

# Steps for conducting intestinal ultrasound

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# Disclosure

I have received:

- Speaker fees from **Janssen, AbbVie, Pfizer, Galapagos, Tillotts, Alfa Sigma**
- Advisory board/consultancy fees from **Janssen, AbbVie, Pfizer, Galapagos**

# Prepare the machine and yourself



- Know the indication, clinical setting and history of the patient
- Clean hands/probe (NO alcoholic solutions)
- On the right side of the patient
- Cord does not belong on the floor or around your neck
- Probe in right hand
- Left hand on buttons

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# Is fasting a preparation requirement for the patient?



Mentimeter

0 ✖

Always required

0 ✖

Not required

0 ✔

Preferred for motility assessment

→ Start quiz



Select a different Menti

Menti

Mod 1 kuwait\_Steps for ...



Choose a slide to present

Is fasting a preparation requirement for the patient?

0 ✖ 0 ✖ 0 ✔

Always required Not required Preferred for motility assessment

Linear Probe: Which is correct?

0 ✖ 0 ✔ 0 ✖ 0 ✖

Has low frequency Has high frequency Needs to have an overview Don't use it to perform IUS

You can turn your probe...

0 ✔ 0 ✖ 0 ✖ 0 ✖ 0 ✖

90° clockwise 180° clockwise 90° anticlockwise 180° anticlockwise as you prefer

Why are landmarks important?

# Preparation (patient)

## Fasting

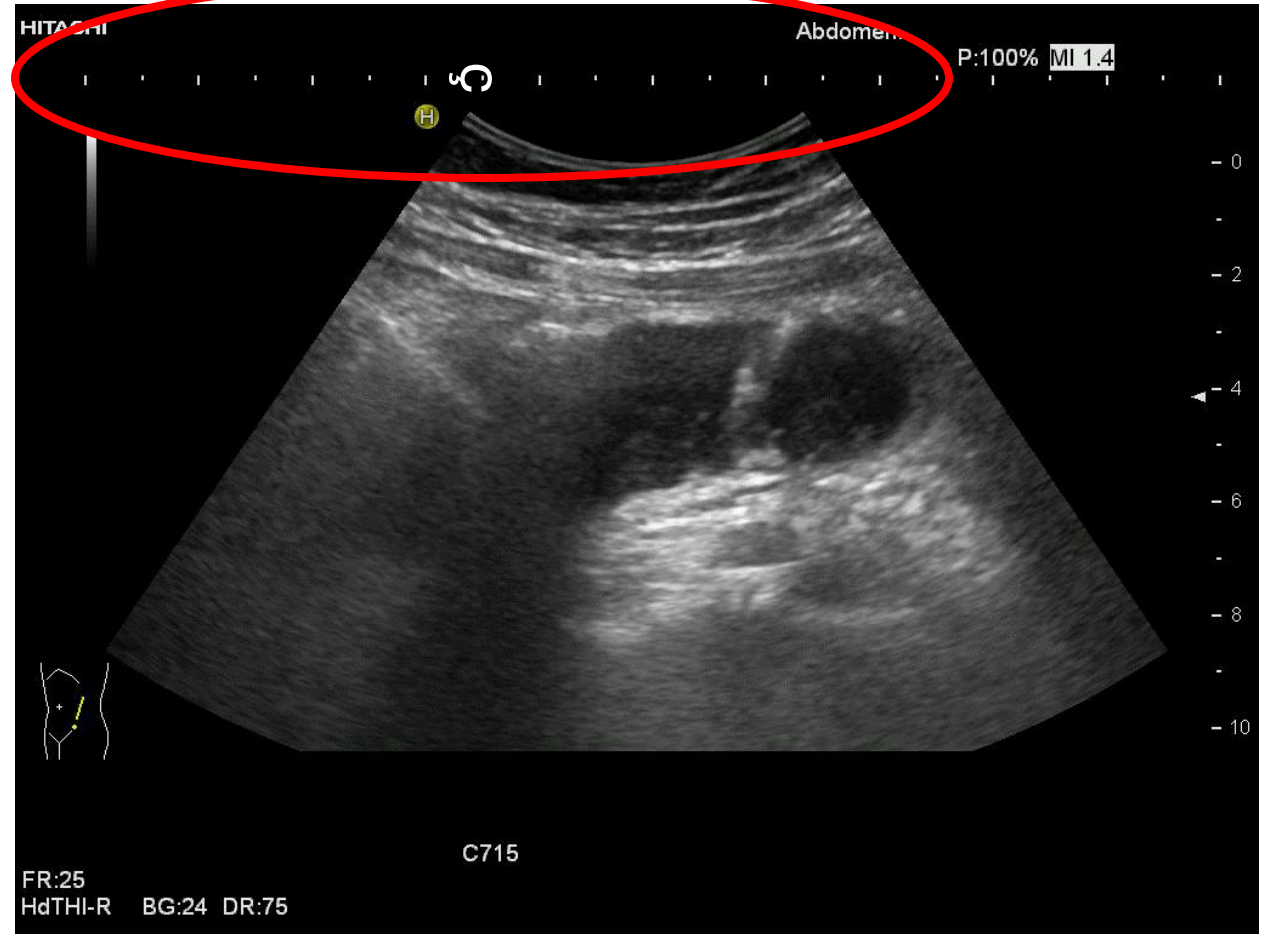
- not necessary
- >4 h → reduce amount of food and air in the small bowel
- >6 h → recommended before assessing splanchnic blood flow and GI motility





# Prepare the machine – Insert patient's details

- Check patient ID / details
- Save examination when you finish



# Ultrasound machine



Monitor

Touchscreen

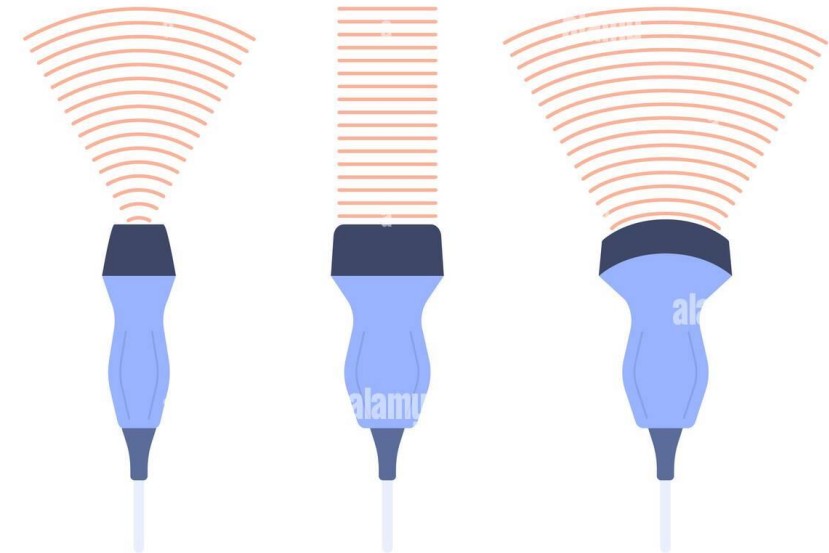
Probes

Control panel

Gel



# Ultrasound probes



PHASED ARRAY

LINEAR

CURVILINEAR

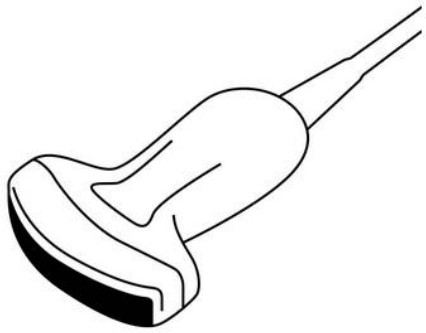
## ULTRASOUND PROBE TYPES

Frequency



# Properties of the different probes

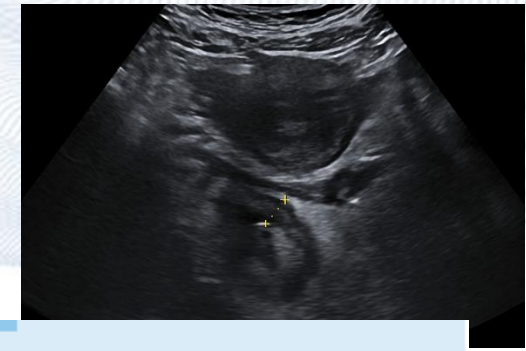
**Low frequency:** 1-6 MHz, overview, more depth, less resolution



curved array for a larger field, detect pathology

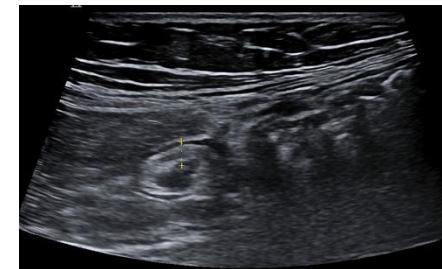
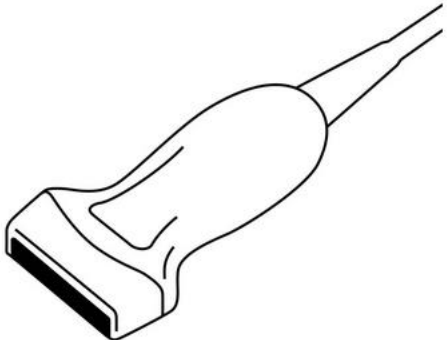
## RECOMMENDATIONS:

1. For a complete examination of the bowel both a low and high resolution probe are needed, LoE 5, GoR C, Strong consensus 13/13
2. A probe with a frequency above 5 MHz should be used when measuring wall thickness, LoE 4, GoR B, Strong consensus 13/13



*Nylund K et al. EFSUMB Recommendations and Guidelines for Gastrointestinal Ultrasound, Ultraschall Med 2017*

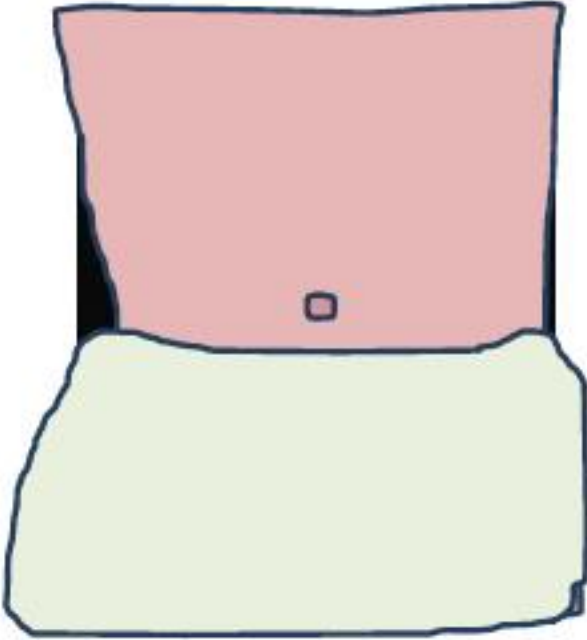
**High frequency:** > 5MHz (5-10 MHz), only surface accessible (8-10 cm depth penetration), high resolution, detailed examination (discrimination of stratification of the bowel wall)



# Ultrasound technique



# Prepare the patient





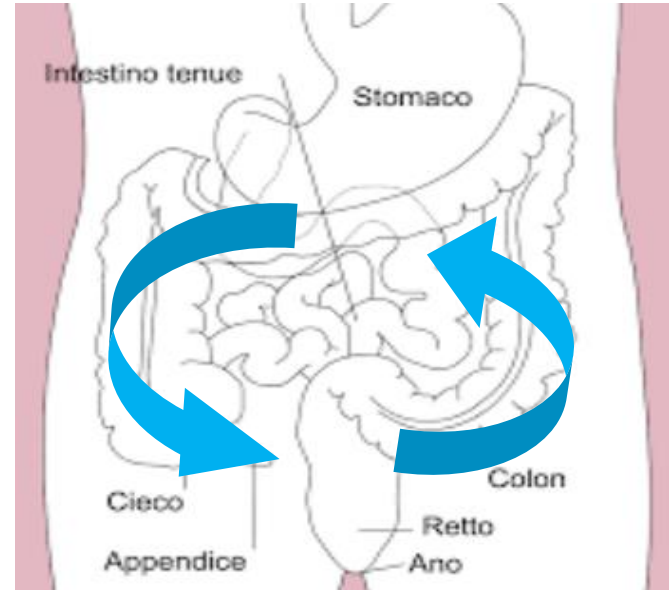


- Expose abdominal area adequately
- Water-based ultrasound gel
- Hold the probe correctly



