

IUS Assessment of Technical Skills (ATS)

Delphi consensus process

Rune Wilkens

Bispebjerg Hospital, Denmark

For IBUS eLearning group



international bowel
ULTRASOUND GROUP





Intestinal ultrasound competency

IBUS CAT



IBUS Competency Assessment Tool (CAT)

Complete examination test to assess



Assessment of Technical Skills (ATS)

Practical exam (15 min) + report. Assessed on a scale from 20-100



Interpretation Skills Assessment (ISA)

Learn how to interpret IUS images of normal and pathologic bowel.
To be tested online in a DICOM reader program.



Knowledge Assessment (KA)

All theory taught in Workshop 1. Multiple Choice Questionnaires (mcq)

IBUS Competency Assessment Tool (CAT)



KNOWLEDGE

Module 1: Theory (workshop, eLearning)
Test: MCQ, online



INTERPRETATION SKILLS

Module 2: Case exposure (Clinic, eLearning)
Test: DICOM Reader, online



TECHNICAL SKILLS

Module 2: Supervised hands-on training (Clinic)
Test: Assessment of technical skills, RECORDING



DOMAINS

For the DELPHI process



**Applied
knowledge**



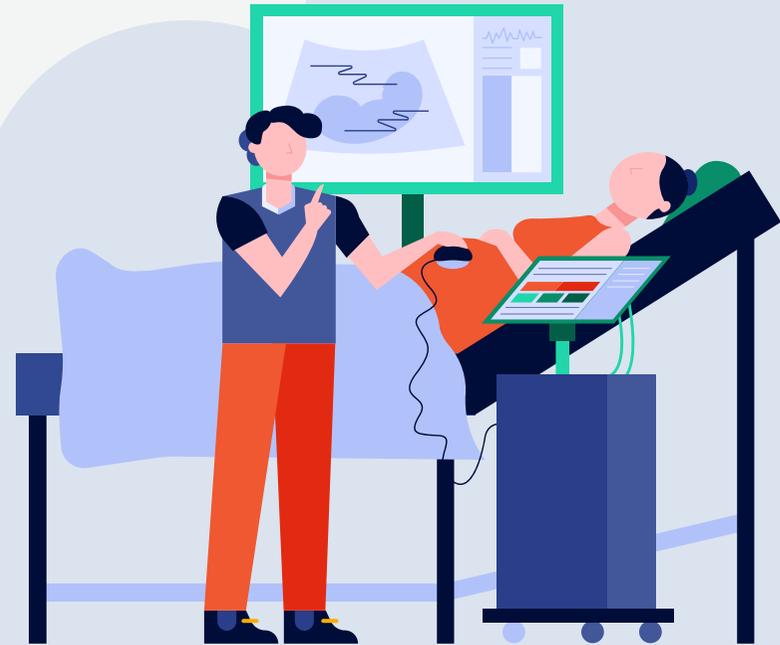
**Image
optimization**



**Systematic
examination**



**Exam
documentation**



APPLIED KNOWLEDGE

FINAL



01

Patient position + preparation

- a. Demonstrate proper techniques for undressing and positioning patients according to their individual needs and medical conditions.
- b. gel application techniques



02

Hygiene

Green marketing is a practice whereby companies seek to go above and beyond.



03

Preset + probe selection

- a. Navigate ultrasound machine menus to adjust presets and select probes effectively for optimal image quality.



04

Probe holding

- a. Best grip and use the probe for compression. Demonstrate sufficient probe pressure and probe orientation while ensuring patient comfort.
- b. Identification of proper cranial and caudal orientation of the probe.



05

Probe maneuvering

- a. Implement centering techniques effectively to position the ultrasound probe accurately over target structures for optimal image quality.
- b. Demonstrate turning, swiping, fanning, rocking, etc.

IMAGE OPTIMIZATION

FINAL



06

DEPTH

a. Adjust depth appropriately to visualize the bowel and extra intestinal structures of interest at varying depths.



07

GAIN

a. Adjust gain settings to optimize black/White balance to enhance image clarity while minimizing artifacts.



08

FOCUS

a. Adjust focus appropriately to the structure of interest during scanning.



09

FREEZE / scroll

a. Demonstrate how to utilize the freeze ± scroll function to identify the optimal still image.



