National Basic Endoscopy Course

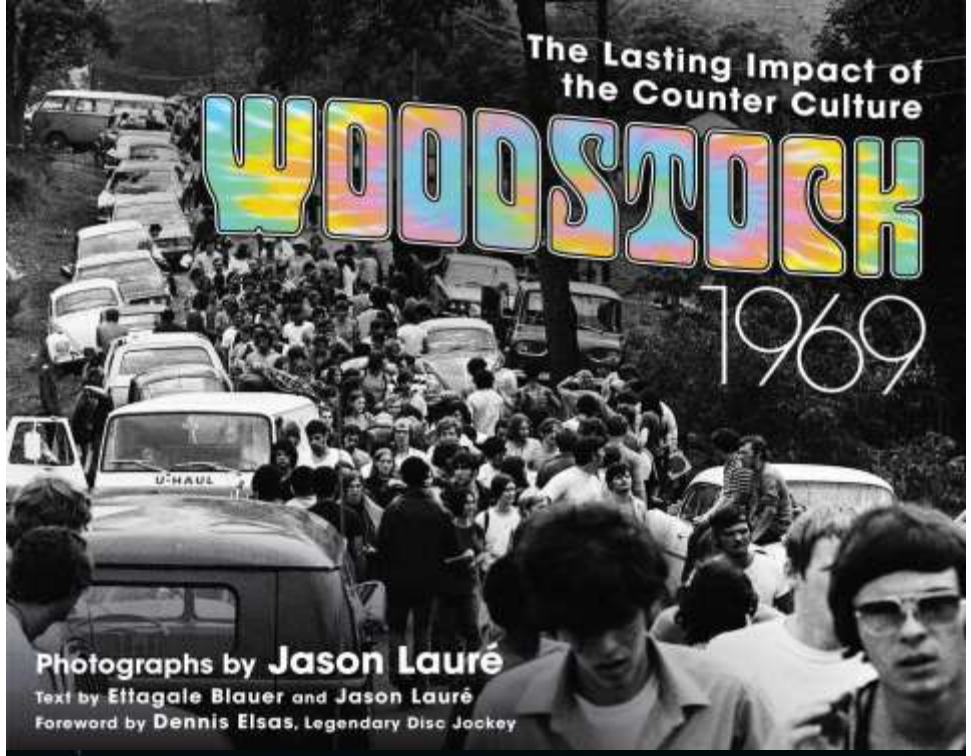
2026 – 2027 / Waterloo

Equipement : endoscope, column, connection, use and disinfection

Dr. Jo Vandervoort

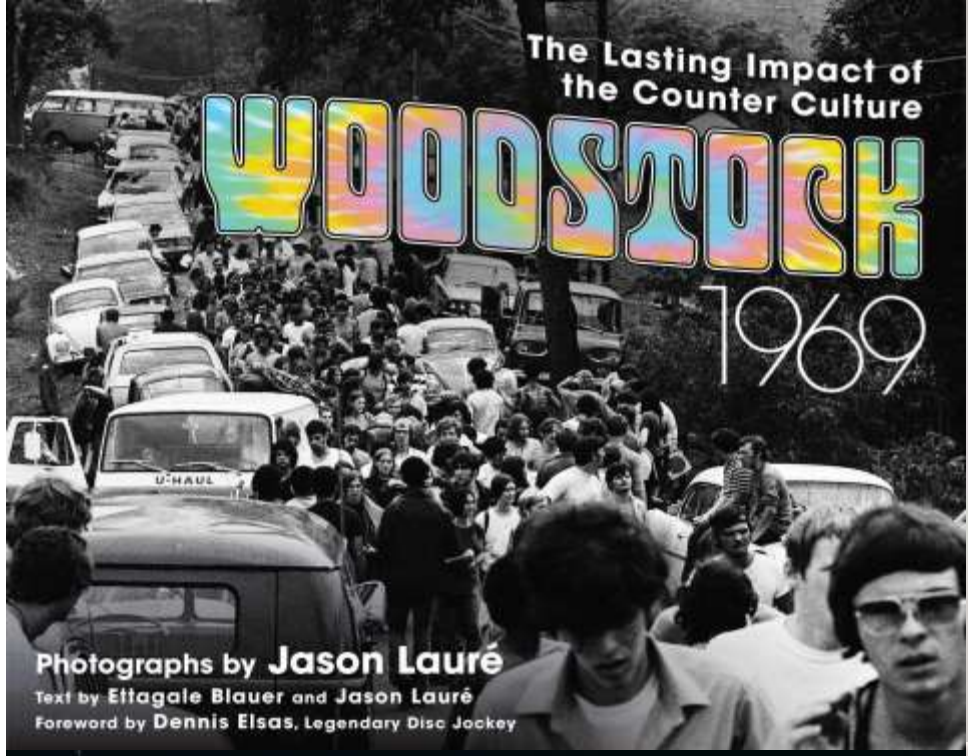
AZORG

Aalst / Asse / Geraardsbergen / Wetteren / Ninove





BSGIE
Belgian Society of Gastrointestinal Endoscopy

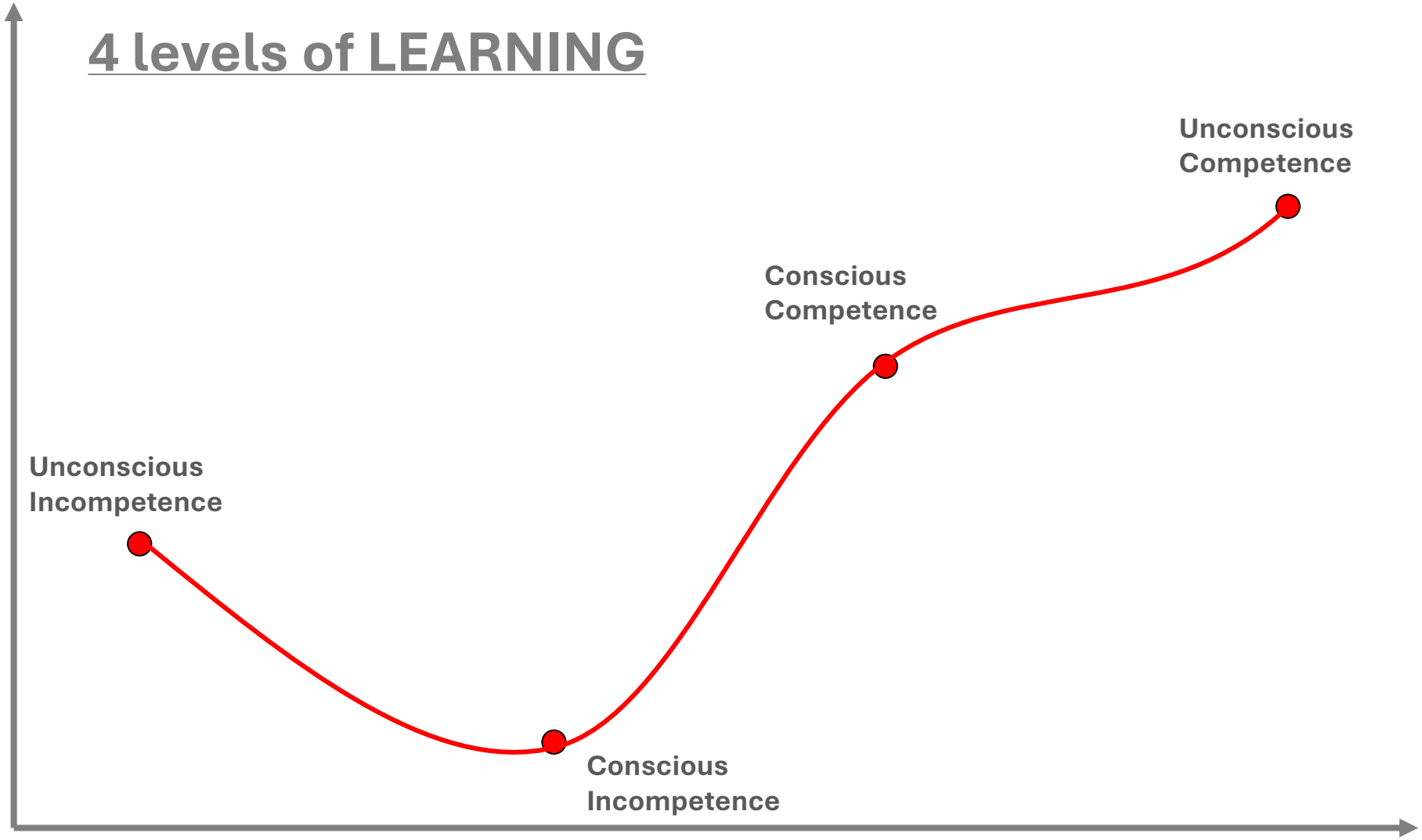

The Lasting Impact of the Counter Culture
WOODSTOCK
1969
U-HAUL
Photographs by Jason Lauré
Text by Ettagale Blauer and Jason Lauré
Foreword by Dennis Elsas, Legendary Disc Jockey