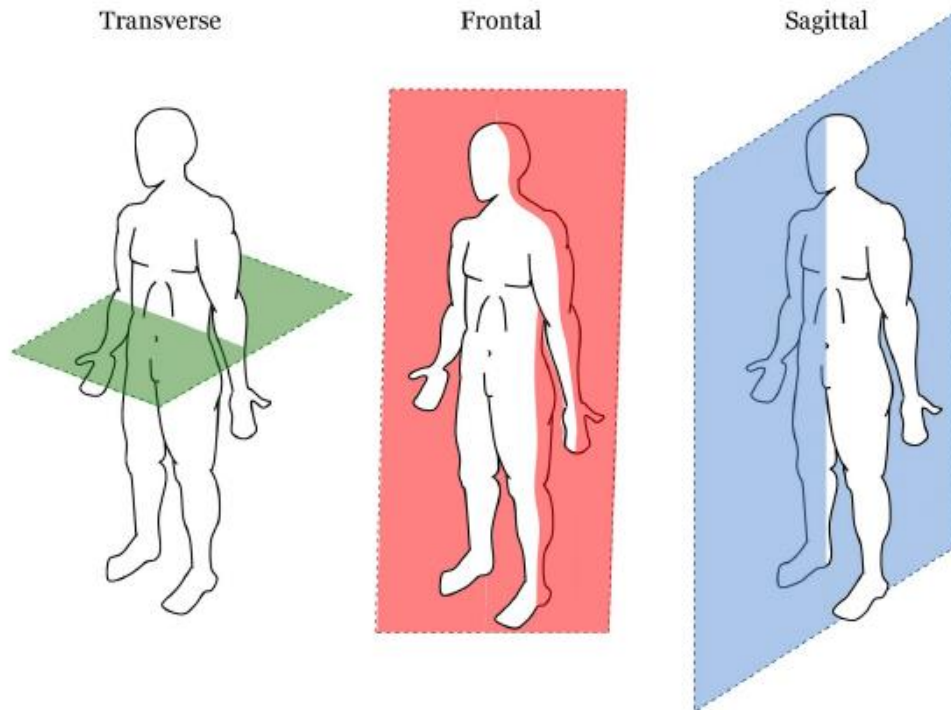


# Ultrasound technique

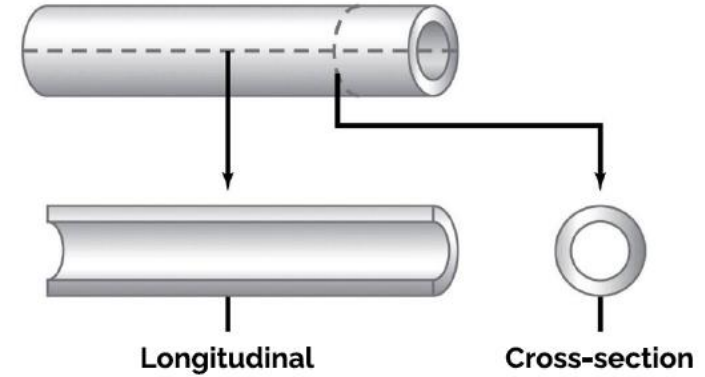


In a segment-wise manner, **all portions** of the bowel are scanned in long and short axes, and images are simultaneously captured to ensure **a continuous assessment**

# Scan planes



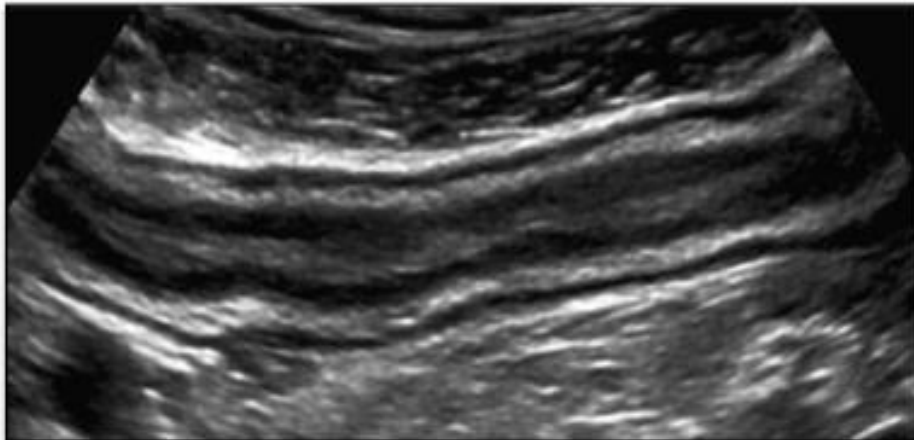
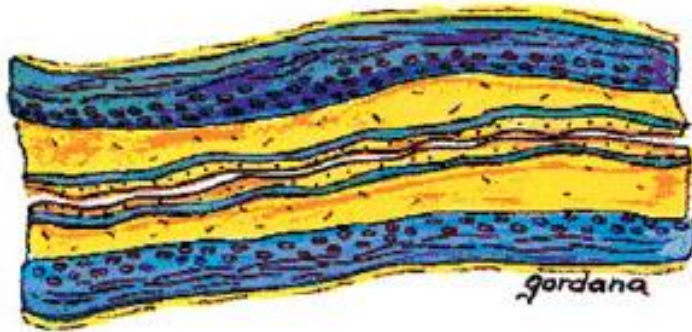
Imaging



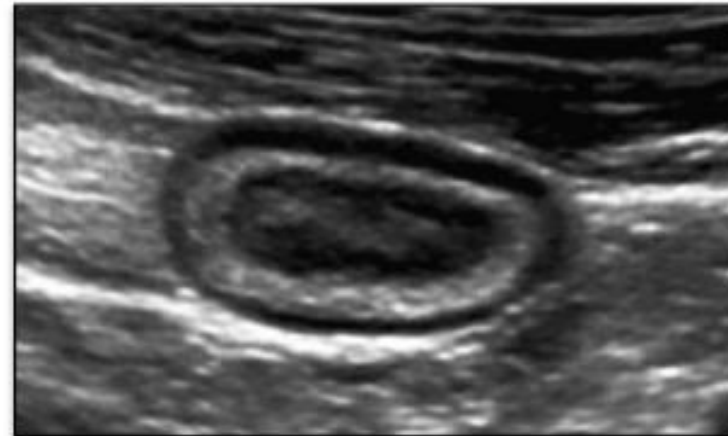
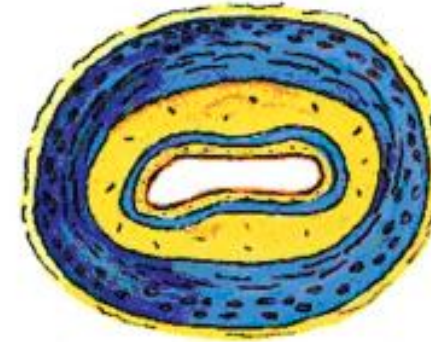
Intestinal ultrasound

# Scan planes

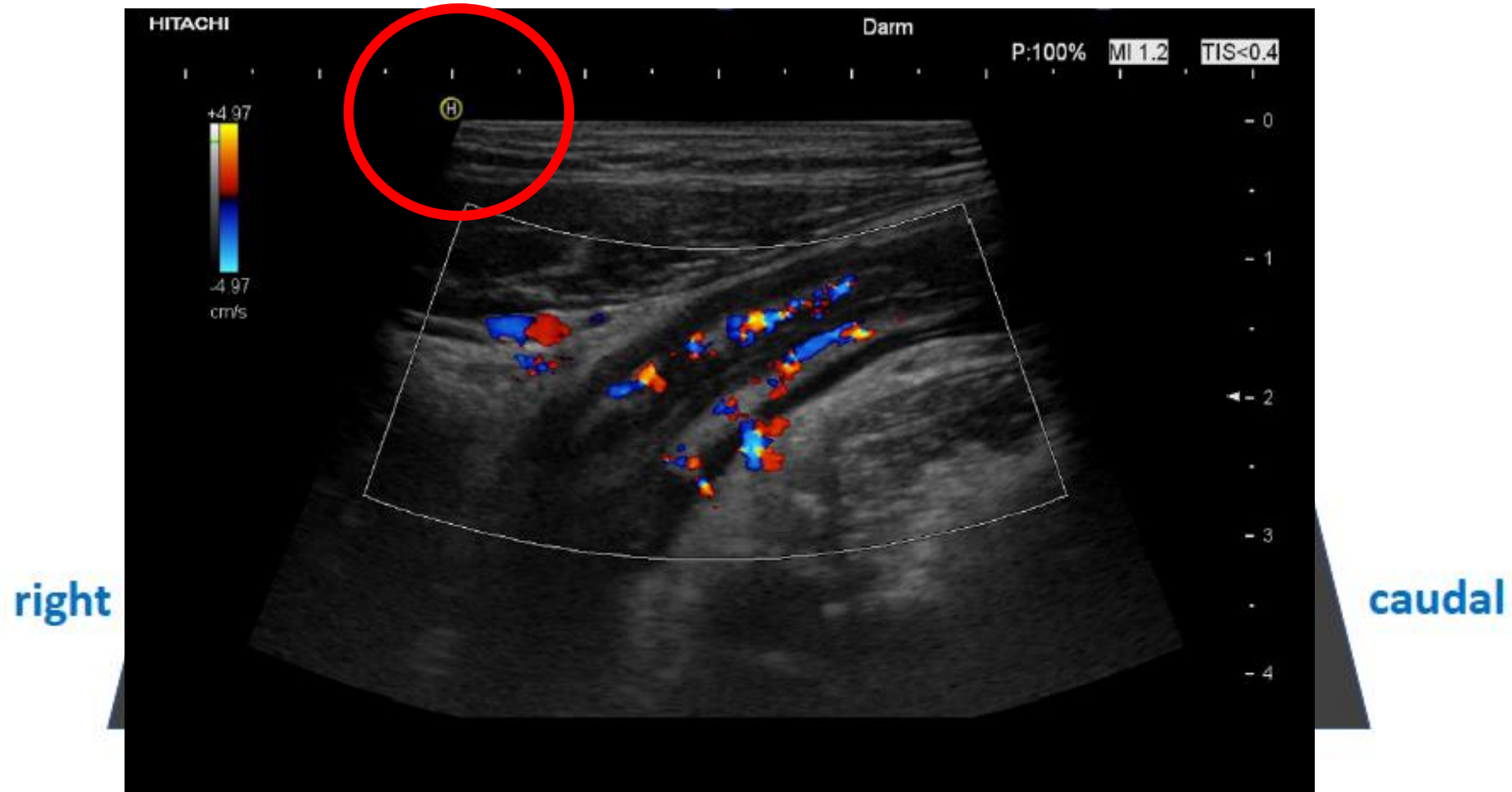
Longitudinal



Cross-section



# Probe orientation







Menti

Mod 1 kuwait\_Steps for ...



Choose a slide to present

Is fasting a preparation requirement for the patient?

0 0 0

Always required Not required Adjusted to reliability of scan and

Linear Probe: Which is correct?

0 0 0 0

Has low frequency Has high frequency Needs to have an overhead. Don't use it to perform US

You can turn your probe...