10

COLOR DOPPLER

a. Utilizing optimal settings for scale
b. Box size
c. Appropriate Doppler gain settings
d. Minimizing artefacts
e. Sufficient assessment time

SYSTEMATIC EXAMINATION

FINAL



11

Anatomical landmarks

a. Identify iliac vessels/psoas muscle, (bladder/iliac crest bone) for SC+TI, spleen/left kidney for splenic flexure, Stomach/liver for TC, Liver/right kidney for hepatic flexure



12

Entire small + large bowel

a. Demonstrate a systematic scan to cover the entire small and large bowel.
b. Start with SC/(rectum) and scan in the oral direction to TI
c. Start with TI and scan in the anal direction to SC/(rectum)
d. Entire small bowel in a sweep



13

Scan planes

a. Demonstrate proficiency in maneuvering between different anatomical scan planes (axial/sagittal) and bowel scan planes (cross-section vs. longitudinal).



14

Entire segment

a. Demonstrate scanning through the entire segment
b. At a prober scanning speed
c. With limited back and forward probe movement.



15

Correctly identify bowel segments

a. Find and differentiate between stomach, large and small bowel, ileocecal valve (based on anatomical location, haustral pattern, kerckring folds, peristalsis, content, and diameter).

DOCUMENTATION OF EXAMINATION

FINAL



16

Annotate

a. Label/bowel body marker of the identified structures



17

Select and store

a. Select and store representative still images and videos.



18

Research documentation

a. 1 cine loop cross-section
b. 1 cine loop in longitudinal
c. 1 cine loop with color Doppler
d. 2 BWT measures in cross-section
e. 2 BWT measures in longitudinal



19

Structured report

a. Generate a report with accurate descriptions of findings, including relevant measurements.



20

Confidence

a. Document the scan quality, scan completeness and the impact on the final interpretation/conclusion.

DOCUMENTATION OF EXAMINATION

FINAL



21

Postoperative

RATING

LIKERT Scale



Domain 2: Image optimization

6. Depth

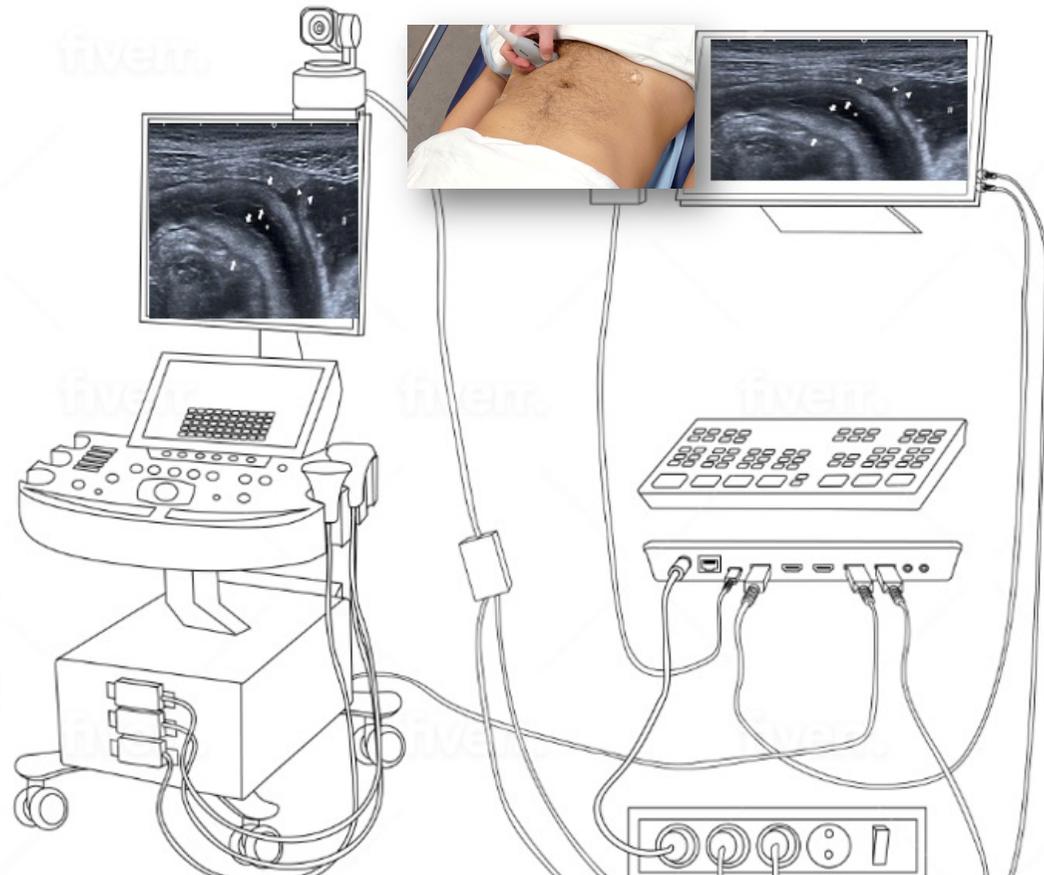
Adjust depth appropriately to visualize the varying depths of the bowel and extra-intestinal structures of interest.