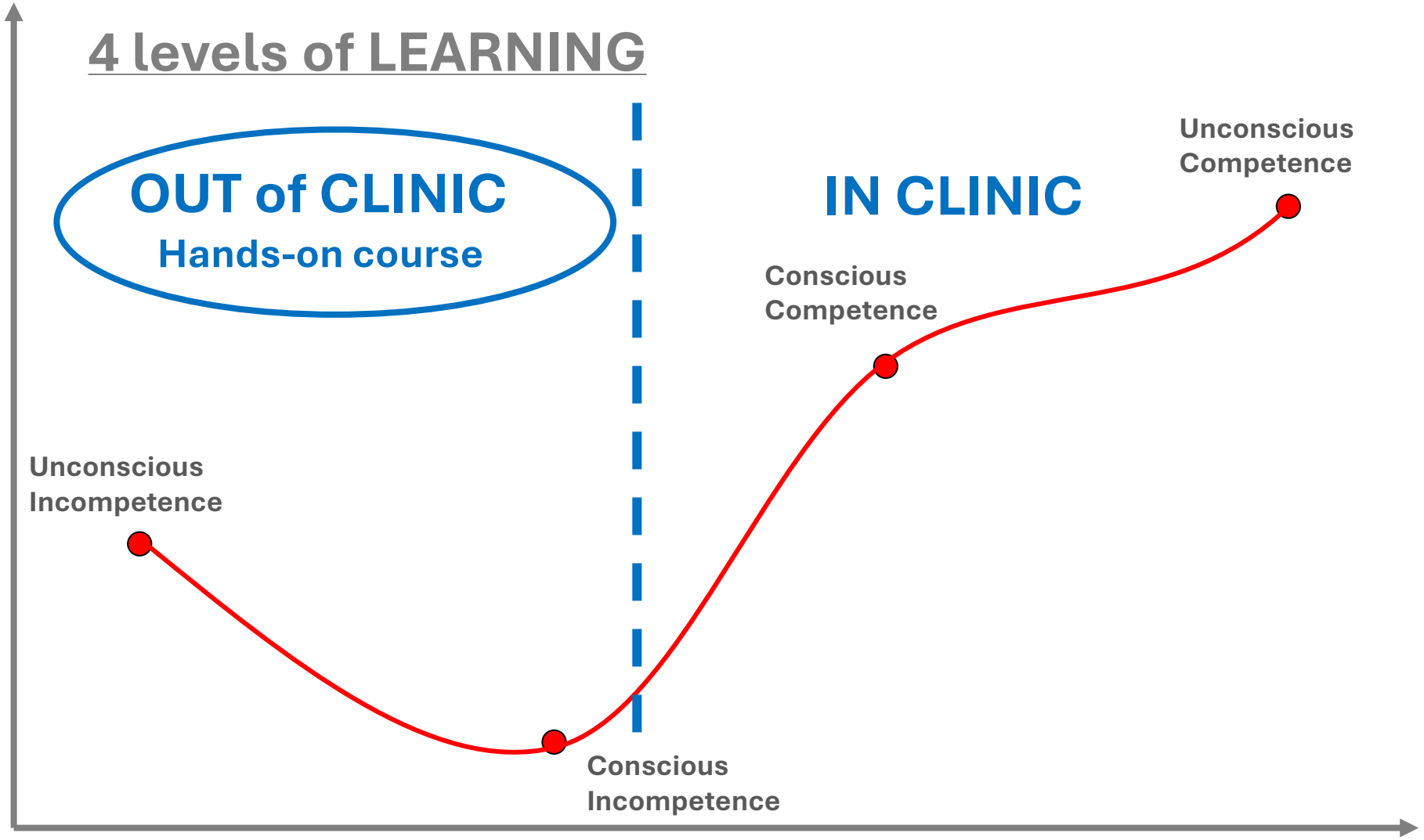




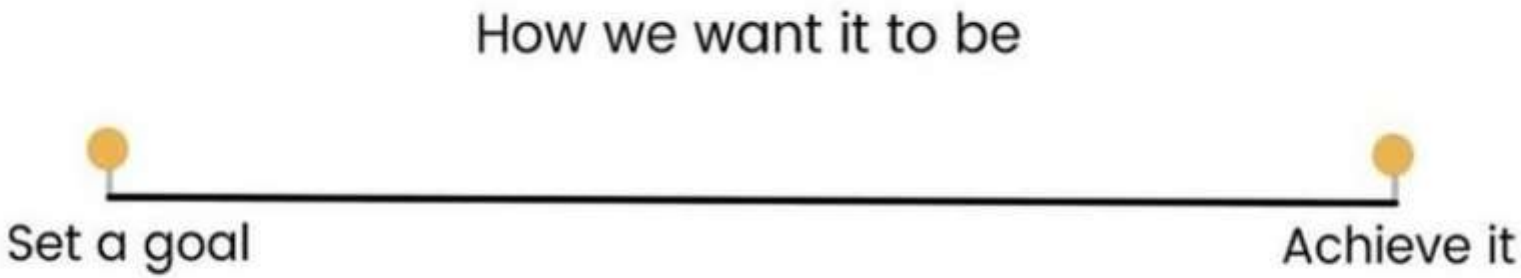
Why should I follow this course?



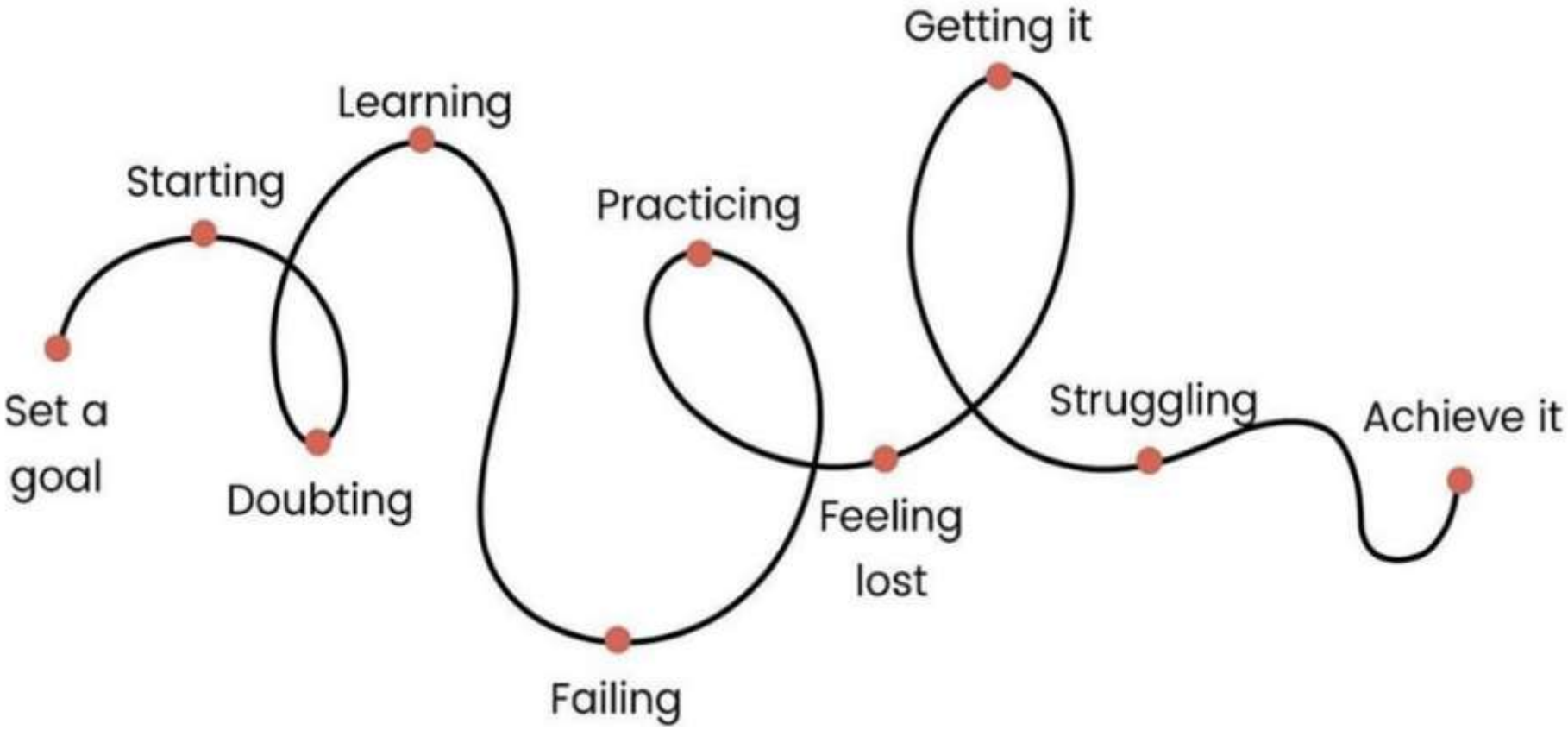
Why should I follow this course?