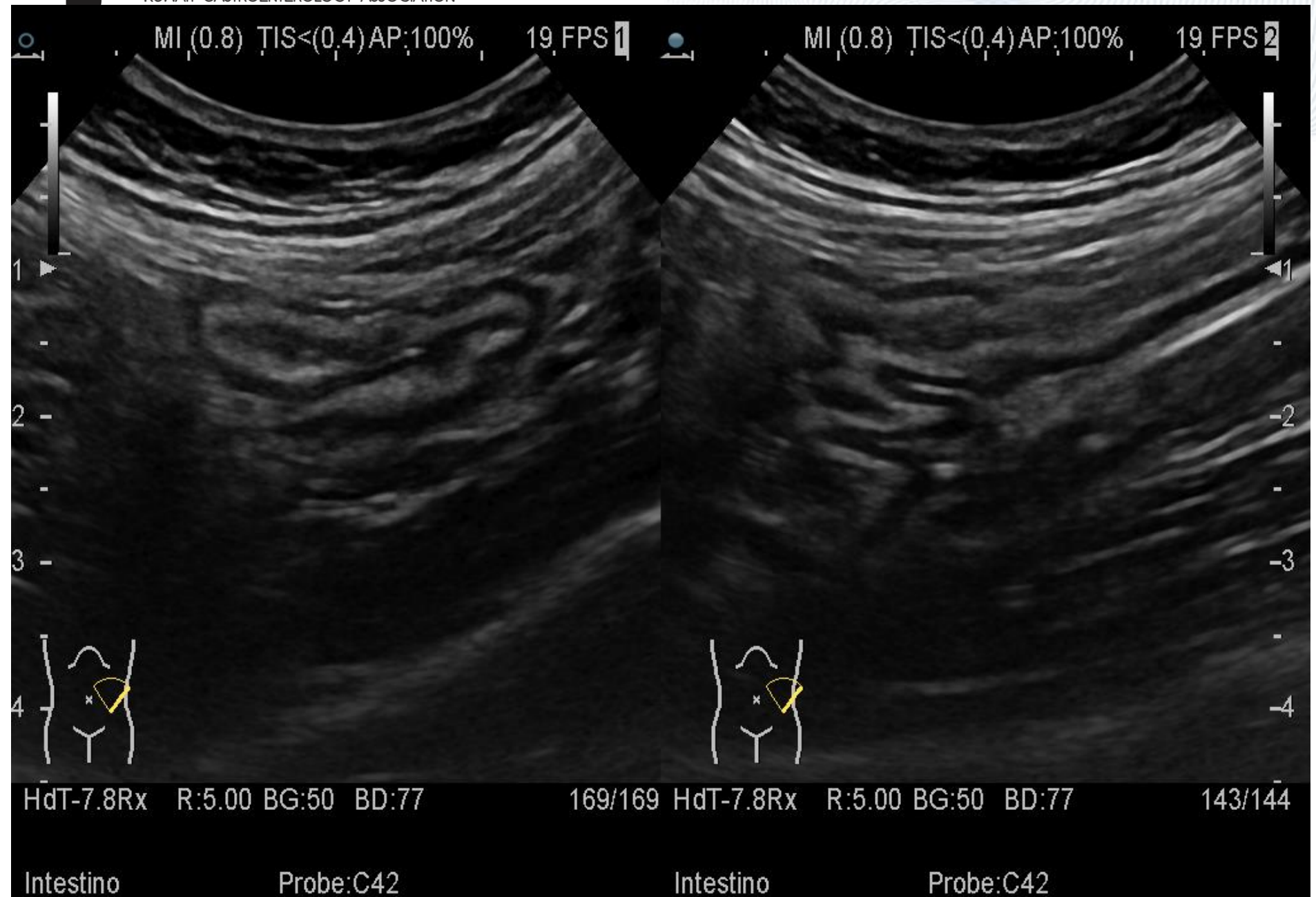
0 0 0 0 0

90° clockwise 180° clockwise 90° anticlockwise 180° anticlockwise as you prefer

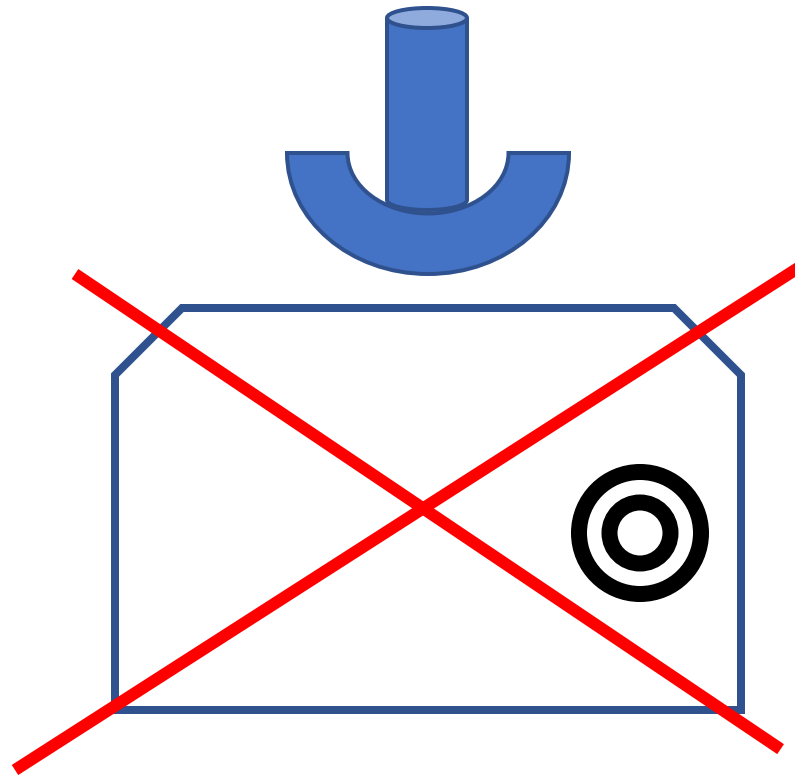
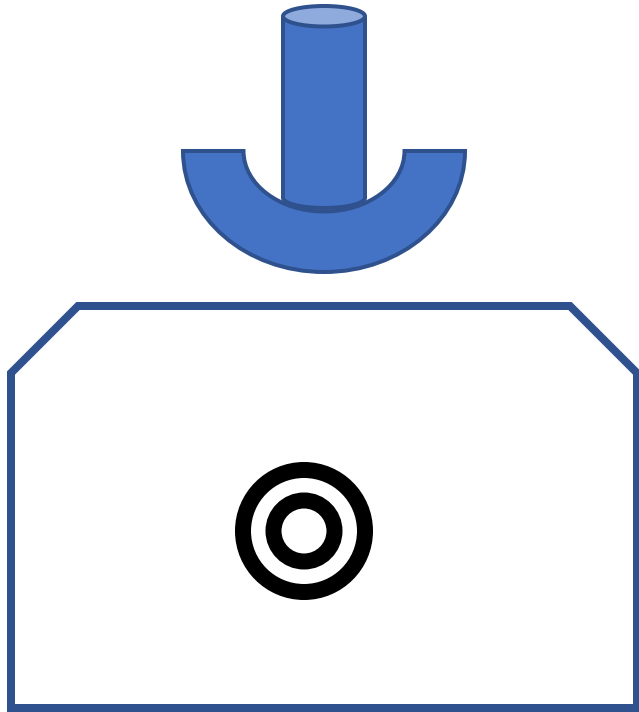
Why are landmarks important?

# Turning the probe



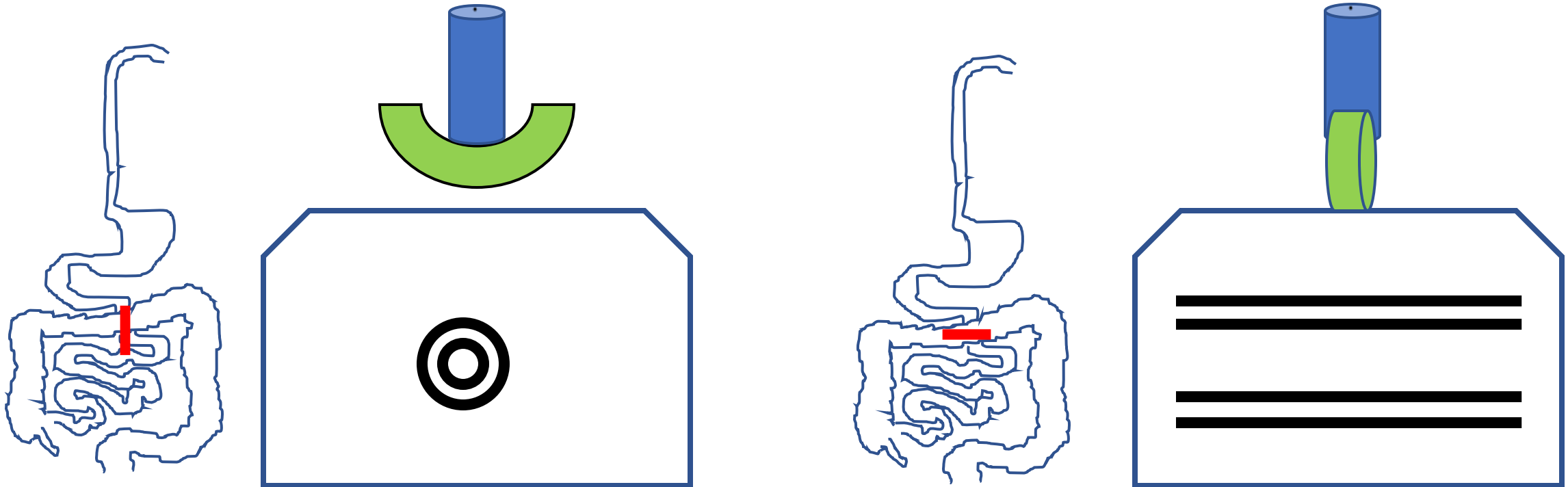


# Keep your region of interest in the center

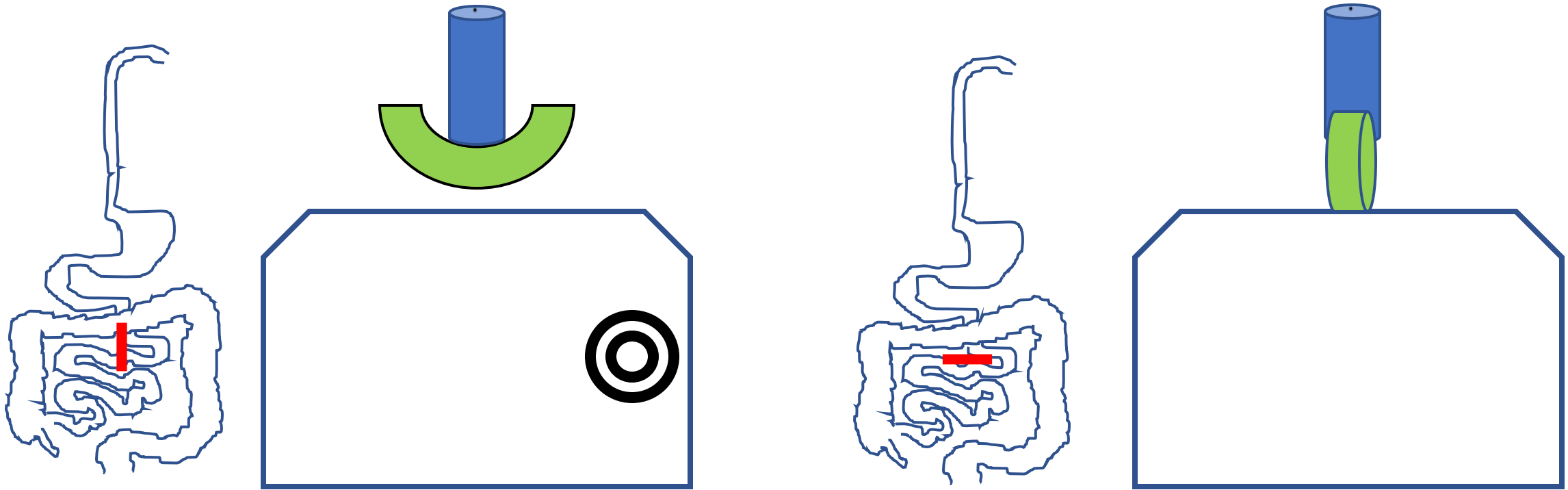




# Keep your region of interest in the center

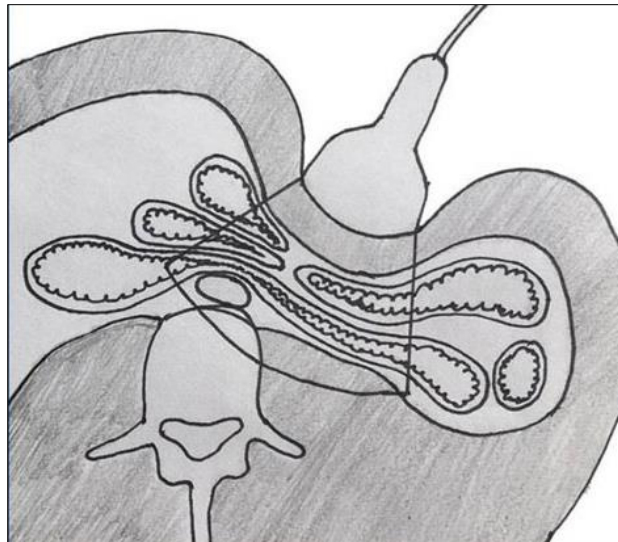
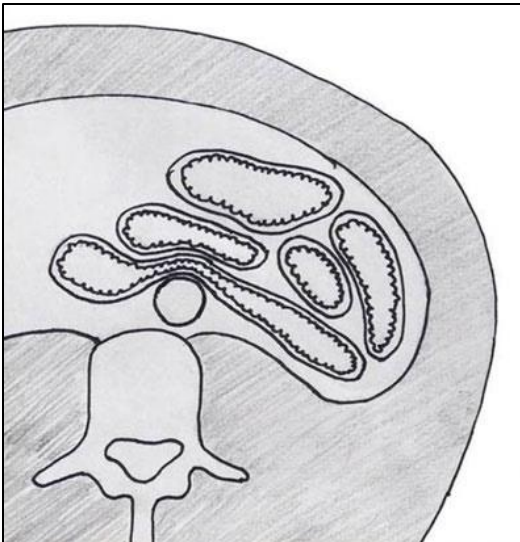


# Keep your region of interest in the center



# Examination technique

- **Probe movement**
  - set and tilt, not chaotic movement
- **Graded compression method**
  - visualization of deep areas using HF probe



