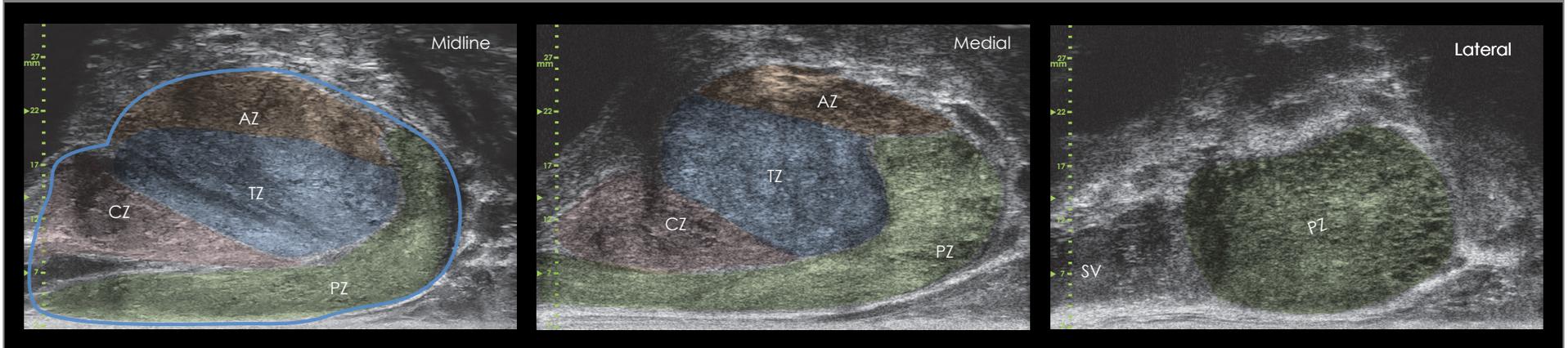
Step 3

Pull-Out

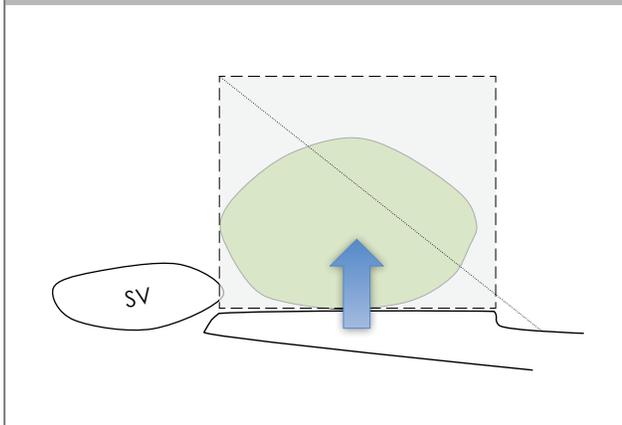


Pull-out the transducer to reach the Apex

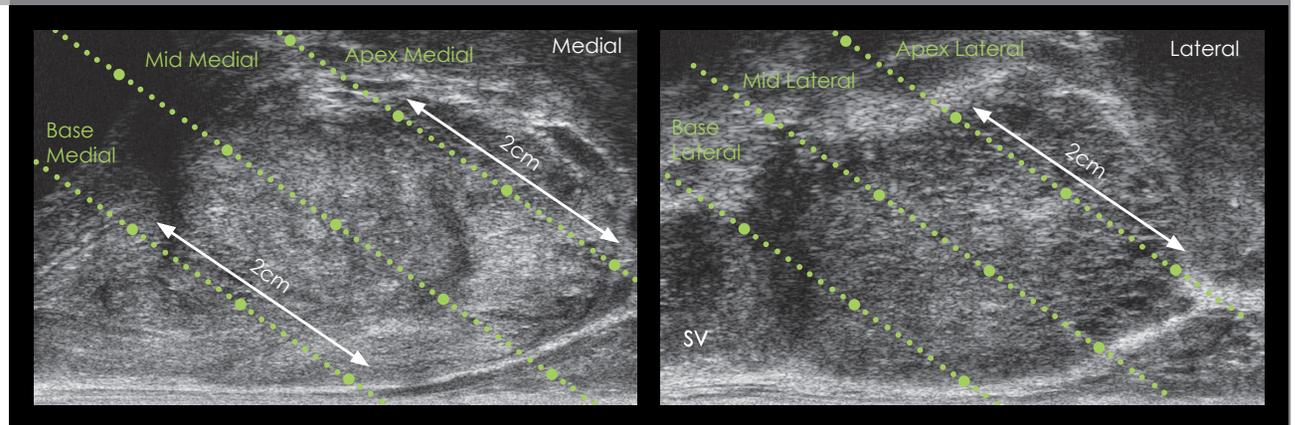
Prostate Anatomy (using high-resolution micro-ultrasound)