Ways of looking at learning curves



Ways of looking at learning curves



Endoscopy Tower

1. Screen *
2. Flexible Endoscope
3. Video Processor & Light Source
4. AI module * / SCOPEPILOT™: 3D Colon
   Navigation System *
5. CO_2 Regulator
6. Flushing Pump

4K Monitors

32“ Premium
32“ Performance



Alternative: 27“



1



2



3



4



Periphery

CO2 Insufflator
Irrigation Pump
Suction Pump
HF Generator

5 — 6

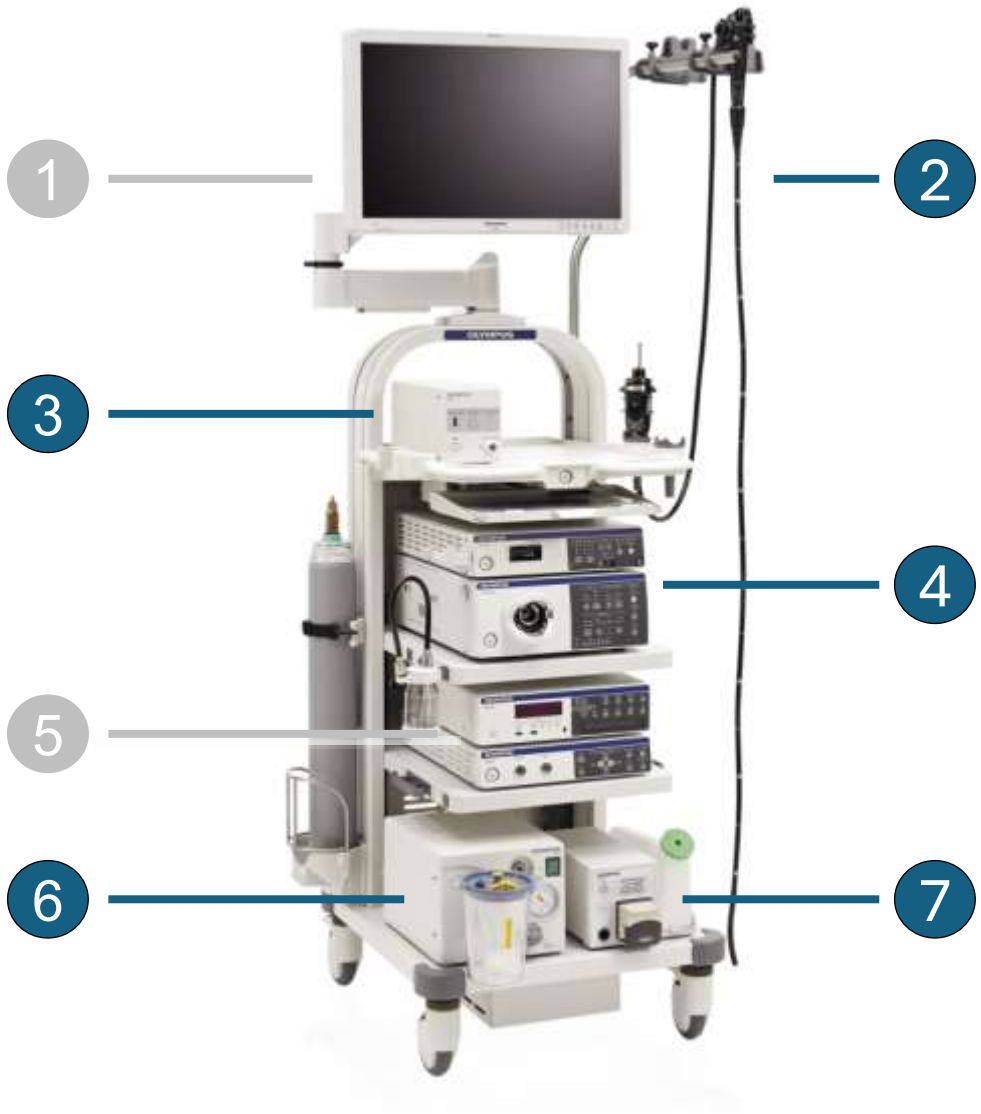
*** Grey marked products are not part of the presentation**

OLYMPUS
Your Vision, Our Future

Medical Expert Training

Endoscopy Tower

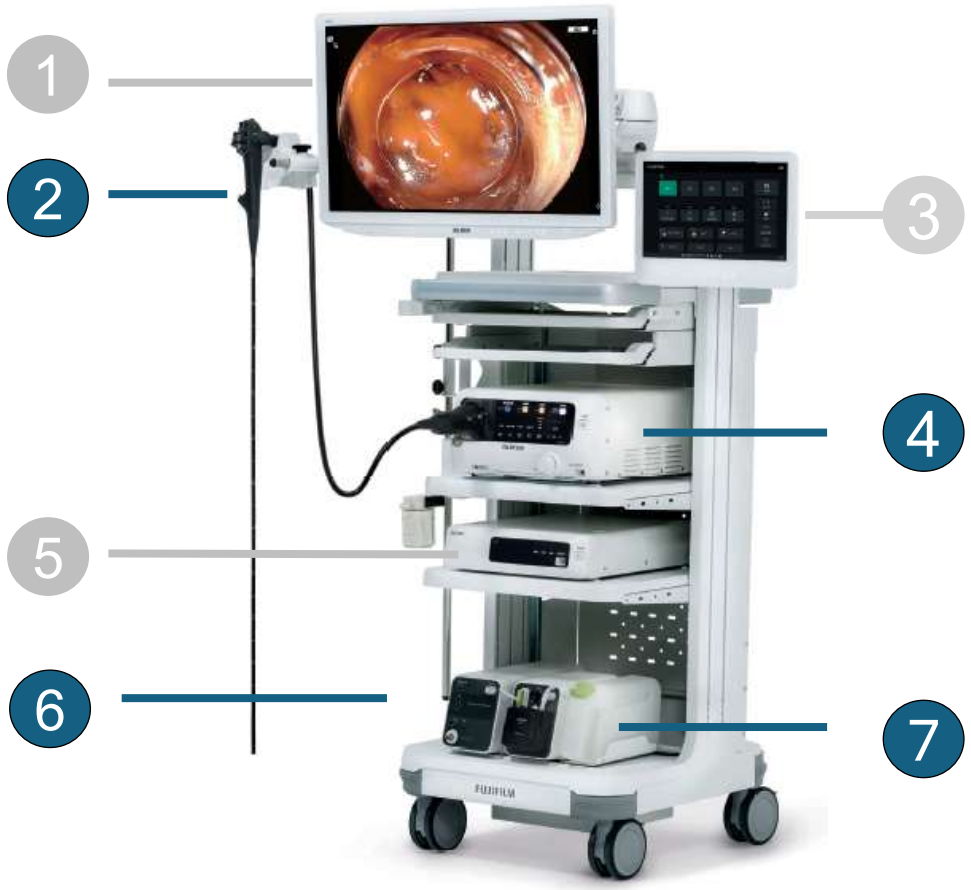
1. Screen *
2. Flexible Endoscope
3. CO_2 Regulator
4. Video Processor & Light Source
5. Documentation System * / ScopeGuide
6. Suction Pump
7. Flushing Pump



*** Grey marked products are not part of the presentation**

Endoscopy Tower

1. Screen *
2. Flexible Endoscope
3. External Tablet*
4. Video Processor & Light Source (EP-8000)
5. CAD Eye - AI Module (EX-1)*
6. CO_2 Insufflator (GW-100)
7. Flushing pump (JW-3)