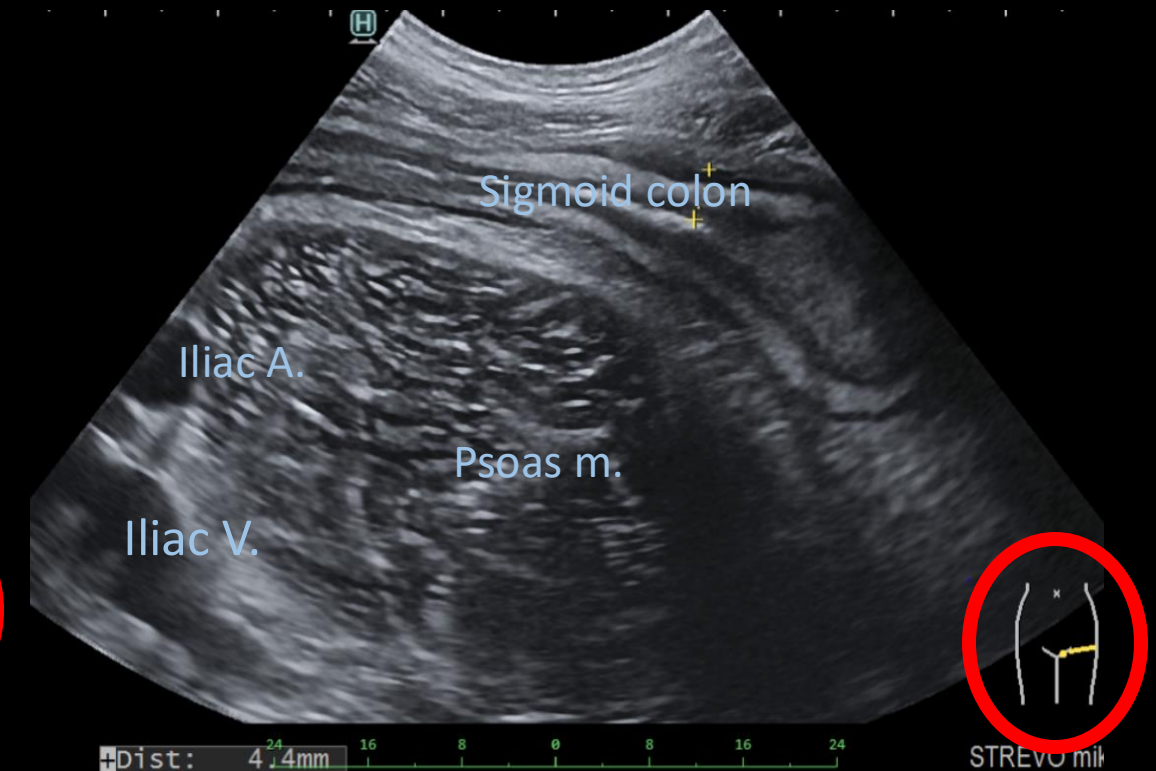
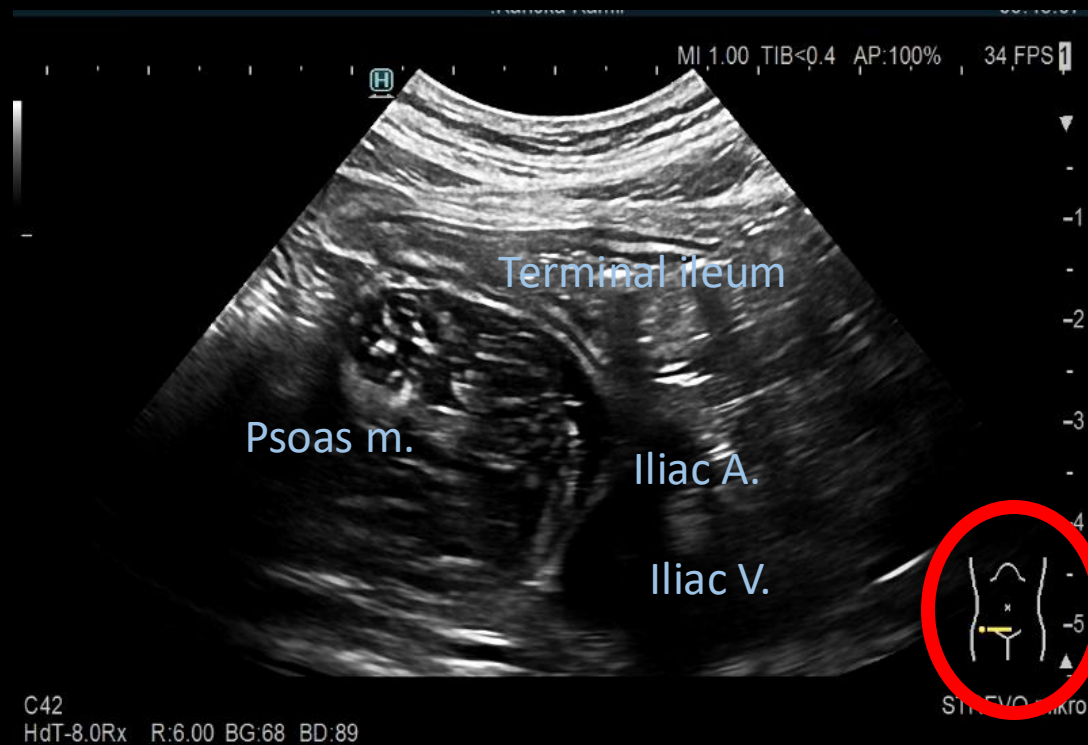
# What to look for

- Recognize the different parts of the bowel and surrounding structures  
→ **Landmarks!!**
- Normal vs. abnormal bowel wall

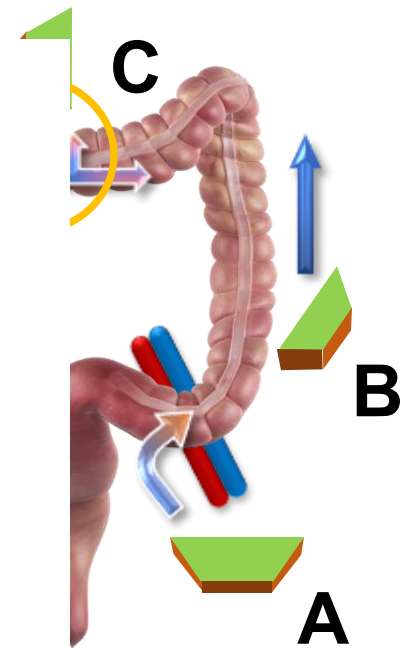
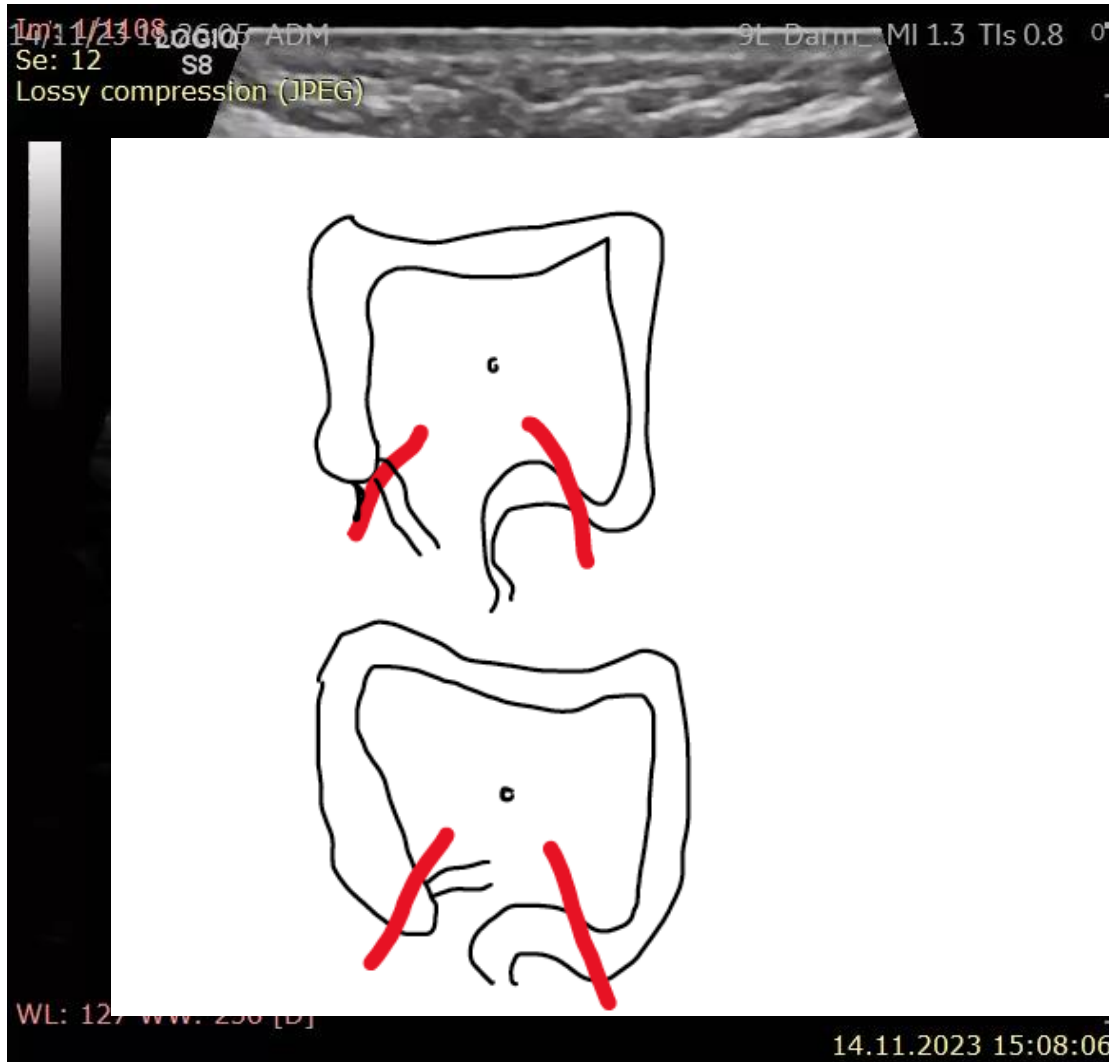


# Localization of the key anatomy (landmarks)

The most important landmarks: iliac vessels and the psoas muscle



# Anatomical landmarks in the mid upper andomen – Finding the Transverse



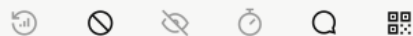


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 **Mentimeter**

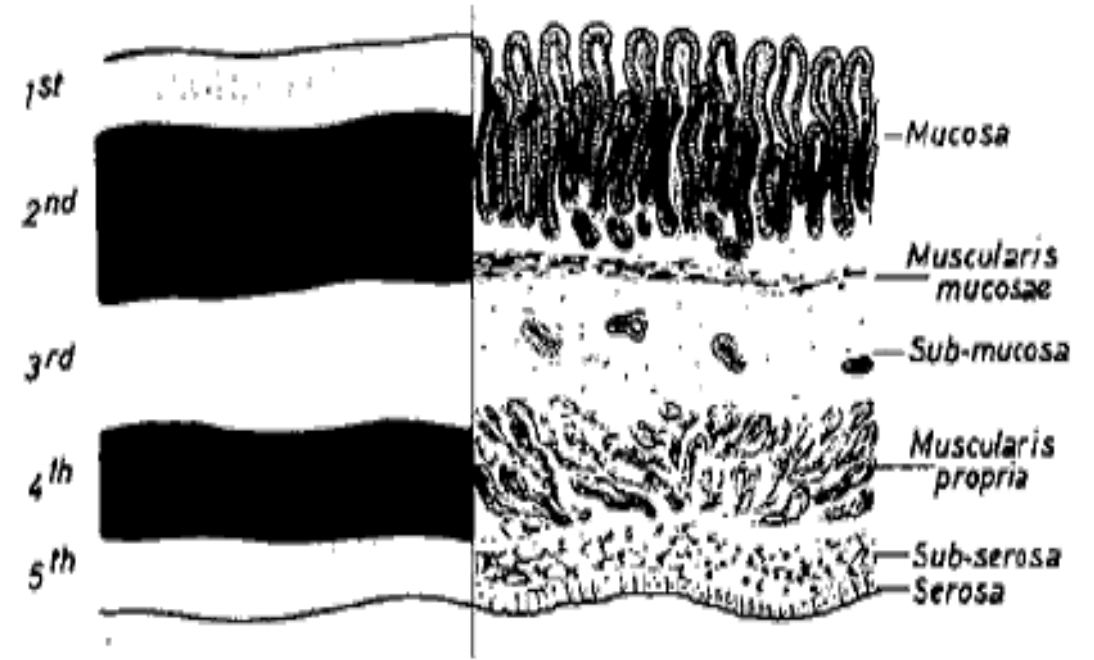
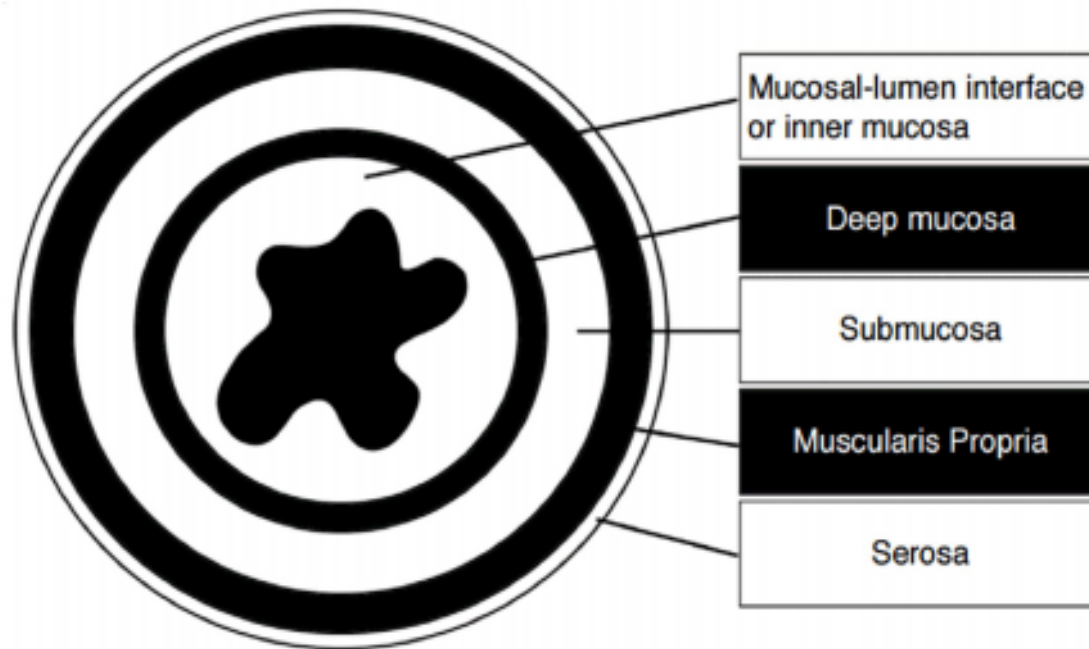
Waiting for players...