Core Length



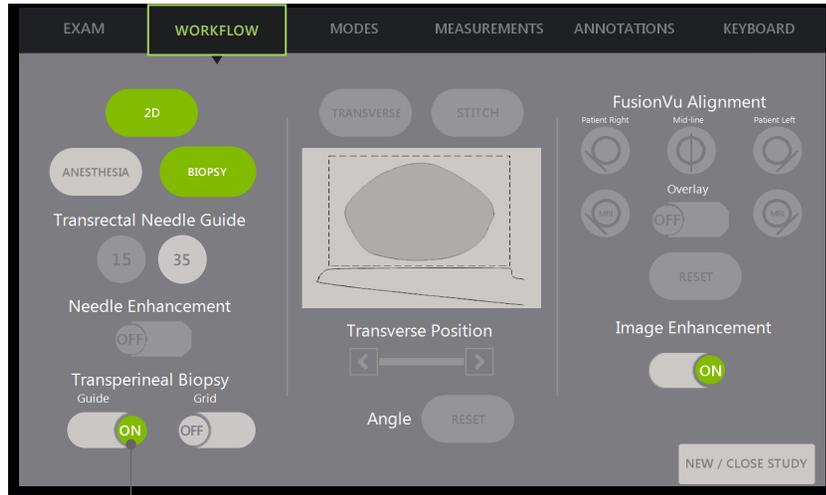
Core Spacing and Needle Guide Scale



Transperineal Biopsy using Needle Guide or Template

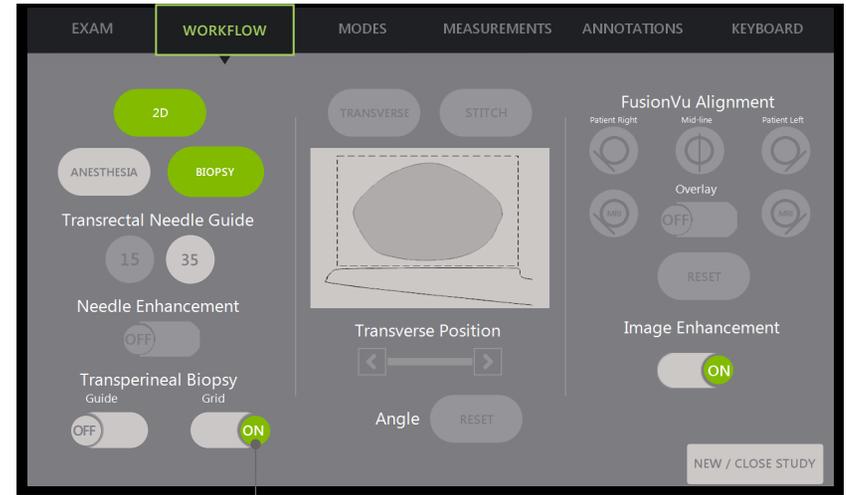
- Follow the same initial steps as for TRUS for image optimization and volume.
- Select **2D** and **Biopsy**.

For Transperineal Biopsy using Needle Guide:

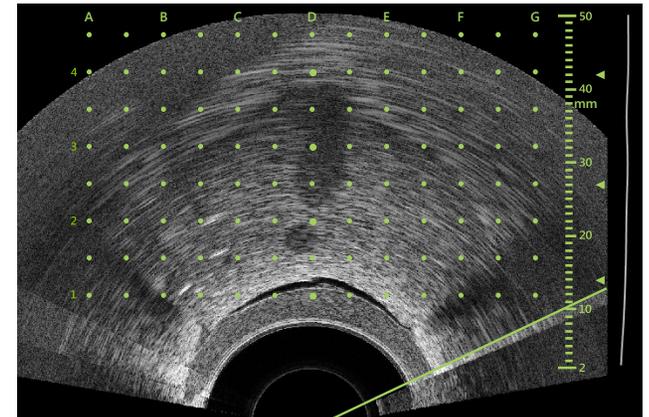
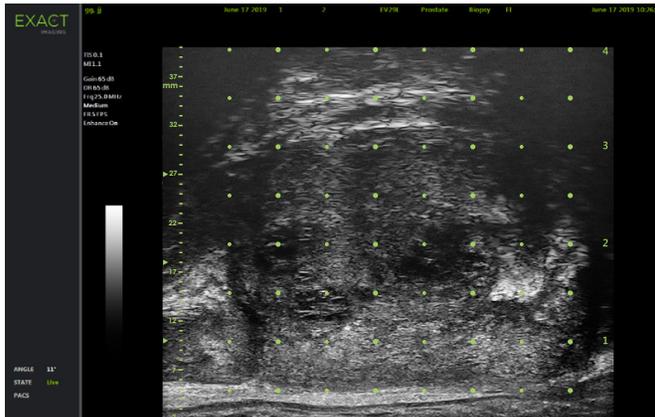


Turn **Transperineal Biopsy Guide ON**.

For Transperineal Biopsy Using Template:

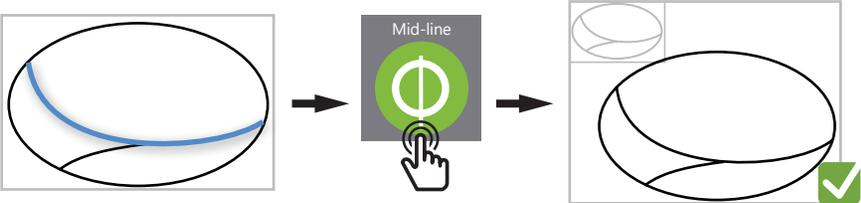


Turn **Transperineal Biopsy Grid ON**.

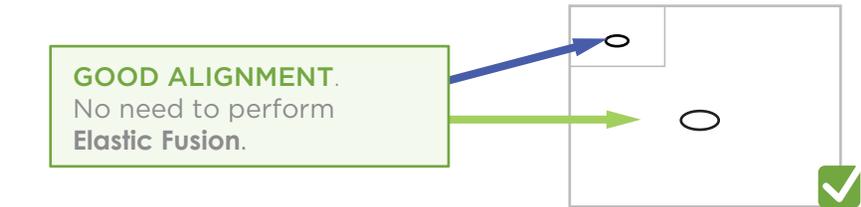


- 1 Mark and load your FusionVu MRI study as usual.
- 2 Perform your **Micro-Ultrasound (MicroUS)** assessment of the prostate.

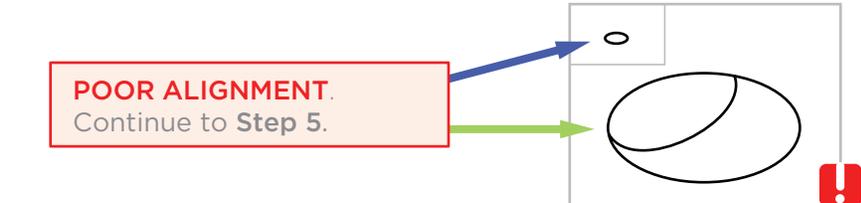
3 Locate the **Urethra** and press “Mid-line” to align the MRI.



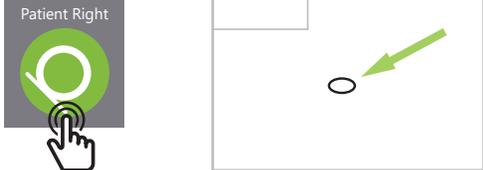
4 Rotate probe to observe whether the lateral borders on **MicroUS** match the lateral borders on the **MRI**.



