



# TOOLS OF THE TRADE – LIGHT SOURCES

RACHID MOHAMED

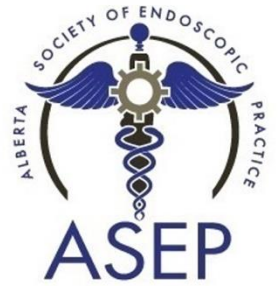
UNIVERSITY OF CALGARY

ASEP 2025

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# ENDO SKILLS 2025

## DISCLOSURE OF COMMERCIAL SUPPORT



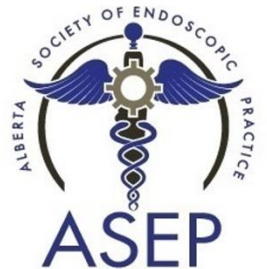
- Endo Skills is presented by the Alberta Society for Endoscopic Practice (ASEP)
- ASEP: not for profit organization, whose goal is to provide education, resources and collaboration for endoscopists and their teams
- Endo Skills planning is independent from the exhibitors
- ASEP covers expenses of speakers and provides gift+/- small honorarium to speakers and planning committee

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# **ENDO SKILLS 2025**

## **MANAGING SOURCES OF POTENTIAL CONFLICT**

- Endo Skills Planning Committee: oversees the program's content development to ensure accuracy and balance.
- Information and recommendations are evidence and/or guidelines-based, and opinions of the independent speakers will be identified as such.
- Program developed in accordance to ethical standards meeting Cert+ guidelines.

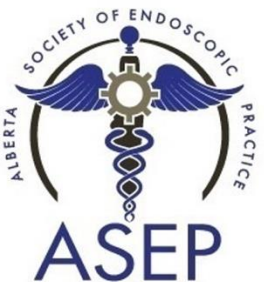


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# ENDO SKILLS 2025: PRESENTER DISCLOSURE

- Presenter: Rachid Mohamed
  
- Relationships that may introduce potential conflict of interest:

**None**





## **LEARNING OBJECTIVES**

- Review how and where endoscopic light filters can assist in colorectal endoscopy



# BACKGROUND

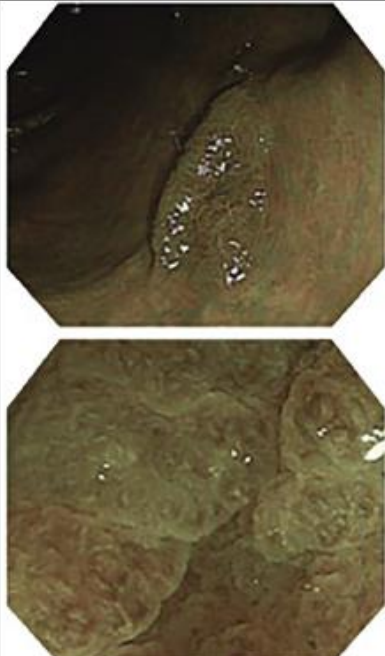
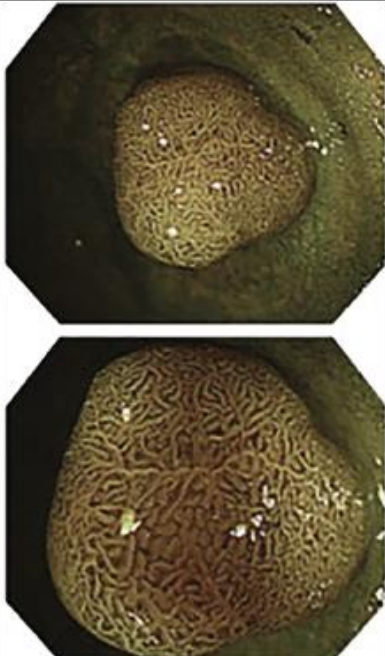
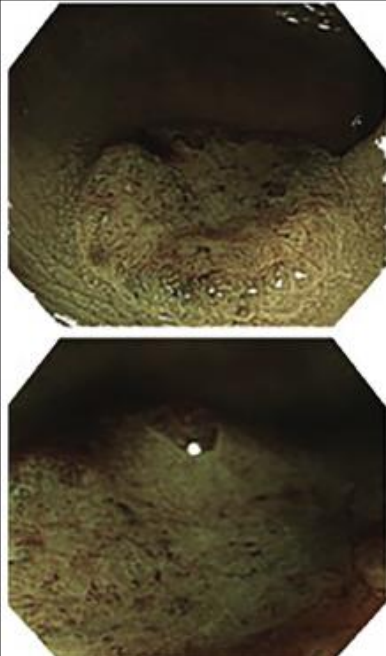
- High-definition white light endoscopy remains the mainstay for evaluation of the gastrointestinal mucosa
  - Significantly improved with modern video chips and image enhancements
- Optical enhancement modalities help to (maybe) detect abnormalities and allow for detailed characterization of findings