→ Start quiz



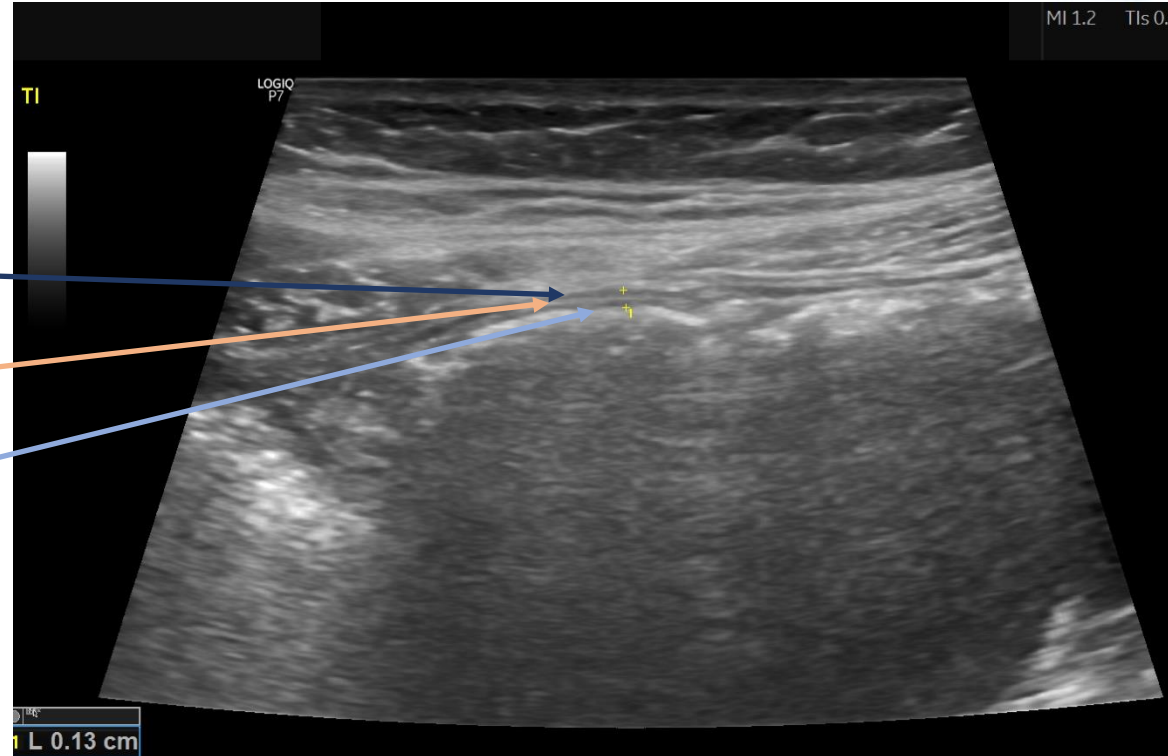
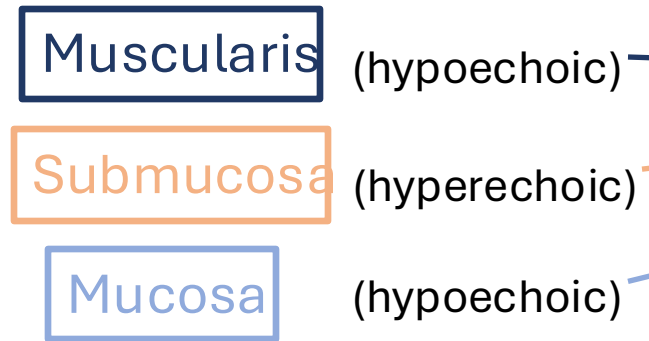
# Normal bowel wall

- 5 distinct sonographic layers





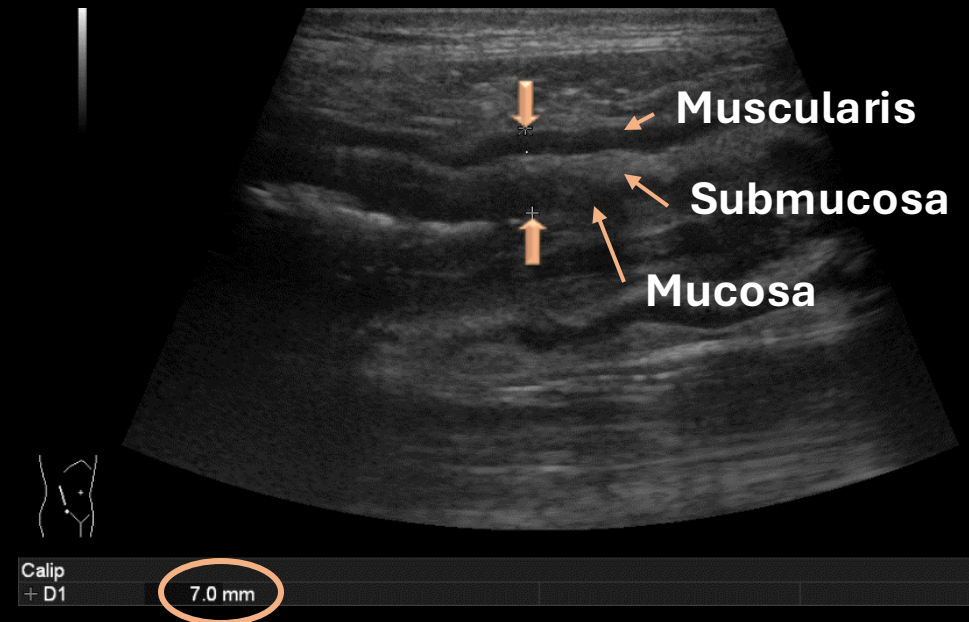
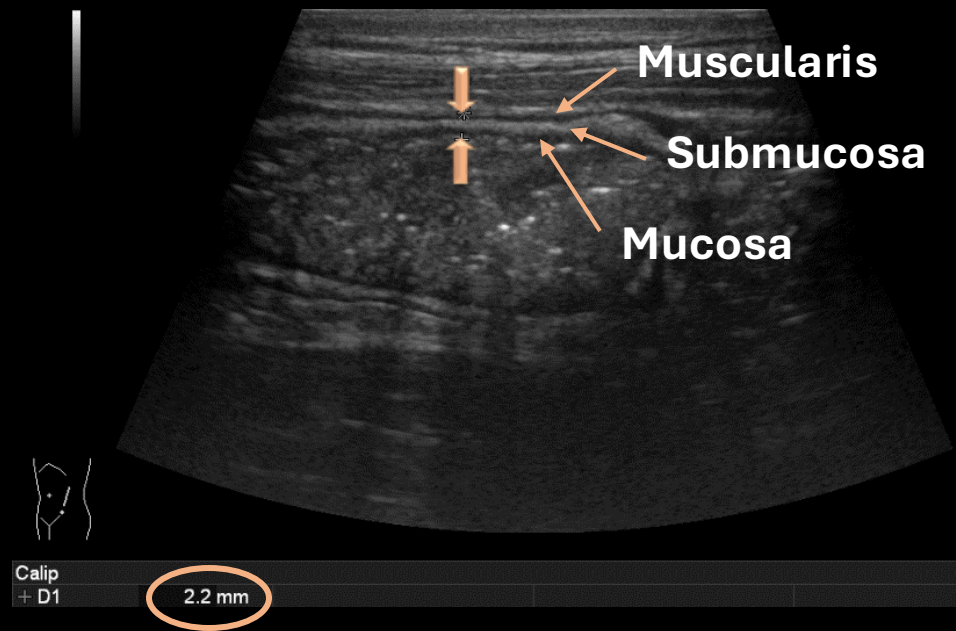
# Normal bowel wall in ultrasonography



## Some practical points:

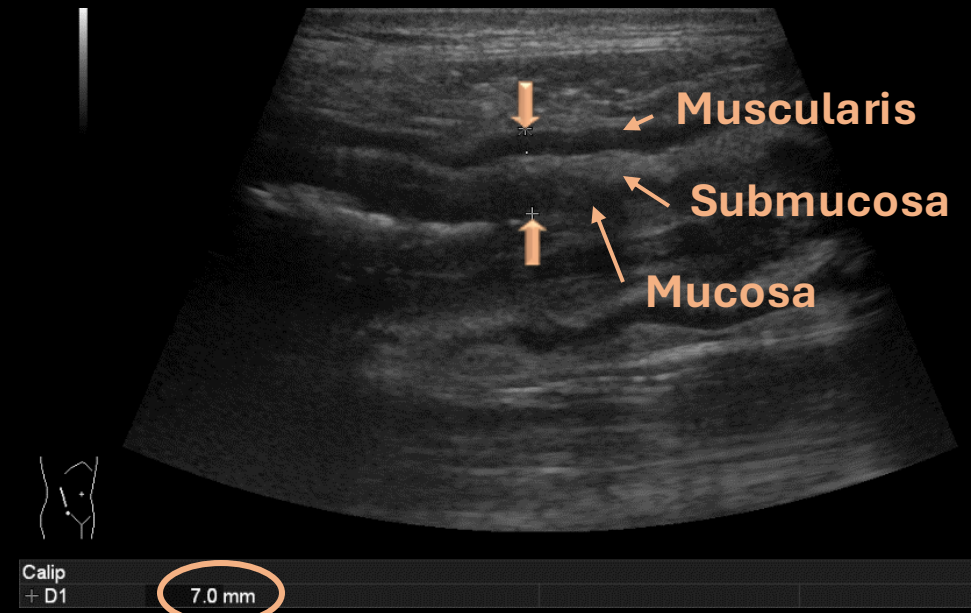
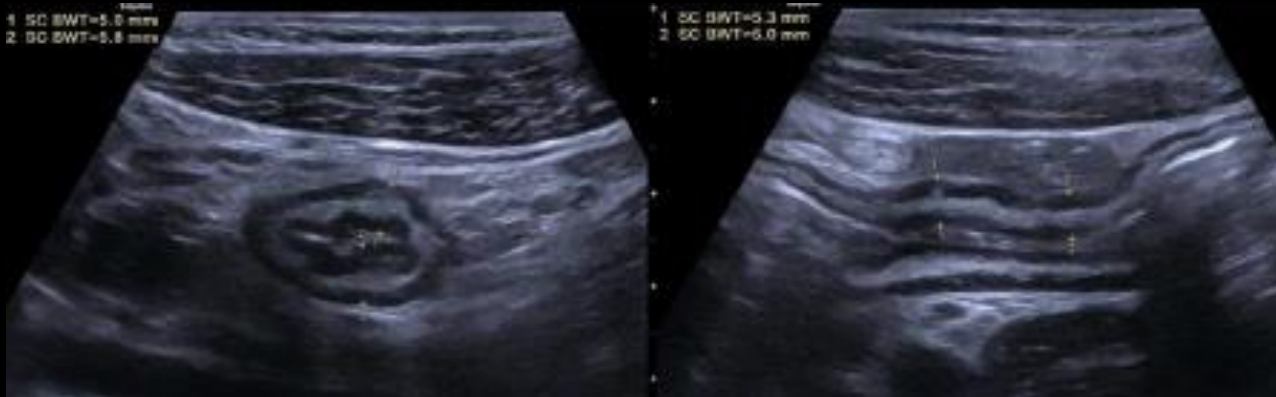
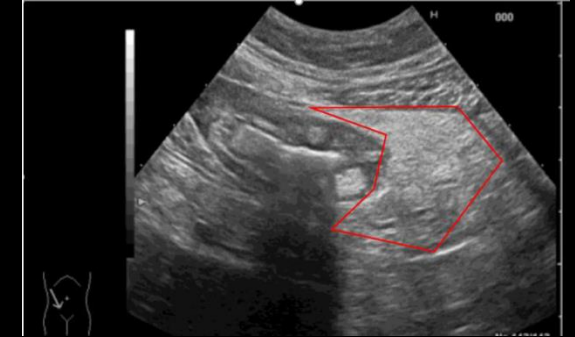
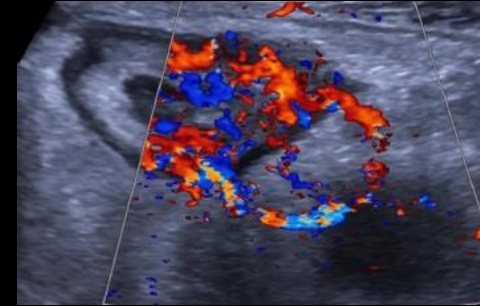
- Interface echo of serosa mixed in with interface from peritoneum
- Posterior bowel wall often not possible to see due to air in the lumen → **Measurements in anterior wall!**
- Measure from mucosal hypoechoic layer to muscularis hypoechoic layer
- Avoid measuring at points of haustrations and mucosal folds (overestimation!)
- Keep probe perpendicular to GI wall

# Bowel wall thickness (BWT)



\*Measure at right angles to bowel wall layers.