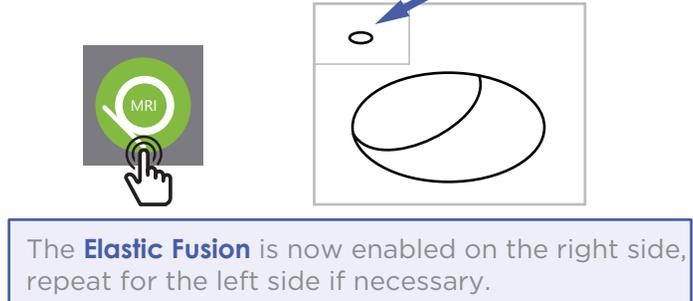
END.....



5 Rotate the probe until you reach the **lateral** aspect of the prostate in the **MicroUS** image. Press the “Patient Right” button.



6 Rotate the probe until you identify the most **lateral** aspect of the prostate in the **MRI** image and press the “MRI” button.



7 Rotate the probe to locate the **MRI** target, and examine the live **MicroUS** image to identify the corresponding lesion according to **PRI-MUS™**.



! If the alignment appears incorrect press “RESET” and repeat the process from Step 3.



FusionVu accuracy is dependent on rotating the probe along the patient's sagittal axis.

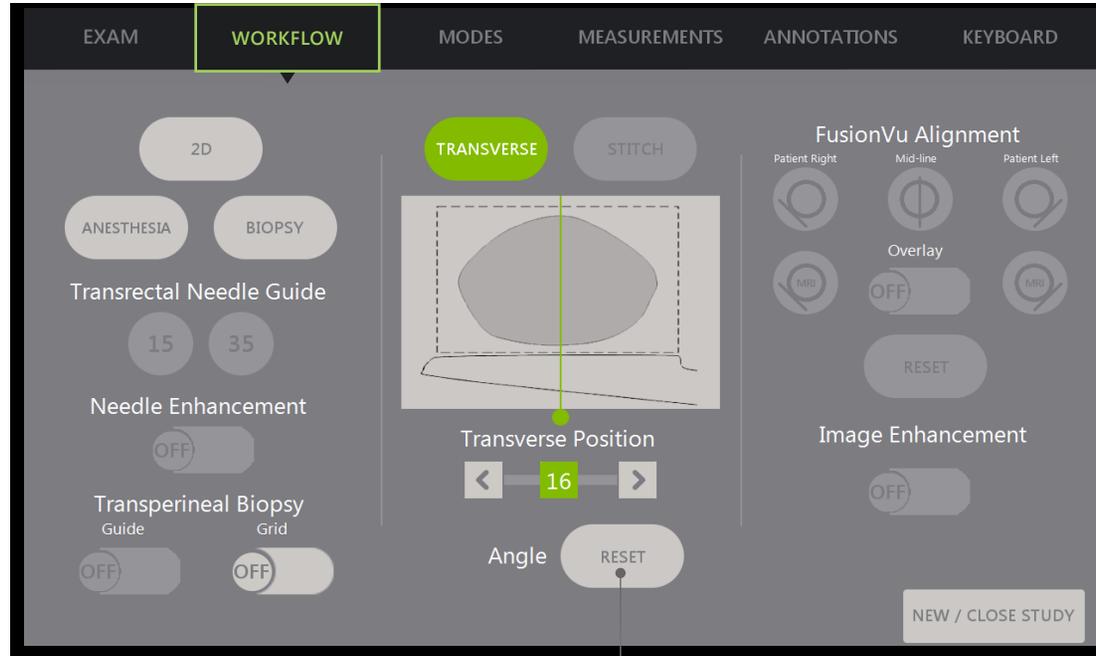
Remember to keep the transducer aligned with the patient's spine during the procedure to avoid alignment errors.