*** Grey marked products are not part of the presentation**

Flexible Endoscopes | Structure

a. Endoscope Connector

b. Universal Cord

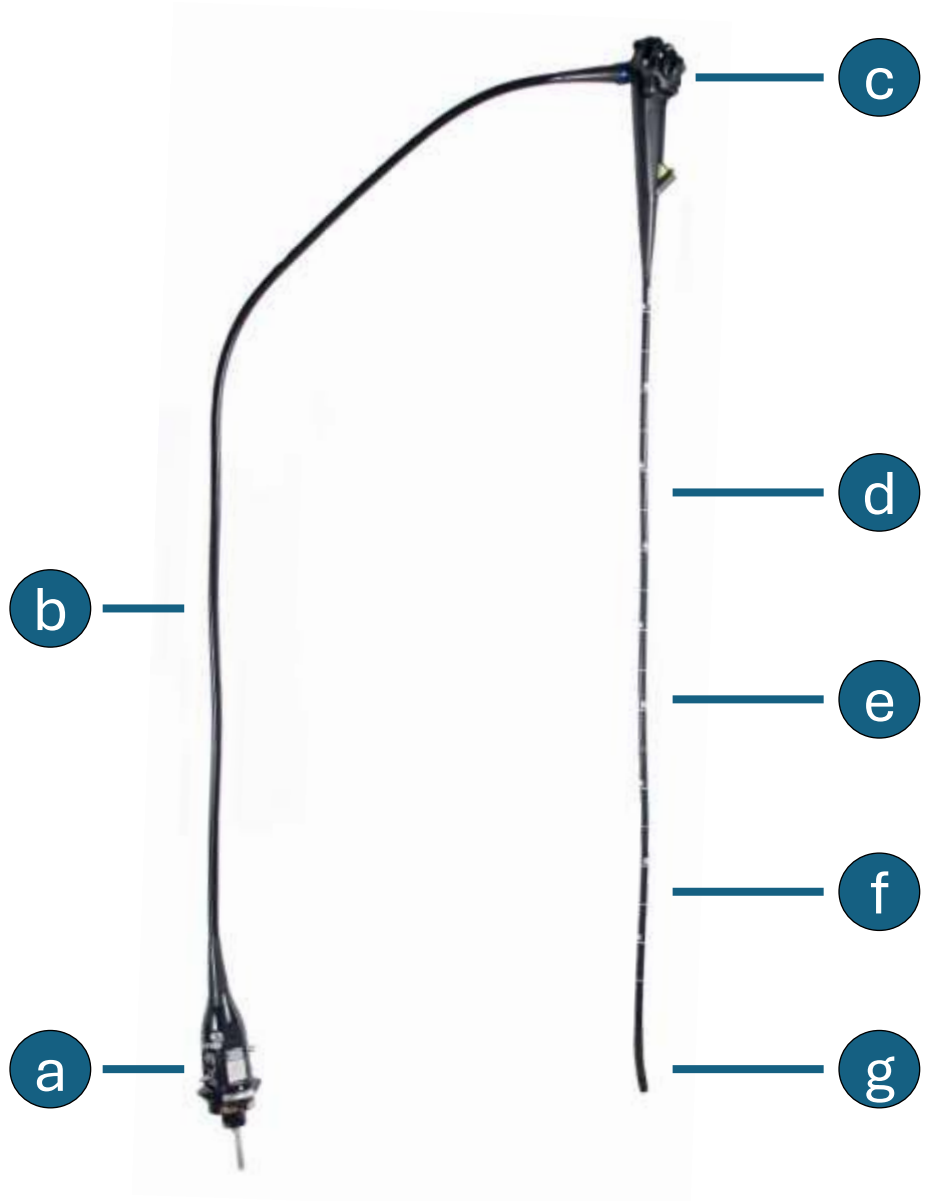
c. Control Section

d. Insertion Tube

e. Variable Stiffness *

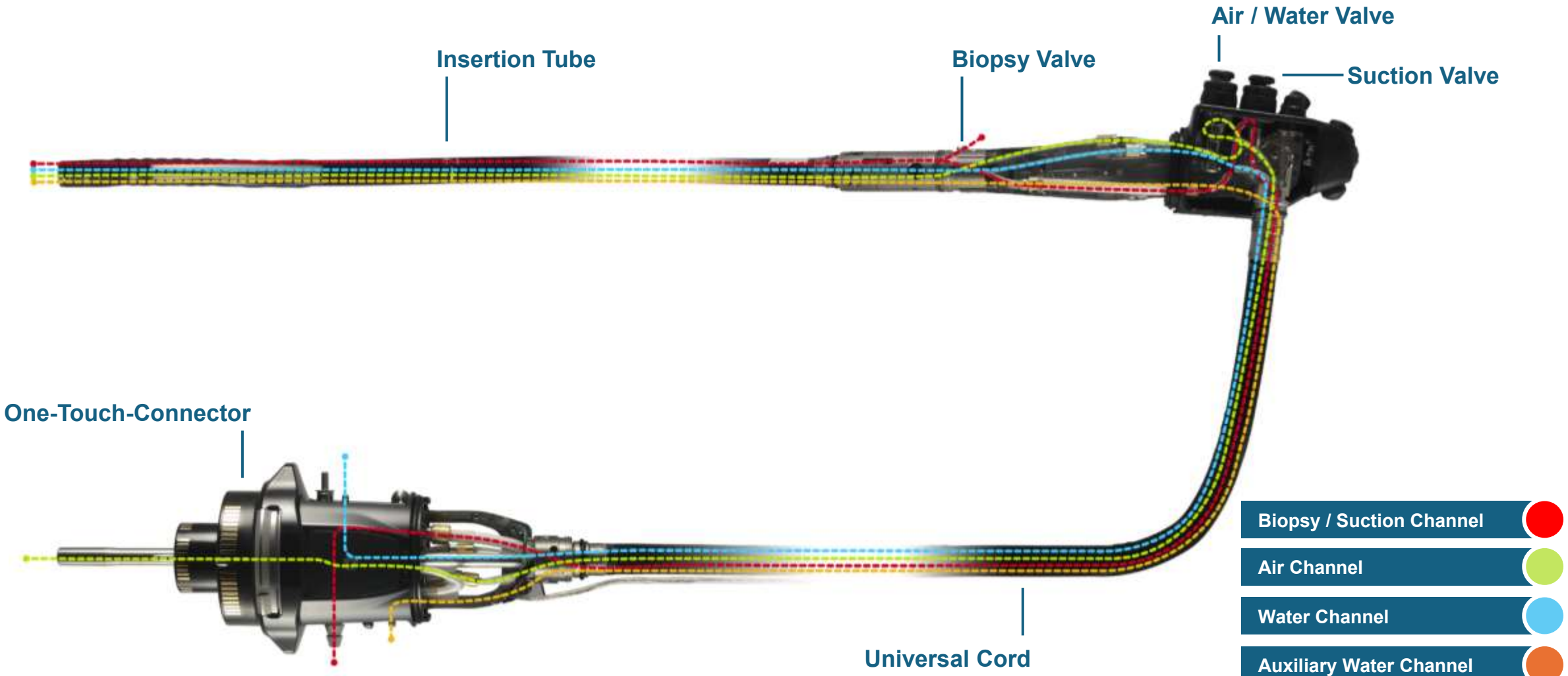
f. Bending Section

g. Distal End



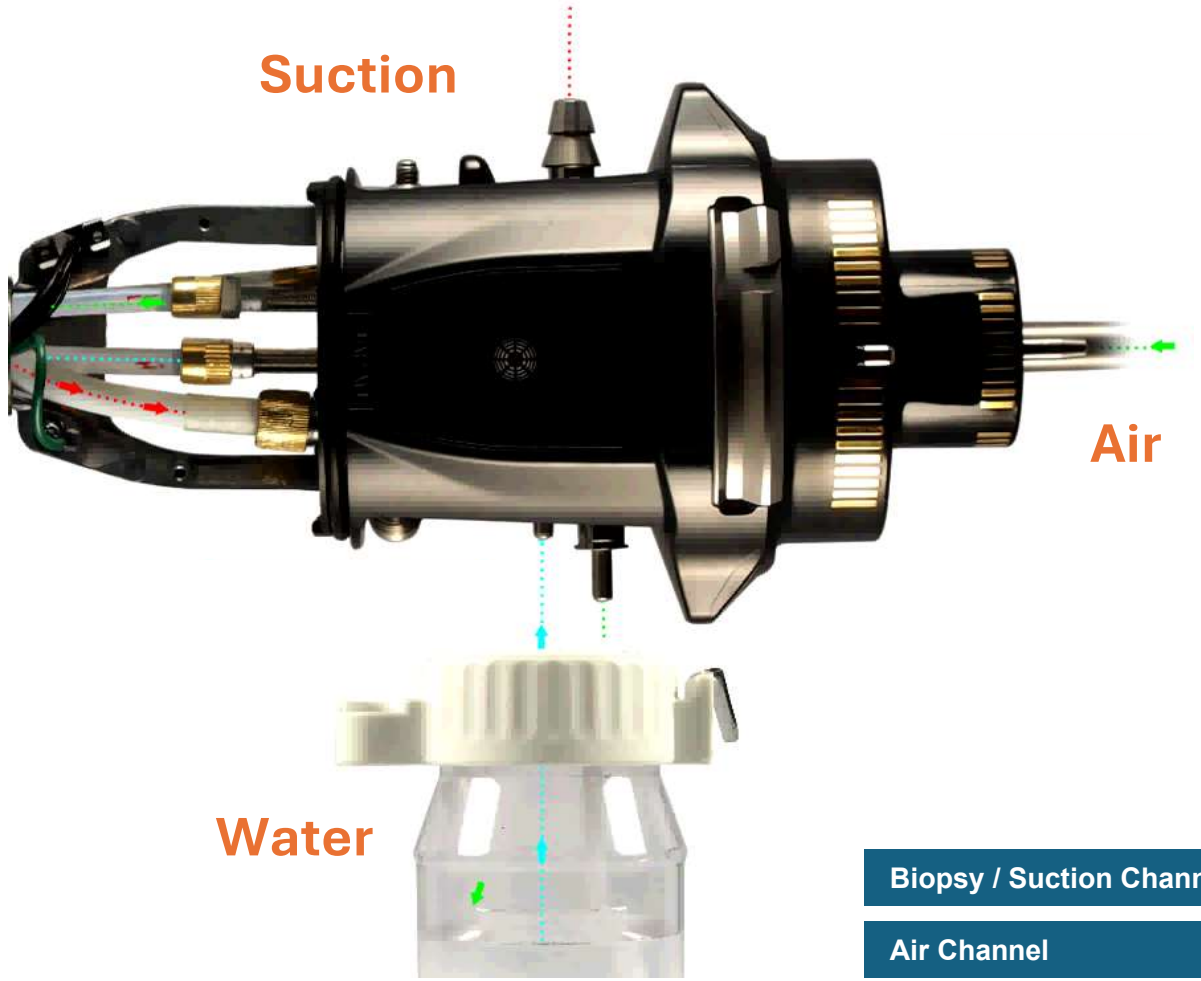
*** Variable Stiffness is only part of a colonoscope**

Flexible Endoscopes | Channels



Flexible Endoscopes | Channels

- One-Touch-Connector
- Air / Water Valve pressed
- Air / Water Valve covered
- Suction Valve pressed
- Cleaning Valve inserted and pressed



Flexible Endoscopes | Channels

- One-Touch-Connector
- **Air / Water Valve pressed**
- Air / Water Valve covered
- Suction Valve pressed
- Cleaning Valve inserted and pressed





Biopsy / Suction Channel

Air Channel

Water Channel

Flexible Endoscopes | Channels

- One-Touch-Connector
- Air / Water Valve pressed
- **Air / Water Valve covered**
- Suction Valve pressed
- Cleaning Valve inserted and pressed





Biopsy / Suction Channel

Air Channel

Water Channel

Flexible Endoscopes | Channels

- One-Touch-Connector
- Air / Water Valve pressed
- Air / Water Valve covered
- **Suction Valve pressed**
- Cleaning Valve inserted and pressed