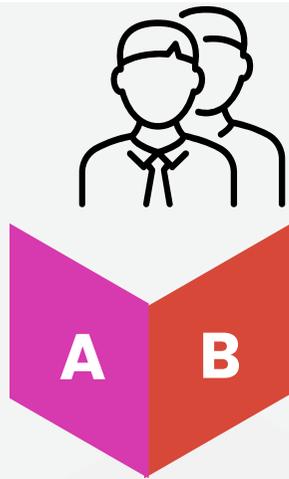
| Level | Criterion |
|-----------------------|---|
| 1 Unacceptable | No depth control: images are too deep or too shallow, causing bowel segments to be cut off or become too small for assessment. |
| 2 Poor | Sporadic or incorrect depth control; ≥ 2 segments are cut-off or too small for assessment, due to depth errors. |
| 3 Adequate | Adjusts depth to include all segments in the field; however, ≥ 2 segments are not optimally framed with excess depth of > 3 cm below the posterior bowel wall. |
| 4 Good | Continuously adjusts depth for most loops; only 1–2 segments fall outside the ideal margin of 1–2 cm below the posterior bowel wall |
| 5 Exemplary | Continuously refines depth so every loop sits approximately 1–2 cm below the posterior bowel wall |

RECORDING

The technical performance of an IUS examination

Technical skills assessment by RECORDING





PARTICIPANT INSTRUCTIONS

EXPECTED COMPETENCIES FOR PRACTICAL EXAMINATION

As a learner, you are expected to demonstrate essential skills during the IUS assessment. **Competency areas:**

1. Patient Preparation and positioning, probe maneuvering, and examiner position

Properly prepare the patient (optimal positioning, exposing the abdomen & gel application). Handle the machine with care, disinfect the probe before & after use. Bare hands/forearms#. Select the best ultrasound probe(s) for intestinal ultrasound and the appropriate preset. Handle the probe efficiently for compression and apply the correct orientation.

Maneuver the probe for optimal images of the examined bowel.

2. Image Optimization

Constantly optimize the image during the examination by adjusting the depth, gain, frequency, focus position, Doppler settings*, placement of the color Doppler box, applying compression, and instructing the patient in breath-holding when necessary. Utilize freeze/scroll for optimal still image visualization.

3. Systematic Examination

Identify/show key anatomical landmarks (iliac vessels/psoas muscles, stomach/liver) and strive to visualize the spleen and boundaries of the entire abdominal cavity.

Perform a systematic examination, that is, examine all 4 colonic segments (SC, DC, TC, AC/CEC)** continuously, the terminal ileum**, and sweep through the proximal small bowel.

Tip: Recognize and differentiate bowel segments based on anatomical and physiological features.

4. Examination Documentation

Adequately select, annotate, and save representative still images and cine loops***.

One segment (of your choice) should be documented as if it were for a research project, including the BWT measurements****. BWT measures are only mandatory for this segment.

Generate a structured report of your findings & indicate scan quality/limitations & confidence.

#No wrist watch/jewelry, artificial nails, etc.

* scale ($\pm 5-7$ cm/s), box size (> 1 cm surrounding the bowel), appropriate gain, > 3 s, minimizing artefacts ** One scan plane is sufficient for this exam, rectum is not mandatory, and no BWT measurements are required. ***

One still image per segment (total = 5) is sufficient for this exam.

Document the proximal small bowel if pathology is seen.

****We expect:

1 cine loop in cross-section of the entire segment

1 cine loop in longitudinal of the entire segment

1 cine loop with color Doppler Imaging of the worst part of the segment.

2 measurements in cross-section with more than 90° apart

2 measurements in longitudinal with more than 1 cm apart.

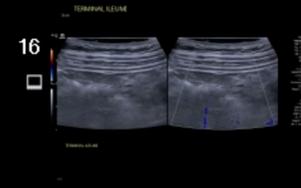
A
[2
F
G
D
F
P



10L4
Intestine
TIB:0.21
TIC:0.62
TIS:0.21
MI:1.15
37fps
95%
2D
H Low
0dB/DR65
c=1540
LD 1
Compound
UA 3
MapC/T5
P2