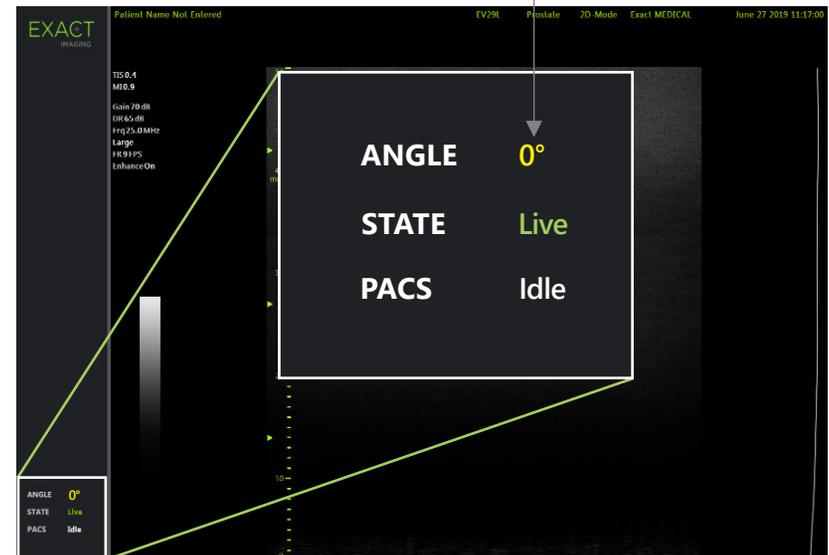
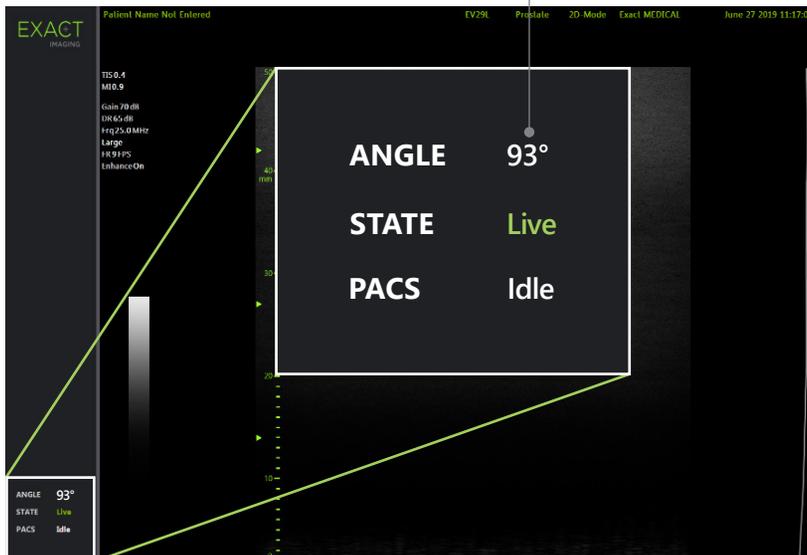
Rotation along the sagittal axis.
ACCURATE FUSION. ✓



Lateral deviation from the sagittal axis.
POOR FUSION. !



Angle Reset resets the angle to zero, if needed



PRI-MUS™: Prostate risk identification using micro-ultrasound

REFERENCE: Ghai, S. et al., "Assessing Cancer Risk on Novel 29 MHz Micro-Ultrasound Images of the Prostate: Creation of the Micro-Ultrasound Protocol for Prostate Risk Identification", *Journal of Urology*, 2016 Aug;196(2):562-9

SYSTEMATIC BIOPSY

TARGET SUSPICIOUS REGION

PRI-MUS ①

PRI-MUS ②

PRI-MUS ③

PRI-MUS ④

PRI-MUS ⑤

1 "Swiss Cheese"

2 Hyper, ductal patches

3 Mild hetero, bright echoes in hyper tissue

4 Bright Echoes "Starry Sky"

5 Irregular Shadowing



Benign



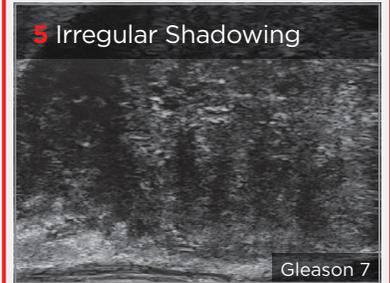
Benign



Benign



Gleason 8



Gleason 7

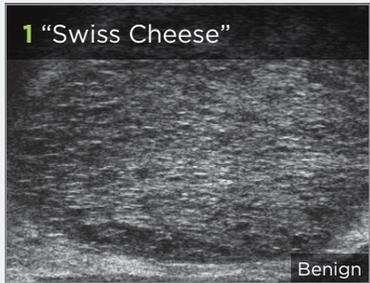
1 "Swiss Cheese"