# NARROW BAND IMAGING (NBI)

- Refinement of white light to specific window of wavelengths (415-540nm)
- This window corresponds to peak Hb absorption allowing for capillary/vascular assessment

# NARROW-BAND INTERNATIONAL COLORECTAL ENDOSCOPIC (NICE)

NBI International Colorectal Endoscopic (NICE) Classification\*

	Type 1	Type 2	Type 3
Color	Same or slightly lighter than background	Browner relative to background (verify colour arises from vessels)	Brown to dark brown relative to background; sometimes patchy whiter areas
Vessels	None, or isolated lacy vessels coursing across the lesion	Brown vessels surrounding white structures**	Has area(s) of disrupted or missing vessels
Surface pattern	Dark or white spots of uniform size, or homogeneous absence of pattern	Oval, tubular or branched white structure surrounded by brown vessels**	Amorphous or absent surface pattern
Most likely pathology	Hyperplastic	Adenoma***	Deep submucosal invasive cancer
Examples			





# OUTCOMES OF NBI FOR POLYP ASSESSMENT

- Threshold: ASGE standards to validate ‘optical biopsy’
  - Technology should provide NPV >90% to adopt non-resection strategy for distal colonic polyps
  - Technology should provide NPV >90% to adopt resect and discard strategy

Committee AT et al. GIE 2015

- Current prospective studies and meta-analysis of NBI have failed to meet these thresholds

Wanders LK et al. Lancet Oncol 2013  
Rees CJ et al. Guy 2017



# I-SCAN

- Post-processor digital enhancement tool
  - Different algorithms to emphasize surface or contrast enhancement
- Surface enhancement (SE) – enhances mucosal features in white light to highlight abnormalities
- Contrast enhancement (CE) – adds blue colour to edges to enhance depressed areas and structural abnormalities
- Tone enhancement (TE) – enhances vascular and mucosal structures
- Optical enhancement (OE) modes 1, 2, 3 – incorporate varying degrees of SE, CE, TE



# I-SCAN PERFORMANCE

- SIMPLE (Simplified Identification Method for Polyp Labeling during Endoscopy)
  - Surface pattern, Vessel pattern, Border
  - Predicts polyp as hyperplastic, serrated or adenoma
- NPV found to be >90% for diminutive polyps *by experienced endoscopists*

Iacucci M et al. Endoscopy 2018

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## **I-SCAN AND ADENOMA DETECTION**

### **The incremental yield of adenoma detection with I-Scan versus high-definition white light colonoscopy—a systematic review and meta-analysis of randomized studies**

- Four studies, ~1500 patients, comparing HDWL and I-scan for adenoma detection
- Subgroup of I-scan 1 showed ADR increase of 9%

## **FUJI – FLEXIBLE SPECTRAL IMAGING COLOUR ENHANCEMENT (FICE)**

- Involves selection of RGB wavelengths to enhance white light image
- Meta-analysis shows NPV ~ 80% (85% with magnification) for diminutive lesion optical diagnosis



# OPTICAL ENHANCEMENT – WHERE I THINK IT HELPS

- Polyp detection
  - If Pentax, use i-scan 1 for colonic withdrawal. All others, use HDWL
- Polyp characterization
  - Optical enhancement to help delineate borders and characterize surface morphology









## SUMMARY

- High-definition white light endoscopy continues to improve and remains the mainstay modality for mucosal evaluation
- Optical enhancement allows for further lesion characterization to permit appropriate therapy application