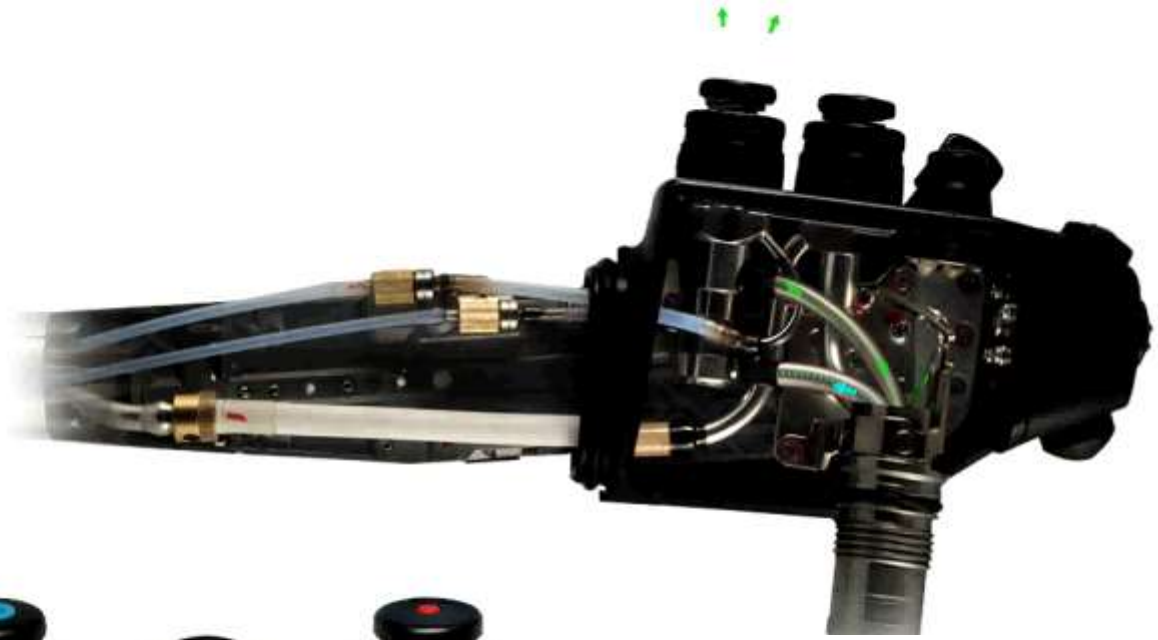
Biopsy / Suction Channel

Air Channel

Water Channel

Flexible Endoscopes | Channels

- One-Touch-Connector
- Air / Water Valve pressed
- Air / Water Valve covered
- Suction Valve pressed
- **Cleaning Valve inserted and pressed**





Biopsy / Suction Channel

Air Channel

Water Channel

Endoscope Connector | Functionality

1. Light Guide, Air Pipe (not visible)
2. Electrical contacts
3. Suction connector
4. Venting connector
5. Air/Water Supply Connector
6. Auxiliary Water Inlet





*** Grey marked components are barely used and not part of every endoscopy type**

Endoscope Connector | Functionality

1. Light Guide, Air Pipe (not visible)
2. Electrical contacts
3. Suction connector
4. Venting connector
5. Air/Water Supply Connector
6. S-cord connector mount
7. Auxiliary Water Inlet
8. Videoscope cable (EVIS EXERA II)

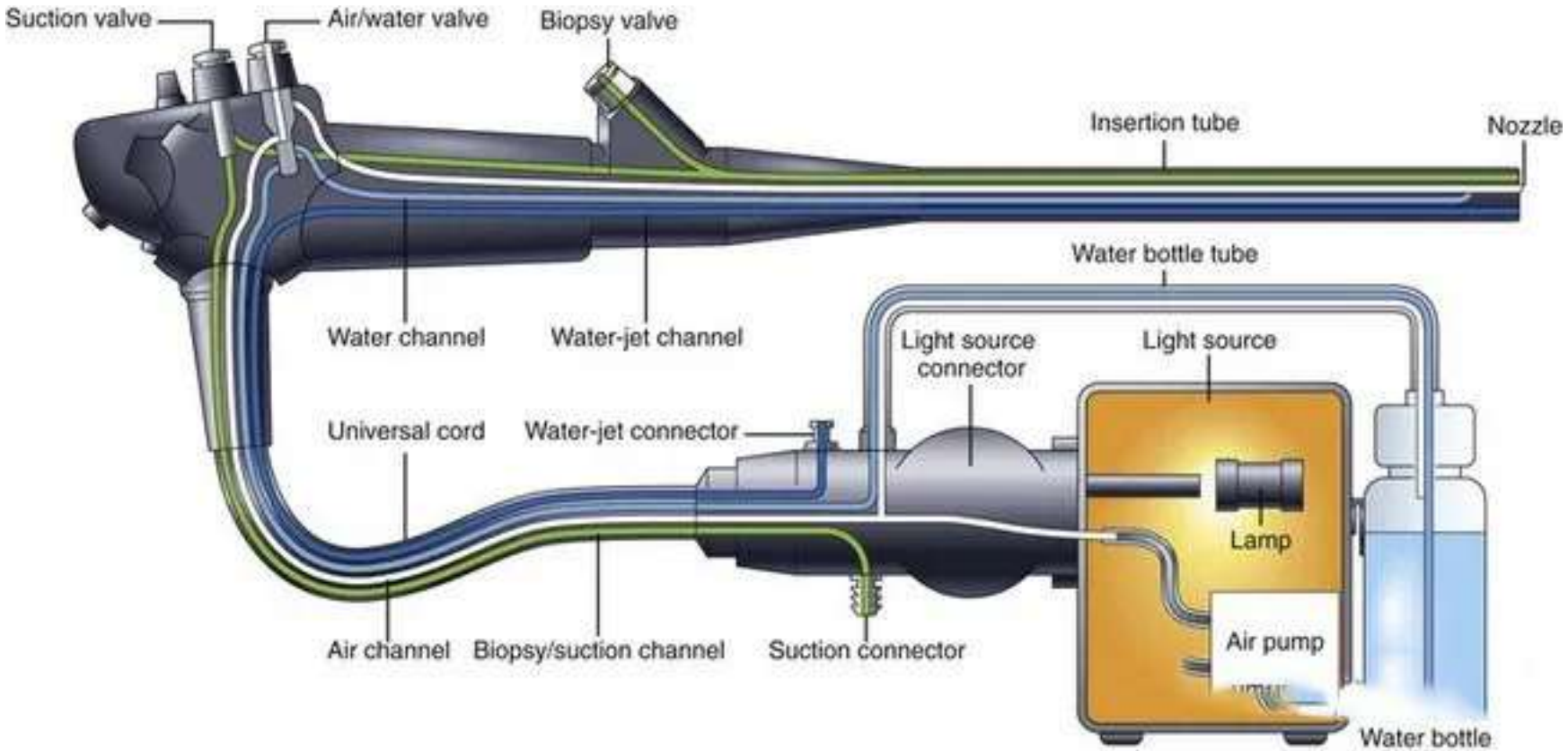


EXERA II
180 Serie

EXERA III
190 Serie

*** Grey marked components are barely used and not part of every endoscopy type**

Endoscope Connector Fujifilm





Endoscope Connector Fujifilm







- No electrodes
- Fast transmission of images via induction
- Easy to clean

Endoscope Connector I Types

1. Videoscope Connector EVIS EXERA II
2. Endoscope Connector EVIS EXERA II
3. Water resistant cap (MH-553) (protection of electronic components)
4. ETO cap (MB-156) for sterilization with ETO (rarely done)
5. One Touch Connector EVIS EXERA III







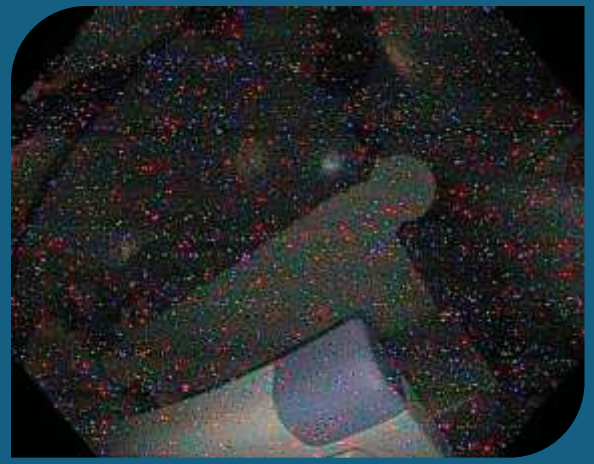


Endoscope Connector I Damage Prevention



Wipe moisture from electric contacts after reprocessing , using lint-free gauze

→ mage Interference (dust & lint, flickers, image distortion, error messages)