2 Hyper, ductal patches

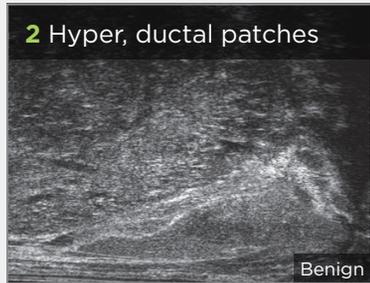
3 Mild hetero, bright echoes in hyper tissue

4 "Cauliflower"

5 Mixed Echo Lesion with Irregular Prostate border



Benign



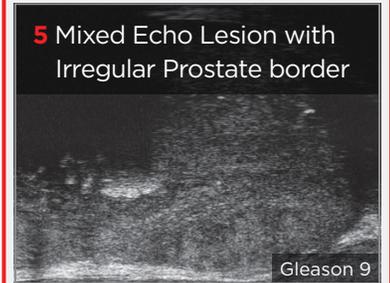
Benign



Gleason 7



Gleason 8



Gleason 9

1 "Swiss Cheese"

2 Hyper, ductal patches

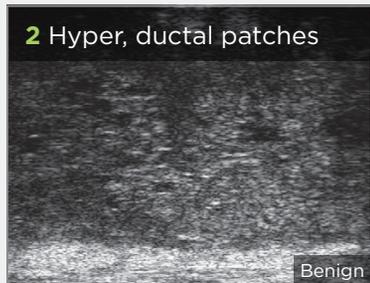
3 Mild hetero, bright echoes in hyper tissue

4 "Smudgy/Mottled"

5 Hypoechoic Lesion with Irregular Prostate border



Benign



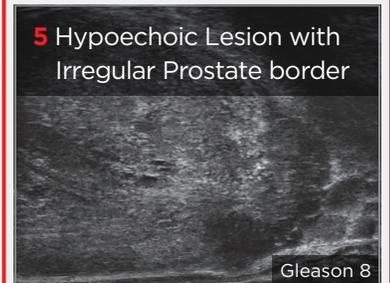
Benign



Gleason 7



Gleason 7



Gleason 8

1 "Swiss Cheese"

2 Hyper, ductal patches

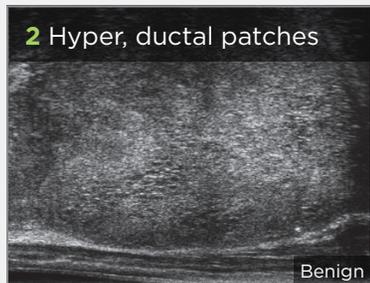
3 Mild hetero, bright echoes in hyper tissue

4 Bright Echoes "Starry Sky"

5 Mixed Echo Lesion



Benign



Benign



Gleason 7



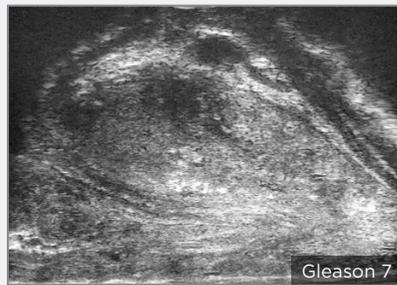
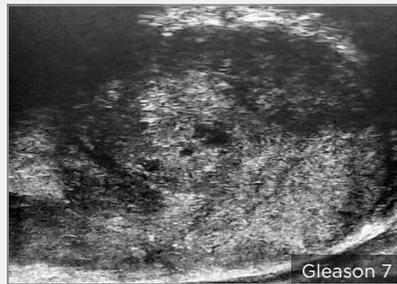
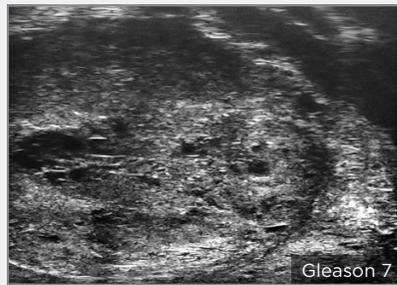
Gleason 7