- ✓ BWT
- ✓ Stratification
- ✓ Vascularization
- ✓ Margins
- ✓ Austras
- ✓ Motility
- ✓ Mesentery
- ✓ Lymph nodes
- ✓ Free fluid





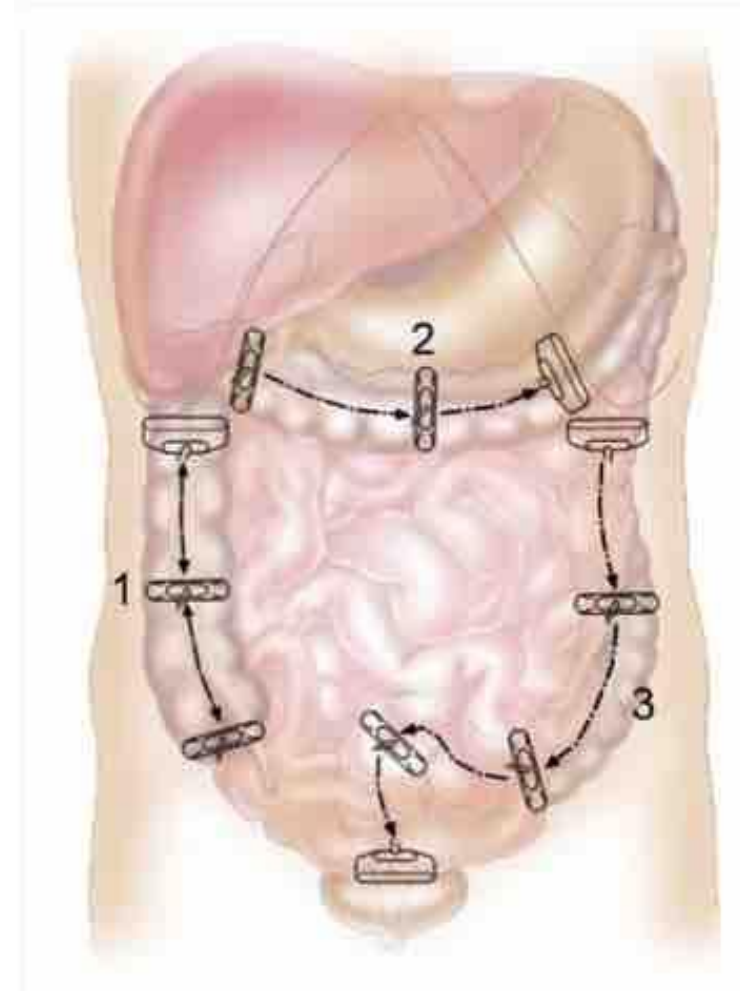
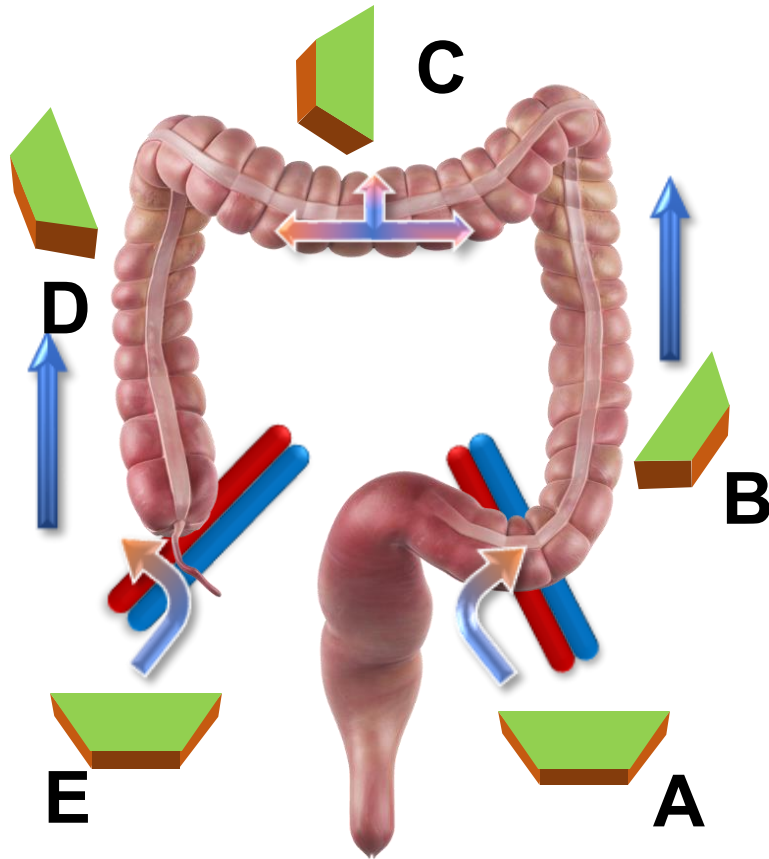
# Examination technique – Systematic

## RECOMMENDATIONS:

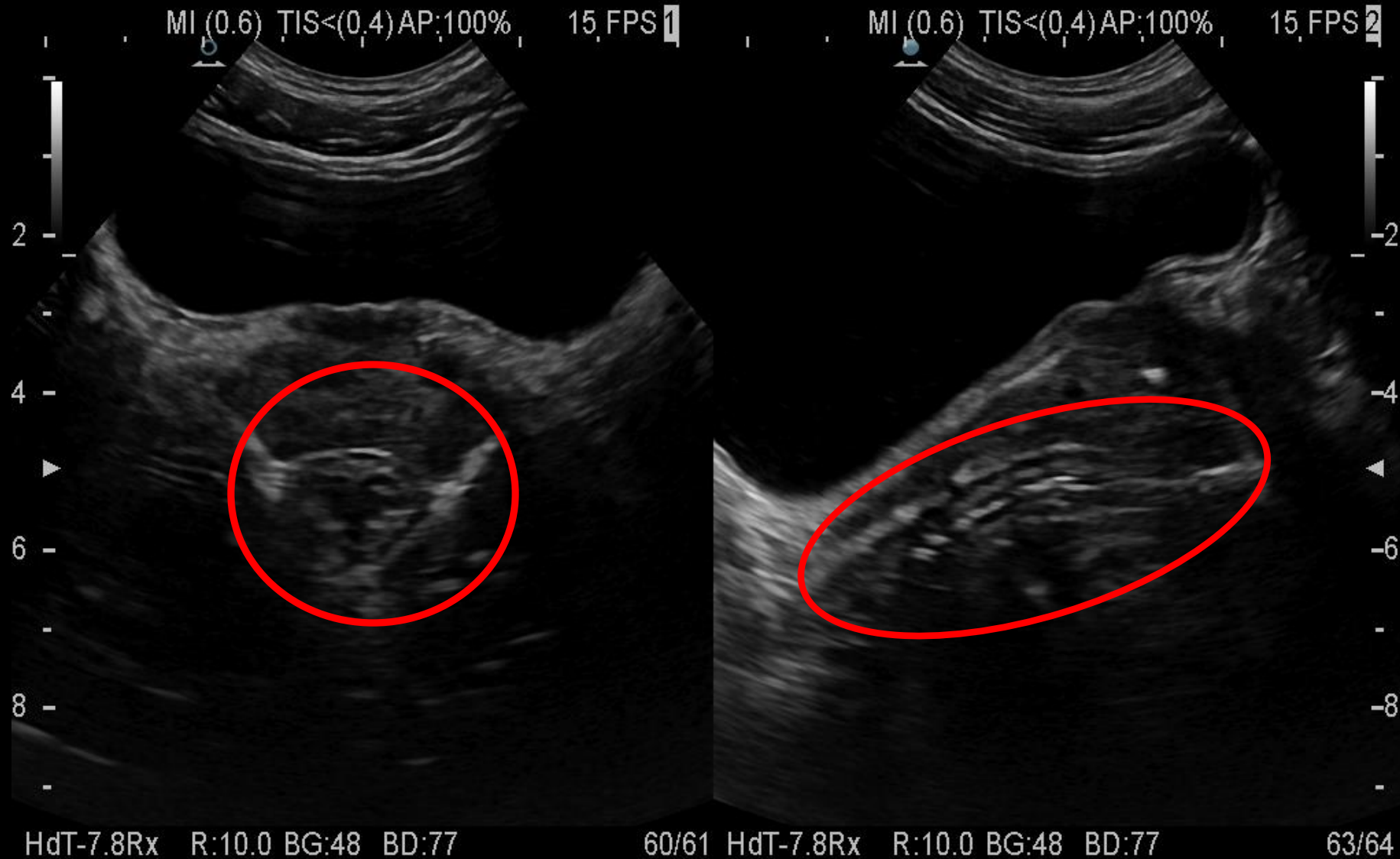
10. The scanning of the intestines must involve a systematic approach, LoE 5, GoR C. Strong consensus 12/12

Rectum → Sigmoid → Descending → Transverse → Ascending → Cecum  
→ Terminal Ileum  
→ Small bowel

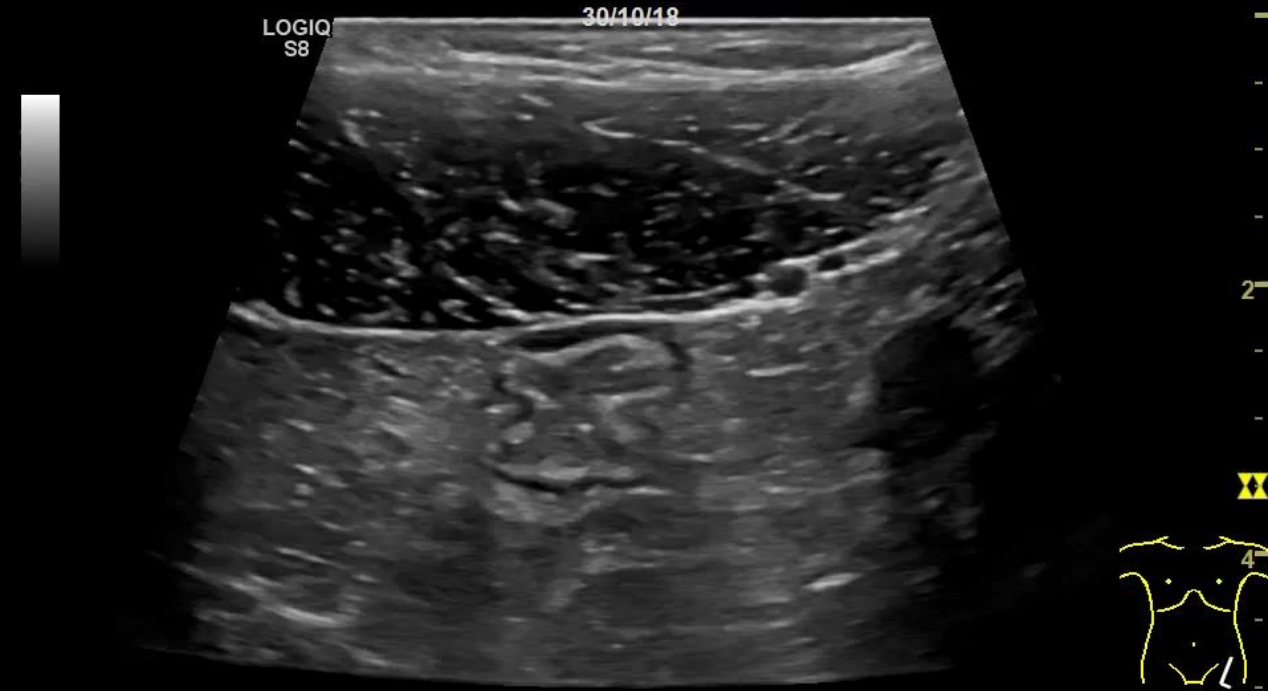
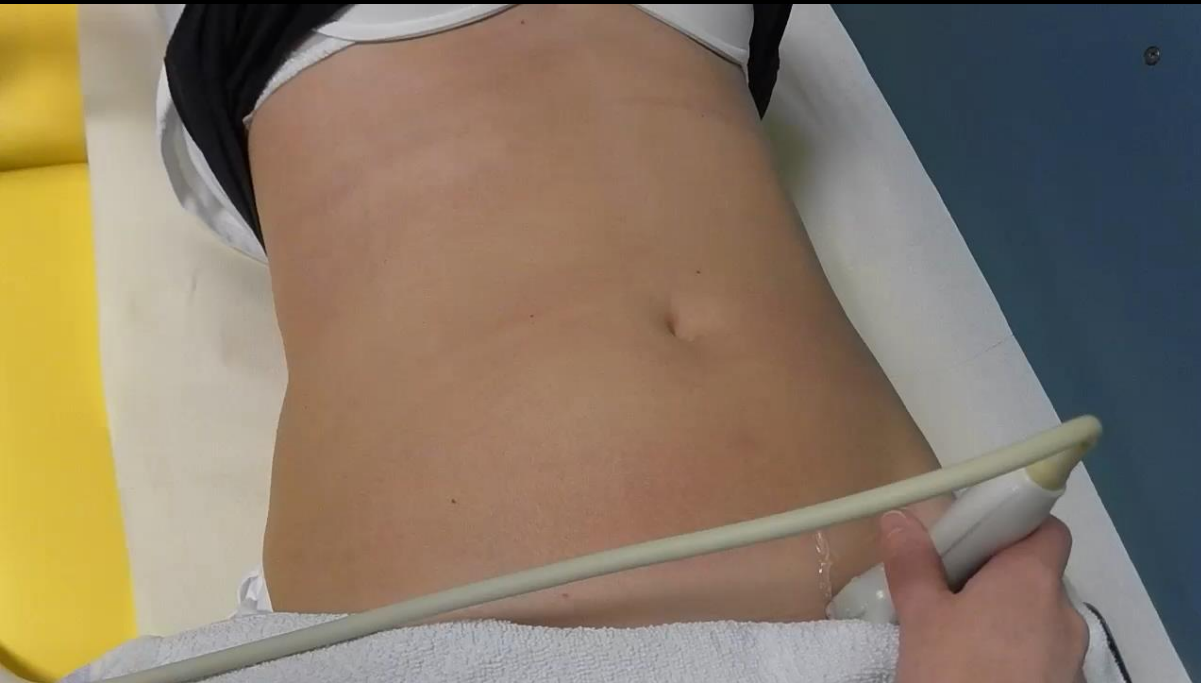
## Colon