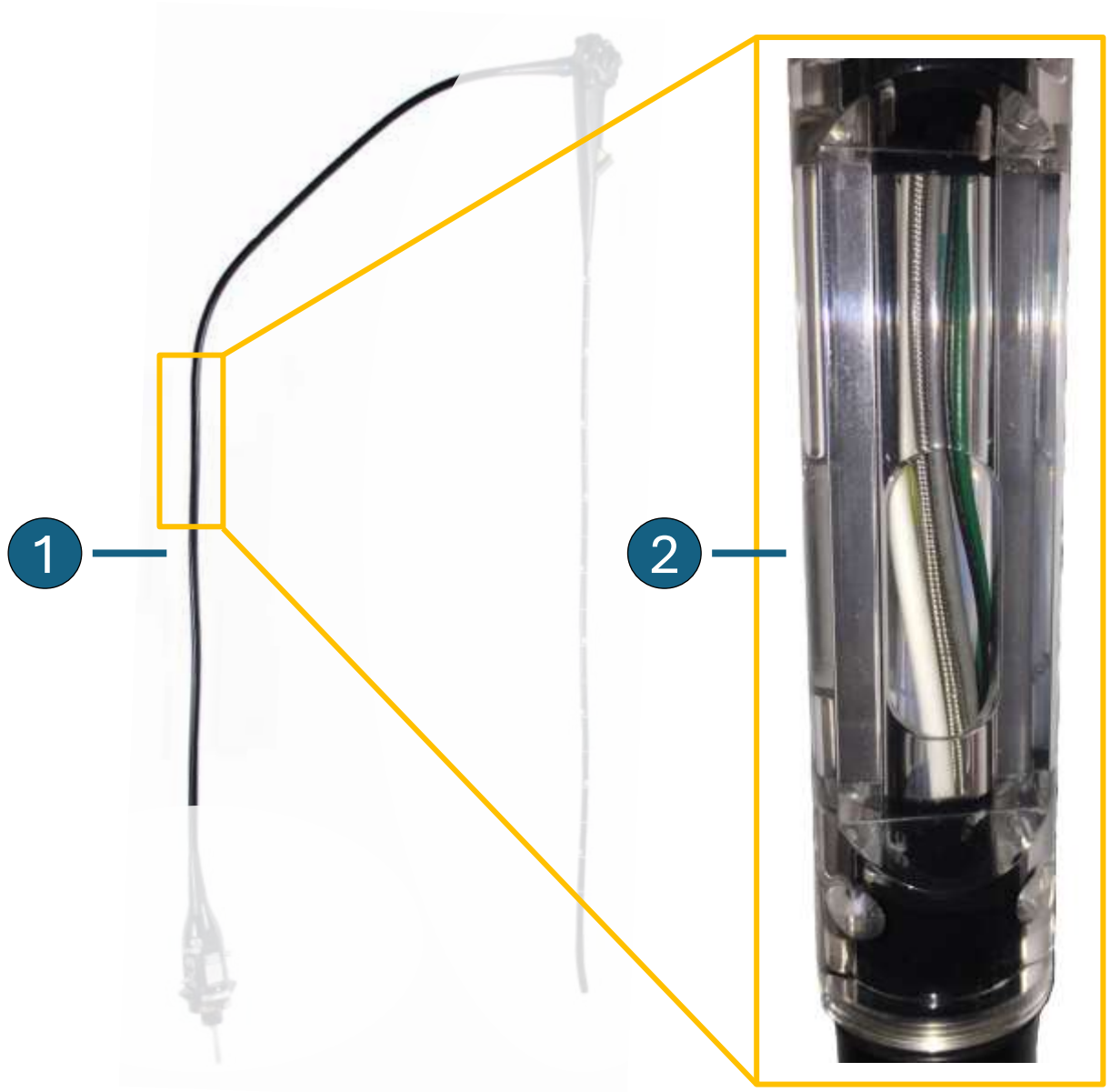




Exercise: I do [*Prevention*] to prevent [*Damage / Consequence*] caused by [*Cause / Hazzard*] .

Universal Cord I Functionality

1. Universal Cord
2. Inner Works



Universal Cord I Damage Prevention



Avoid twisting or coiling of the insertion tube & universal cord :

→ kinks and bulges, malfunction of bending

- loss of image signal
- water entering channels
- perforation of outer rubber



Exercise: I do [*Prevention*] to prevent [*Damage / Consequence*] caused by [*Cause / Hazzard*] .

Universal Cord I Damage Prevention



Adequate protection during use, transportation and storage of endoscopes :

→ deformation of Inner Workings

Solution : Protect the distal end with ‘ProTech’



Exercise: I do [*Prevention*] to prevent [*Damage / Consequence*] caused by [*Cause / Hazzard*] .

Universal Cord I Damage Prevention



Adequate protection during use, transportation and storage

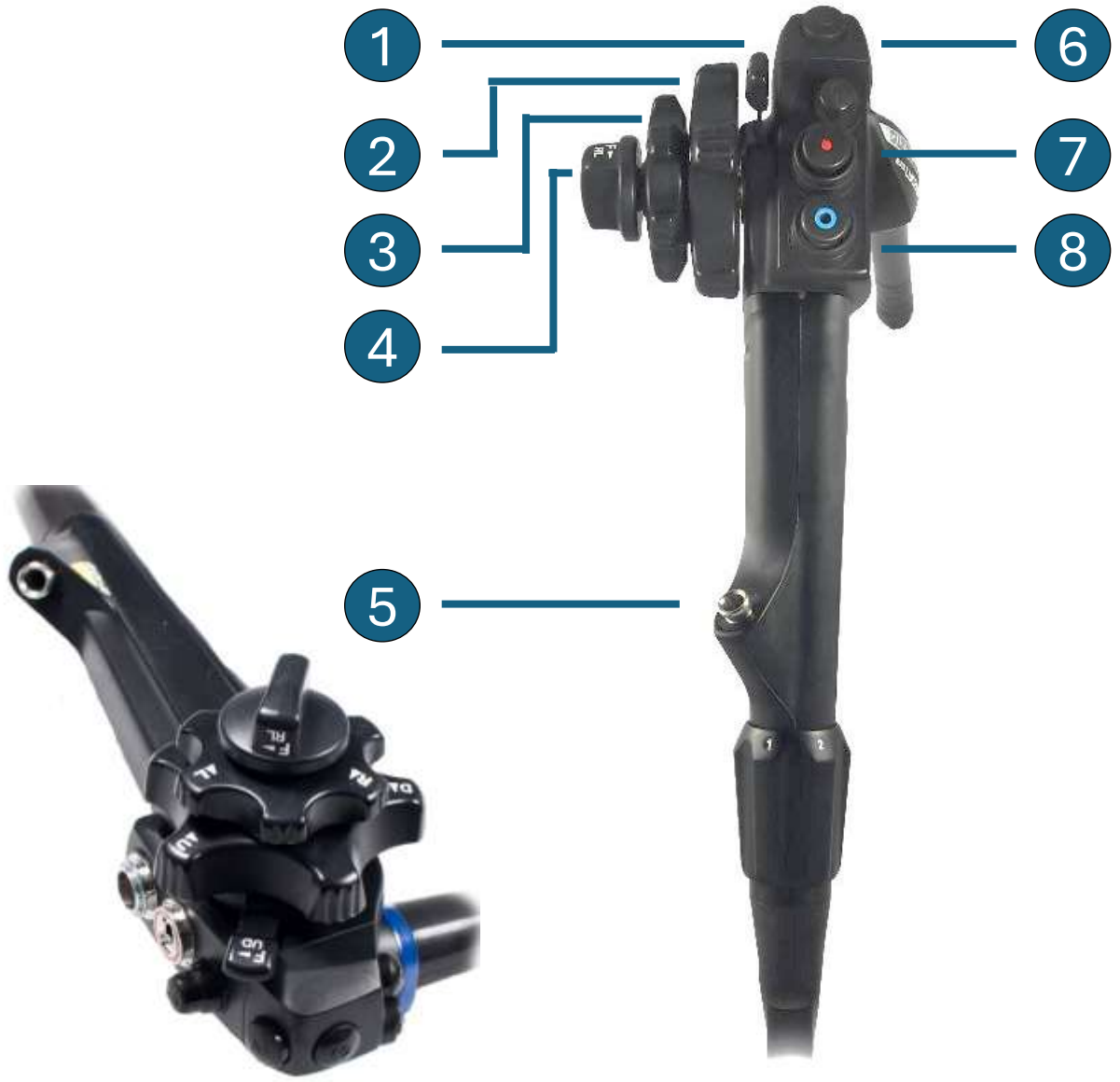
- scratches / serious damaged distal end
- humidity entering the scope (corrosion)
- microorganisms



Exercise: I do [*Prevention*] to prevent [*Damage / Consequence*] caused by [*Cause / Hazzard*] .

Control Section I Functionality

1. Up / Down Angulation Lock
2. Up / Down Angulation Control Knop
3. Right / Left Angulation Control Knop
4. Right / Left Angulation Lock
5. Instrument Channel
6. Remote Switches 1-4 (5) *
7. Suction Valve / Cylinder
8. Air / Water Valve / Cylinder



*** Grey marked information is not displayed**

Control Section I Functionality

- **Improved handling – focus on improved ERGONOMICS**
  - **ErgoFeel** Control Body & Reduced weight
  - Improved A/W and suction valves
  - **Retroview**: PENTAX made the 1st Retroview scope (**UP angulation of 210˚**) Now this feature is applied to all of PENTAX i20c endoscopes as standard feature









Change press-direction of remote buttons for better finger access



EndoWheel: Offer a solution for endoscopist with small hands **to reach the R/L wheel easier**

Control Section | Functionality

1. Instrument Channel / Biopsy Valve
2. Color Code



Color coded handles



1.2 mm *1.7 mm* *2.0/2.2 mm* *2.6 mm* *2.8/3.2 mm* *3.7/4.2 mm* *5.0 mm*

Biopsy Channels Diameter

Control Section I Functionality

Fujifilm

1. Instrument Channel / Biopsy Valve
2. Color Code



Color coded handles



Labels attached to the control portion, which show the model number and instrument channel inlet size



1 Colour code of G7 control portion
2 Identification colour of working channel size
3 Instrument channel diameter
4 Corporate brand logo
5 Model number



Endoscope series and channel diameter
How to recognize your scope

PENTAX® MEDICAL

Legacy series

EG29-i10c Routine gastroscope	3,2 mm
EG-2990Zi Zoom gastroscope	2,8 mm
EG34-i10 Therapeutic gastroscope	3,8 mm
EG17-J10 Video Ultraslim gastroscope	2,0 mm
EC38-i10c (M/F/L) Routine coloscope	3,8 mm
EC34-i10c (M/F/L) Pediatric coloscope	3,8 mm
EC-3890Zi (F/L) Zoom colonscope	3,8 mm

Newest series

EG29-i20c Routine gastroscope	3,2 mm
EG27-i20c Slim gastroscope	2,8 mm
EC38-i20c (M/F/L) Routine coloscope	3,8 mm
EC34-i20c (M/F/L) Slim Pediatric colonscope	3,2 mm
ED34-i10cT2 I-DEC™ Duodenoscope	4,2 mm
ED32-i10 Slim DEC™ Duodenoscope	3,2 mm