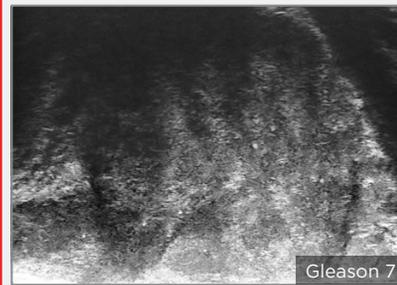
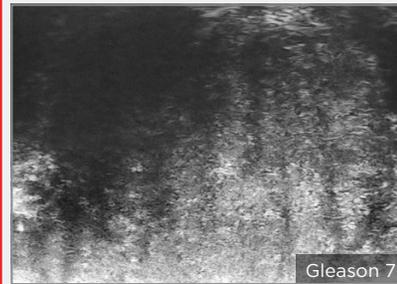
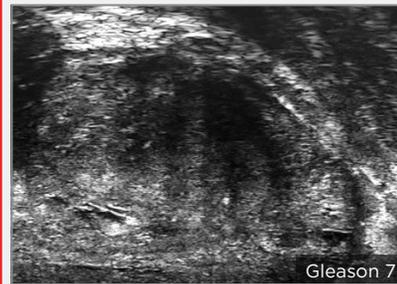
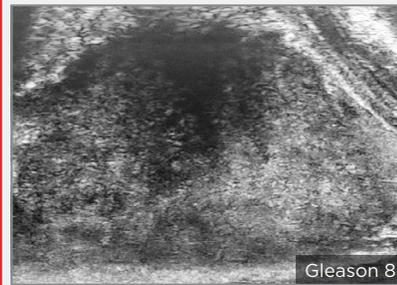
Gleason 7

HIGH-RISK FEATURES (NO PARTICULAR ORDER OF RISK)

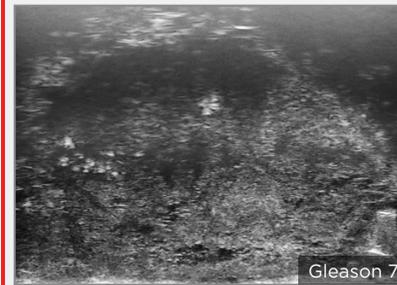
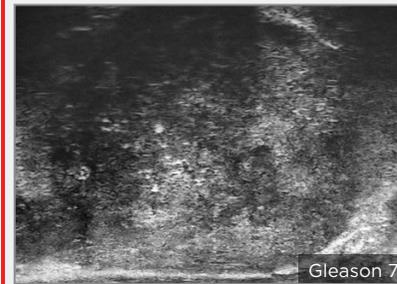
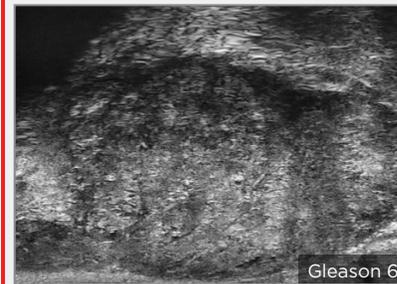
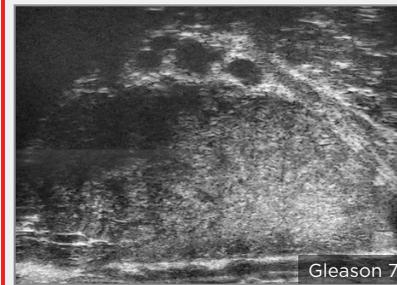
Focal Anterior Lesions



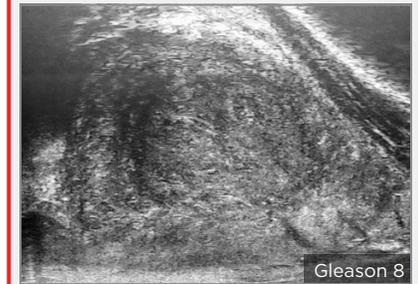
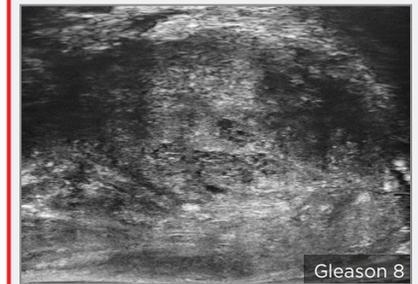
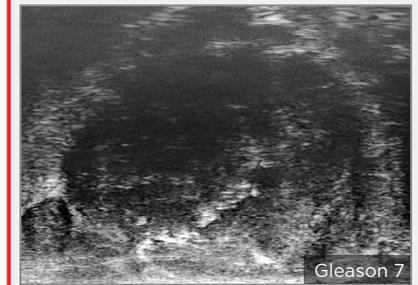
Hypoechoic Finger-like Projections