001



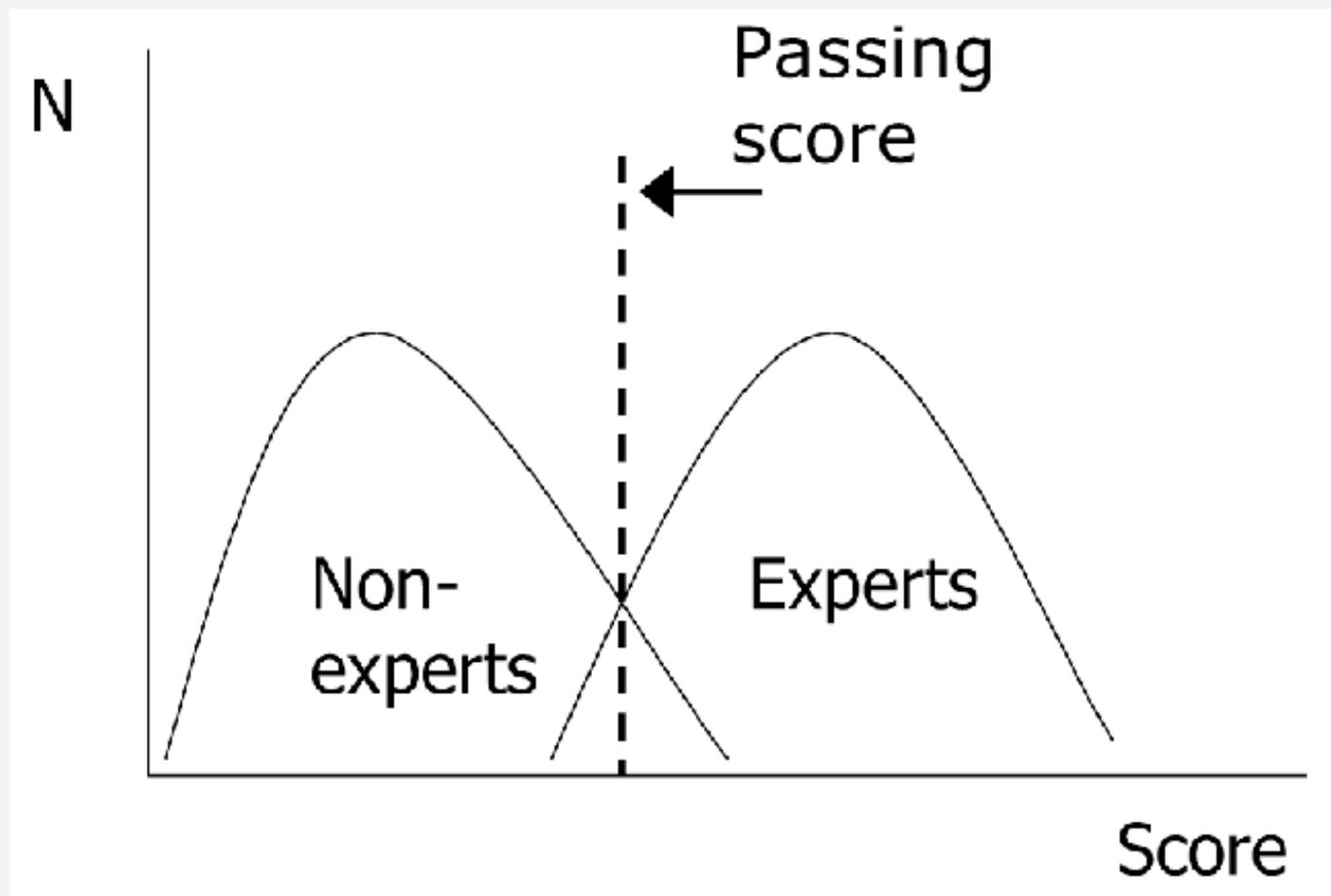
4cm

08:51:04:05 08:57:30:23

Intended Learning Outcomes

IBUS Boot Camp

1. Apply proper knobology and adjust machine settings to optimize image acquisition.
1. Explain and perform systematic scanning techniques, including probe positioning, movements (e.g., glide, sweep, tilt), and orientation in cross-sectional and longitudinal planes.
2. Measure bowel wall thickness and assess wall stratification, vascularity (IBUS-SAS CDS), and motility in both normal and inflamed bowel.
2. Recognize sonographic differences between small and large bowel.
3. Distinguish between active and chronic inflammation and evaluate the extent of disease and skip lesions.
3. Identify anatomical structures and pathological findings on IUS images and cine loops, including assessment of postoperative anastomoses.
4. Explain the use of the IBUS-SAS for assessing disease activity and treatment response.
4. Perform a complete, systematic IUS examination and integrate findings into the clinical context.
5. Store, annotate, and document relevant findings according to recommended and taught practices.
5. Formulate and structure an IUS report using correct terminology and scoring systems.
- 1.-5. Use IUS actively to support decision-making for diagnosis, disease monitoring, and treatment response in IBD.





EXAMPLE

RECORDING OF AN EXAM