Prefix
EG = gastroscope
EC = colonoscope
ED = Duodenoscope

Suffix
U = echo-endoscope (EUS)

Letters
c = Cmos (chip system)
Z = Zoom
T = Therapeutic
M = Short 1300mm
F = Intermediate 1500mm
L = Long 1700mm

- Routine gastroscopes (EG) with standard channeldiameter 3.2mm, coloscope 3.8mm
- Duodenscope in 2 versions, routine (4,2mm) and slim version (3,2mm)
- SCOPEPILOT Video navigation coloscopes as well as EUS (Echoendoscopes) are not mentioned in this overview

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Your Vision, Our Future

Endoscope series and channel diameter

180
EVIS EXERA II

GIF-H180 Gastroscoop	2,8 mm
CF-H180AL Colonoscoop	3,7 mm
PCF-Q180AL Pediatrische colonoscoop	3,2 mm
TJF-Q180V Duodenoscoop	4,2 mm

190
EVIS EXERA III

GIF-H190 Gastroscoop	2,8 mm
GIF-1TH190 Therapeutische gastroscoop	3,7 mm
GIF-XP190N Ultraslanke gastroscoop	2,2 mm
CF-HQ190L Colonoscoop	3,7 mm
PCF-HQ190L Pediatrische colonoscoop	3,2 mm
TJF-Q190V Duodenoscoop	4,2 mm

1100
EVIS X1

GIF-1100 Gastroscoop	2,8 mm
CF-HQ1100DL Colonoscoop	3,7 mm

1500
EVIS X1 · EDOF

GIF-EZ1500 Gastroscoop	2,8 mm
CF-EZ1500DL Colonoscoop	3,7 mm

Onthoud Gastroscoop 2,8 mm, colonoscoop 3,7 mm, al vier generaties lang. Groter kanaal: therapeutische gastroscoop en duodenoscoop. Kleur van de label = kleurcode op het handvat.

Endoscope series and channel diameter
How to recognize your scope

FUJIFILM

700 series

EG-760R Routine gastroscope	2,8 mm
EG-760Z Zoom gastroscope	2,8 mm
EG-760CT Therapeutic gastroscope	3,8 mm
EG-740N Ultraslim gastroscope	2,4 mm
EC-760R-V/M, V/I, V/L Routine coloscope	3,8 mm
EC-760P-V/M, V/L Pediatric coloscope	3,2 mm

800 series

EG-860R Routine gastroscope	2,8 mm
EG-840T Therapeutic gastroscope	3,2 mm
EG-840TP Ultraslim therapeutic gastroscope	3,2 mm
EC-860R-V/M, V/I, V/L Routine coloscope	3,8 mm
EN-840T Enterescope – Double balloon	3,2 mm
ED-840T Duodenoscope	4,2 mm

Prefix
EG = gastroscope
EC = colonoscope
ED = Duodenoscope
EB = Bronchoscope

Suffix
UT/US = echo-endoscope (EUS)

Letters
R = Routine
Z = Zoom
T = Therapeutic
V = Variable stiffner
M = Medium
I = Intermediate
L = Long
P = Petit (small)

***Small portion of the complete portfolio**

Control Section I Damage Prevention



Adequate cleaning (Reprocessing Manual)

- Painting coming off
- Change of color
- Material getting brittle



Exercise: I do [*Prevention*] to prevent [*Damage / Consequence*] caused by [*Cause / Hazzard*] .

Control Section I Damage Prevention



Proper use of cleaning and endoscope devices (correct angle)

- notches
- suction defects
- leakage



Exercise: I do [*Prevention*] to prevent [*Damage / Consequence*] caused by [*Cause / Hazzard*] .

Control Section I Damage Prevention



Avoid impacts on hard surfaces / adequate protection during use, transportation & storage / do not lay down Endoscope on angulation knobs

→ scratches & cracks /

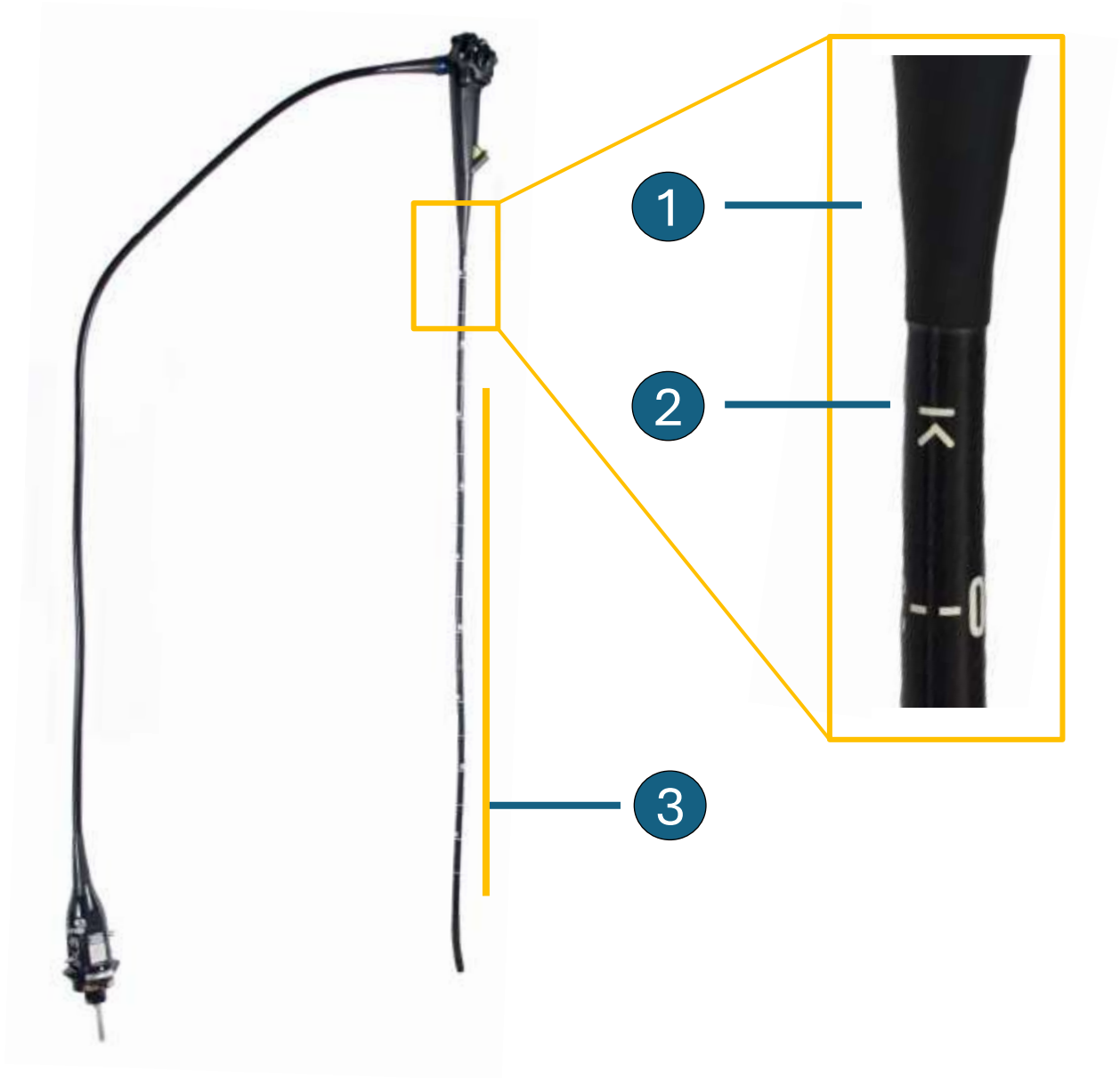
- humidity entering the scope (corrosion)



Exercise: I do [*Prevention*] to prevent [*Damage / Consequence*] caused by [*Cause / Hazzard*] .