Storm-cloud



Lesions Occupying the Anterior Horn and Lateral Anterior Prostate



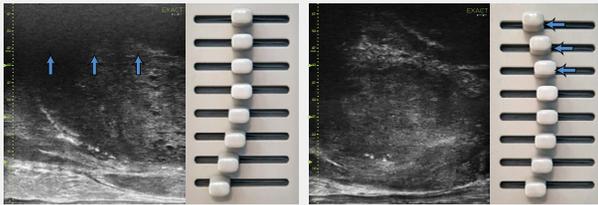
Anterior Apex



Most common locations for AP cancer.

- ✦ Use the existing PRI-MUS chart to evaluate the anterior apical horn and lateral anterior PZ for suspicious features.
- ✦ Use the correct apical horn sampling technique to ensure good coverage of the anterior apex.
- ✦ Pay close attention to the capsular anterior mid gland and anterior apex during assessment. This is where most AP cancer occurs.

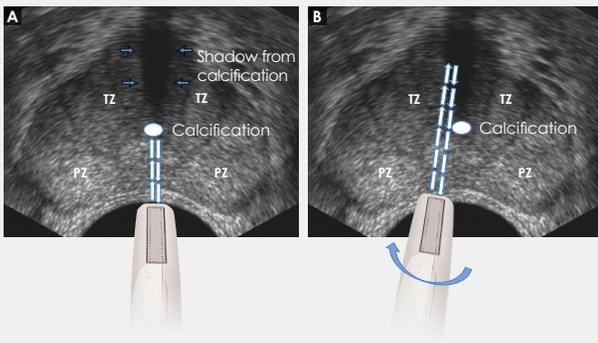
TGC Optimization



Adjustment of the top TGC sliders to minimize 'noise' in the far field. A hazy, noisy far field can be rectified by 'bending' the top TGC sliders to the left.

- ✦ Use an appropriate depth setting for interrogating the AP and AP capsule. AP Cancer is just as likely a finding in a small gland as in a very large gland.
- ✦ Linear zone boundaries can be balanced with use of appropriate gain and TGC settings.
- ✦ Try 'bending' the top three TGC sliders to the left to reduce any far field noise in the image.

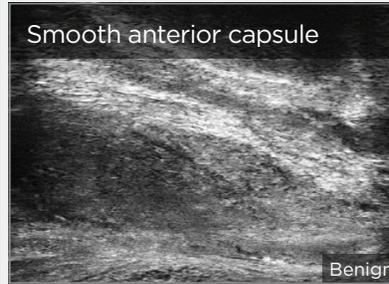
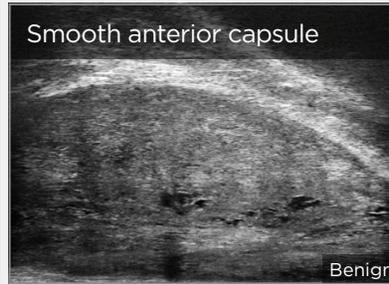
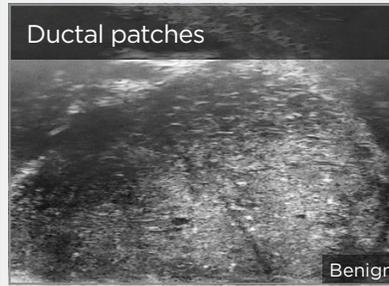
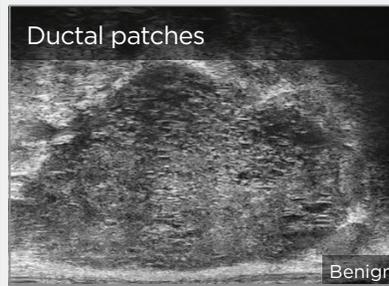
Handling Calcifications



- ✦ Apply gentle probe pressure to dissipate subtle shadowing artifacts.
- ✦ Manipulate and angle the probe to overcome dense calcifications along the line of the urethra.

LOW-RISK FEATURES

Ductal Patches in Hyper or Hypoechoic Tissue



Pitfalls and Nodules