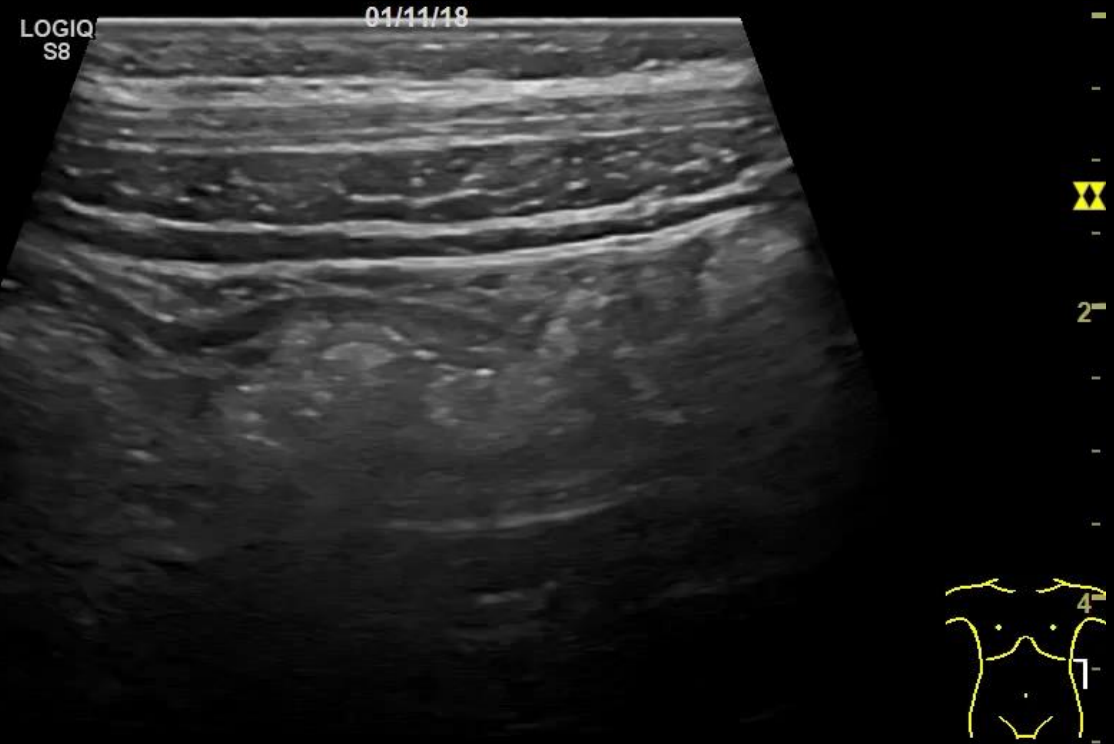
# Sigmoid Colon



# Sigmoid Colon

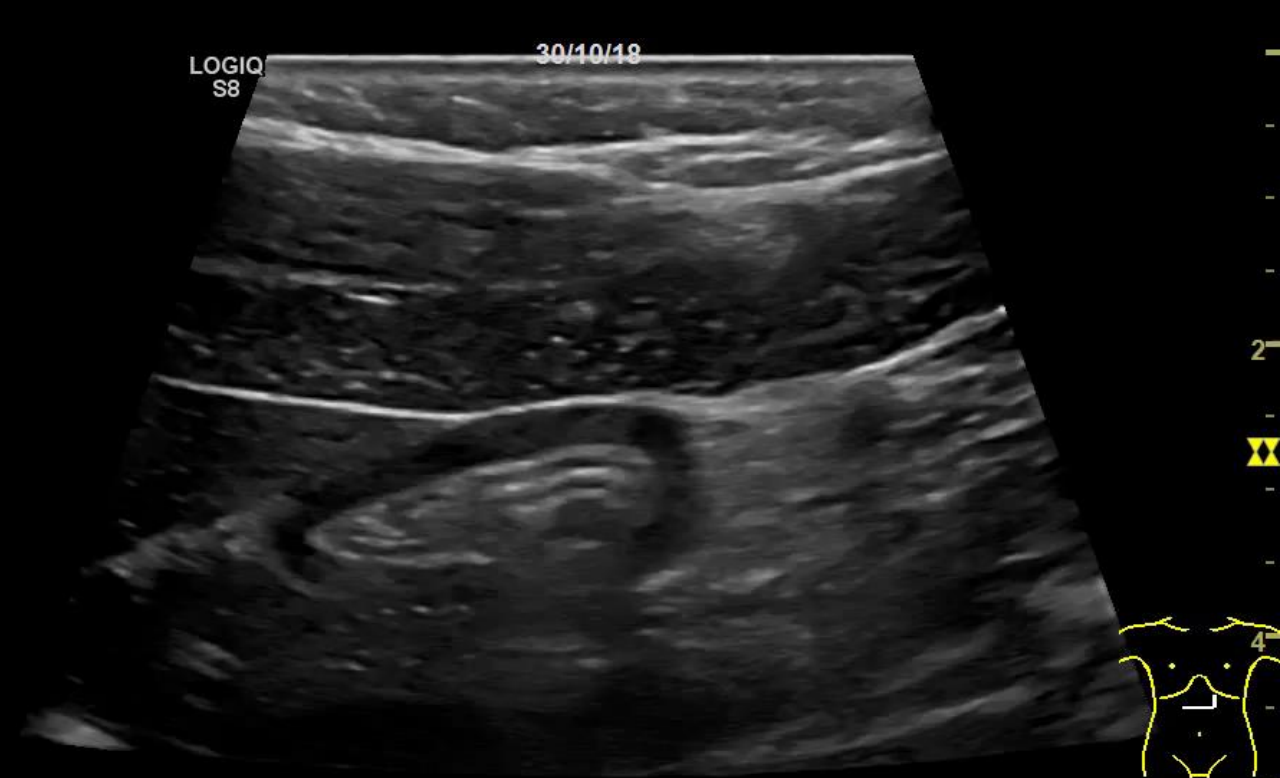
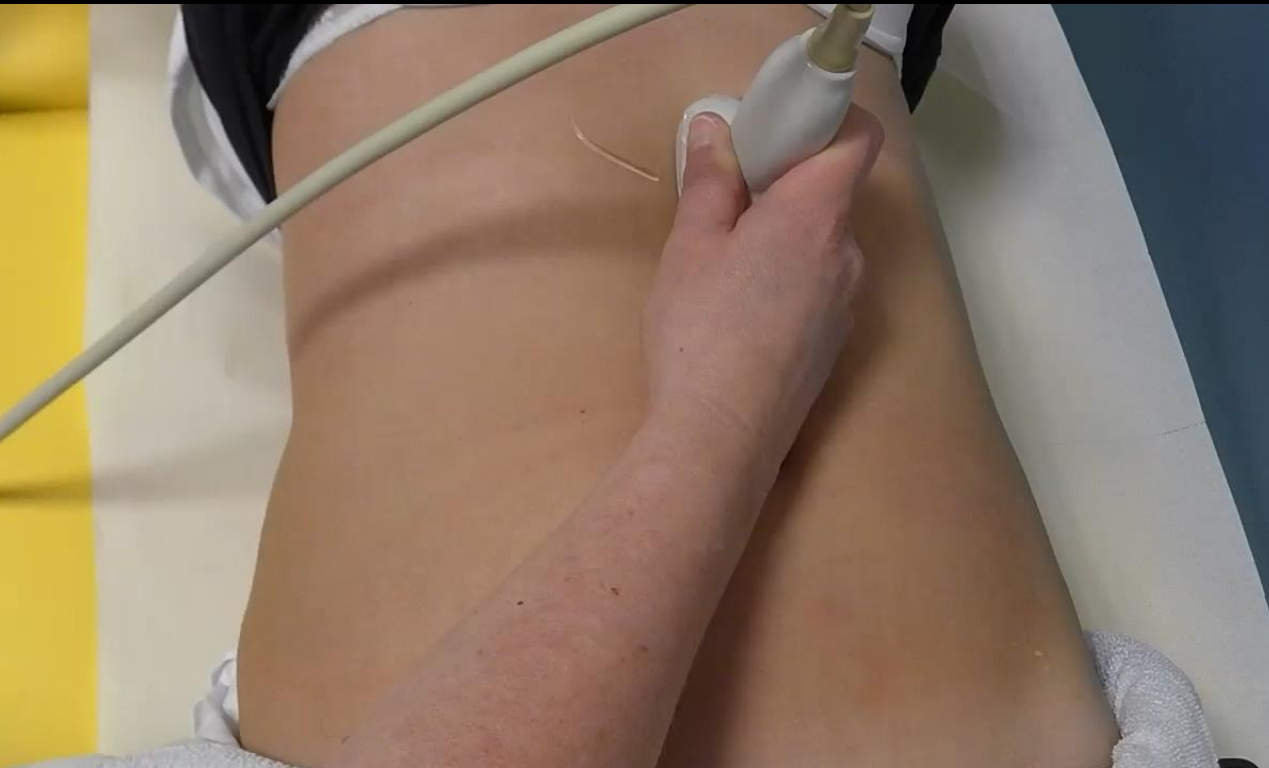


# Descending colon

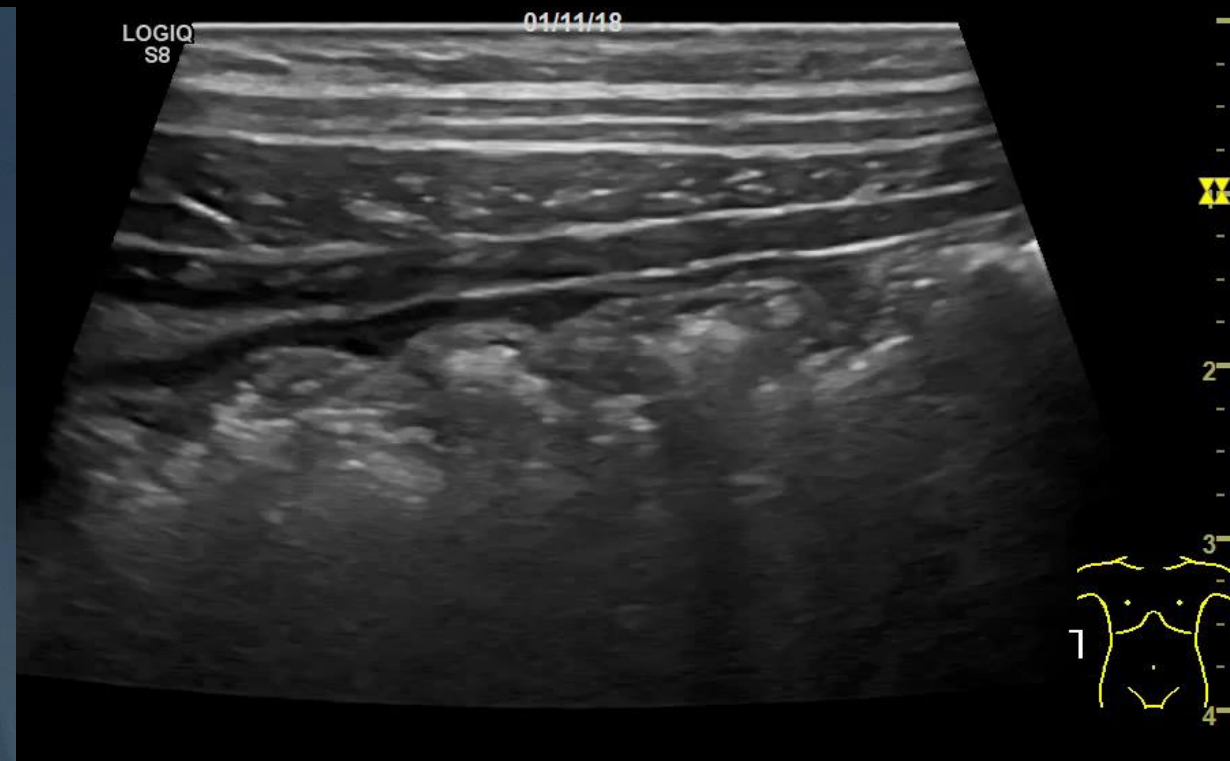




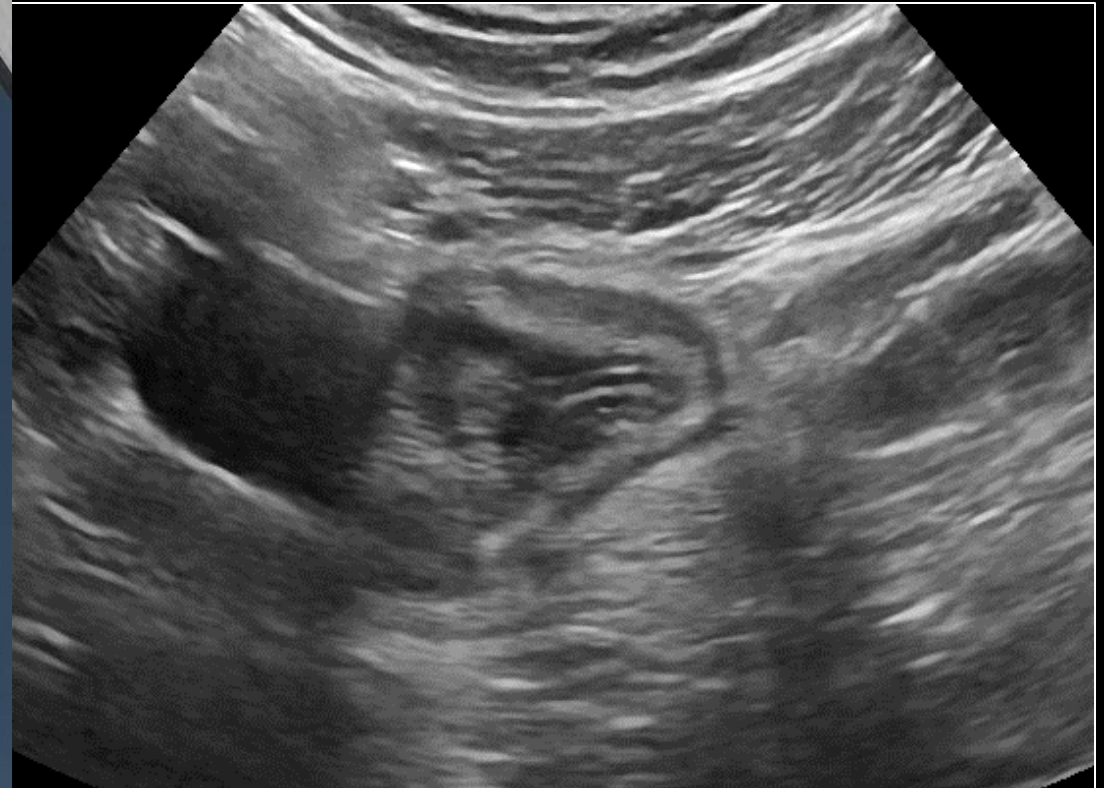
# Transverse colon



# Ascending colon



# Terminal ileum



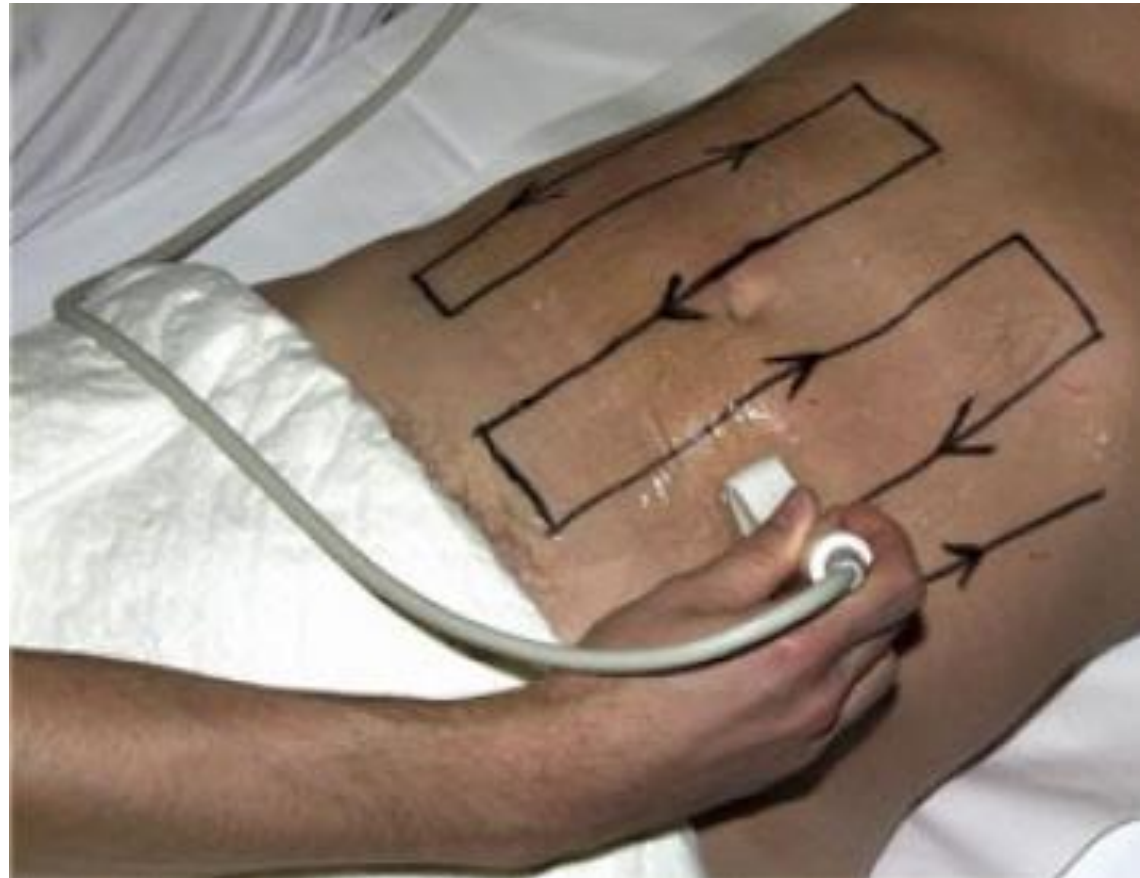


# Examination technique

## Systematic approach

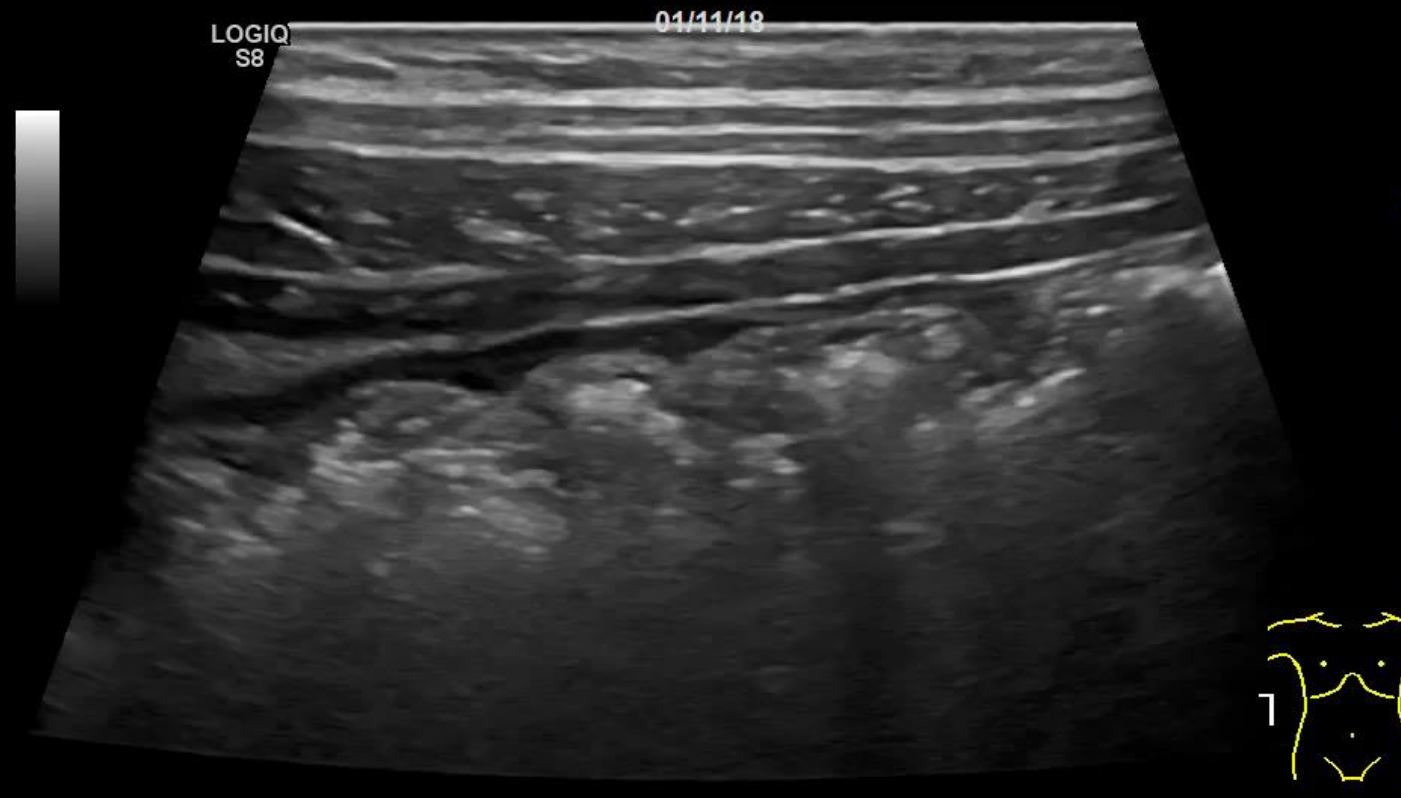
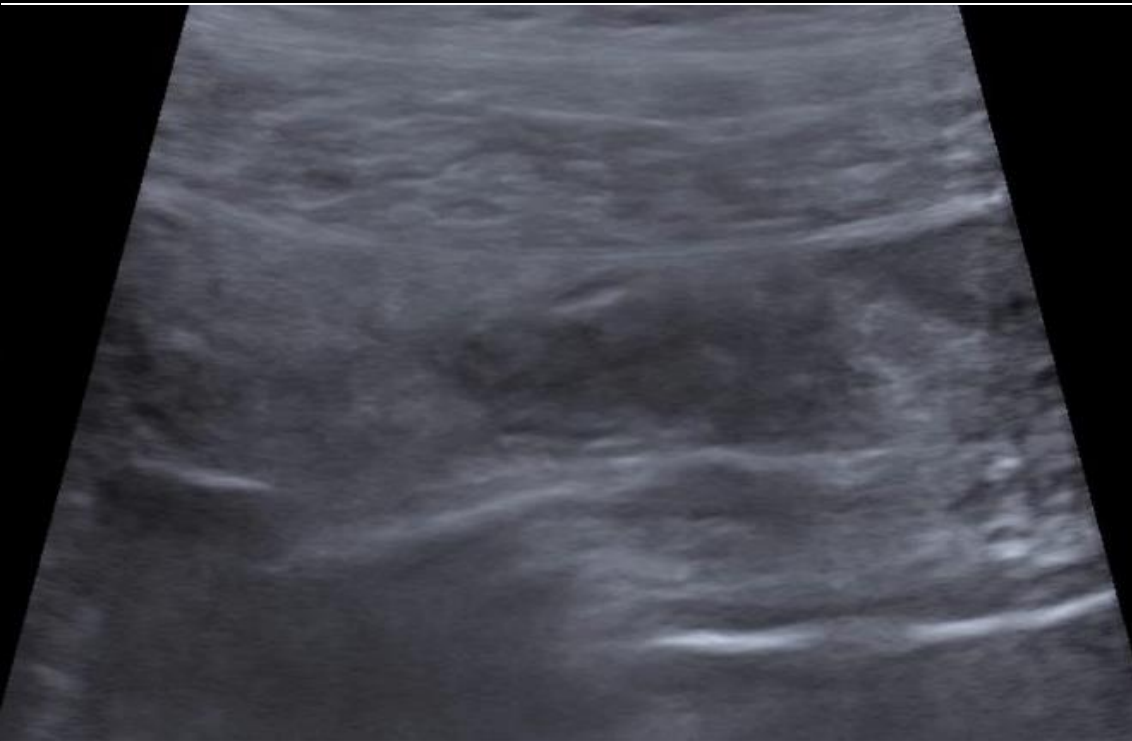
- Small bowel

*“mowing the lawn” technique*





# Differentiation between small and large bowel on IUS



# Take home messages

- ✓ Preparation: none
- ✓ Probe 5-8 MHz
- ✓ orientation
- ✓ know what to look for
- ✓ anatomical landmarks
- ✓ ultrasound scan plans
- ✓ systematic approach

Thank you