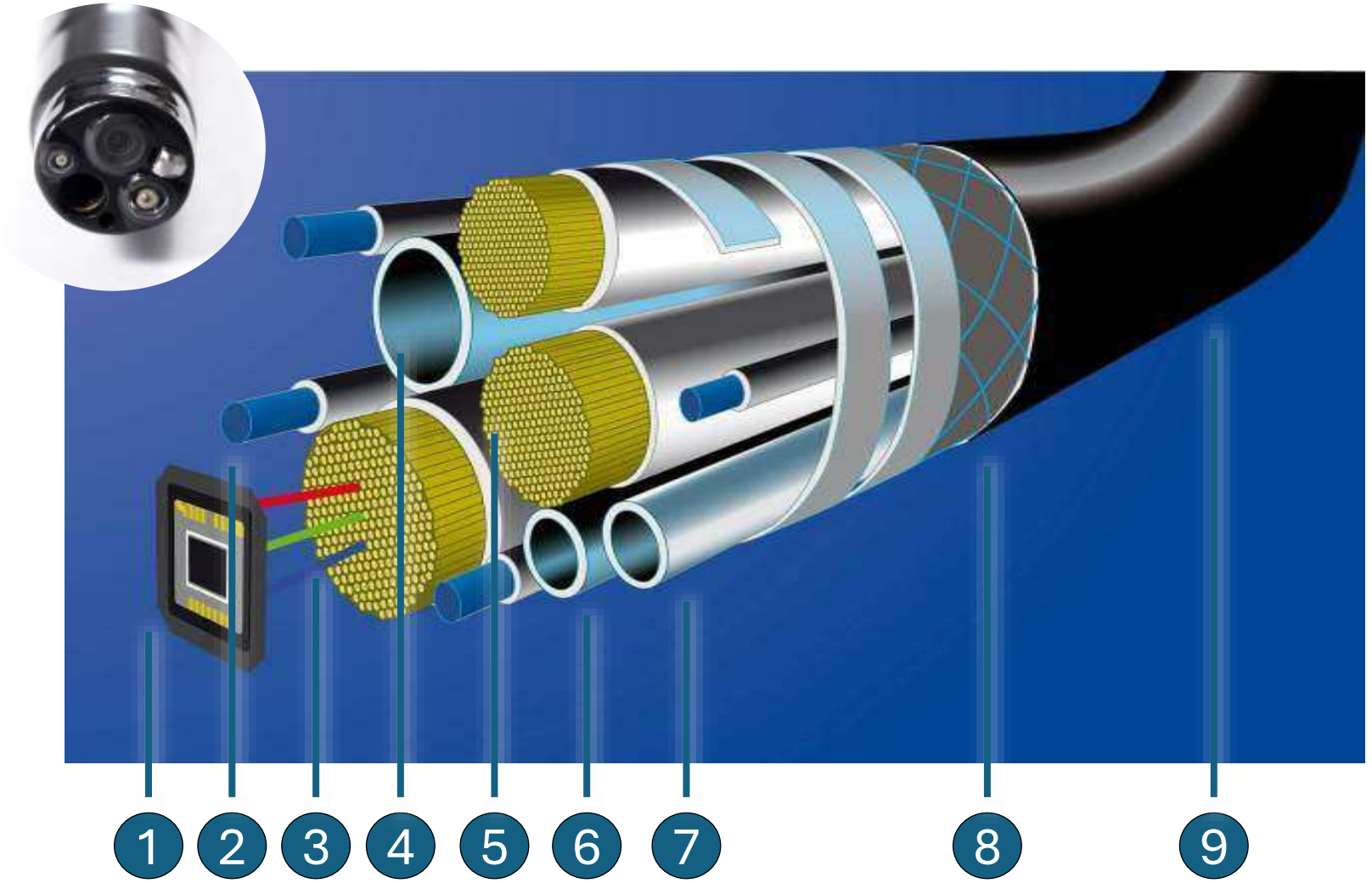
Insertion Tube I Functionality

1. Boot
2. Insertion Section Limit Mark
3. Insertion Tube



Insertion Tube I Functionality

1. CCD-Chip
2. Steering Cables (4x)
3. Image Guide
4. Biopsy Channel
5. Light Guide
6. Air/Water Channel
7. Auxiliary Water Channel
8. Metal Spiral Tube
9. Black Outer Tube



Bending Section | Functionality



Insertion Tube I Damage Prevention



Correct use of ET device / Choosing correct sizes

/ avoid excessive bending & force

- cuts, perforations,
- scratches & leaks
- bulges
- microorganism



Exercise: I do [*Prevention*] to prevent [*Damage / Consequence*] caused by [*Cause / Hazzard*] .

Insertion Tube I Damage Prevention



Avoid excessive bending & impacts on hard surfaces / adequate protection during use, transportation & storage

→ cuts, perforations, scratches

- humidity entering the scope (corrosion)
- broken fibers / loss of flexibility /
- loss of light transmission



Exercise: I do [*Prevention*] to prevent [*Damage / Consequence*] caused by [*Cause / Hazzard*] .

Variable Stiffness I Functionality

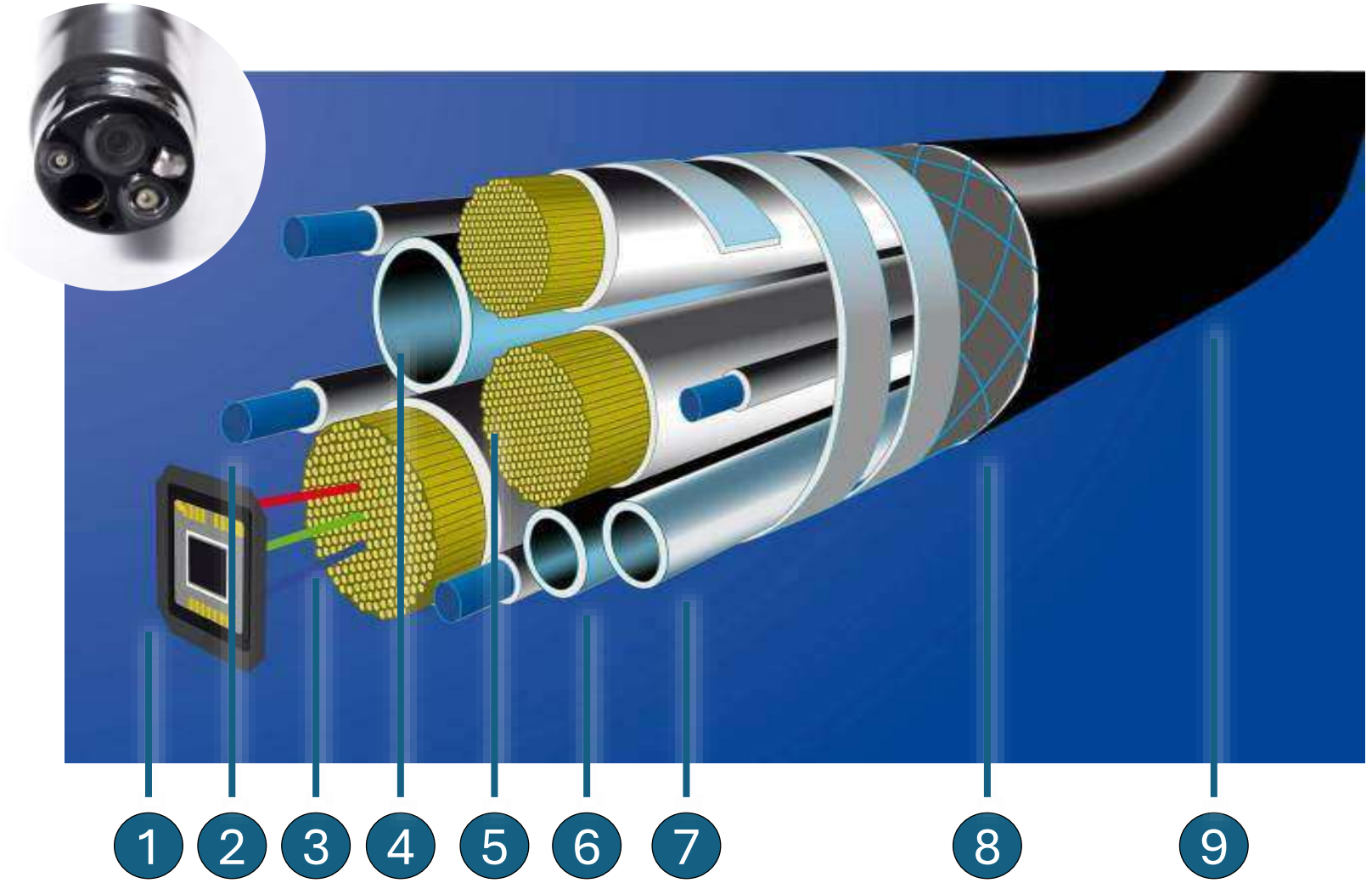
1. Flexibility Adjustment Ring
2. Decreasing flexibility process from mark (●) 1 to 3





Distal End I Functionality

1. CCD-Chip
2. Steering Cables (4x)
3. Image Guide
4. Biopsy Channel
5. Light Guide
6. Air/Water Channel
7. Auxiliary Water Channel
8. Metal Spiral Tube
9. Black Outer Tube



Distal End I Damage Prevention



Avoid hitting hard surfaces & twisting or coiling of tube & cord / adequate protection

- broken CCD
  - loss of image
  - cracks , scratches
  - broken cover lens
  - malfunction of electronics



Exercise: I do [*Prevention*] to prevent [*Damage / Consequence*] caused by [*Cause / Hazzard*] .

OLYMPUS ENDOSCOPEN

Endoscope specifications : series, channels, software ...

1 Prefix = type scoop

GIF	Gastroscoop
CF	Colonoscoop
PCF	Pediatrische colonoscoop
TJF	Duodenoscoop (ERCP)
SIF	Enteroscoop (dunne darm)
CHF	Choledochoscoop
GF-U	Echo-endoscoop (EUS)
BF	Bronchoscoop

2 Letters = eigenschappen

H	HDTV-beeld
Q	Hoge resolutie
HQ	HD + Dual Focus
Z / XZ	Optische zoom
EZ	EDOF (full focus)
T	Therapeutisch, groot kanaal
1T / 2T	1 groot / 2 werkkanalen
XP / N	Extra slank / transnasaal

3 Cijfers en suffix

180	EVIS EXERA II
190	EVIS EXERA III
290	EVIS LUCERA ELITE
1100	EVIS X1 routine
1200	EVIS X1 zoom
1500	EVIS X1 EDOF
L / I	Lange / intermediaire lengte
V / P	V-groeve / petit (smal)

VOORBEELD

GIF	1T	H	190	TJF	Q	190	V
Gastroscoop	1 groot kanaal	HDTV	EXERA III	Duodenoscoop	Hoge resolutie	EXERA III	V-groeve

OLYMPUS
Your Vision, Our Future

Medical Expert Training

Optical diagnosis in Flexible Endoscopy

1. **Standard Endoscopic image (White light image)**
2. **Narrow Band Imaging (NBI)**
3. **New technologies to enhance diagnosis (EVIS X1)**

OLYMPUS
Your Vision, Our Future

Medical Expert Training

Standard Endoscopic image (White light image)

White light image generated by :

- **High Definition resolution image sensor (CCD)**
- **Xenon-lightsource or LED**
- **HD-Monitor for ultra sharp & clean image**

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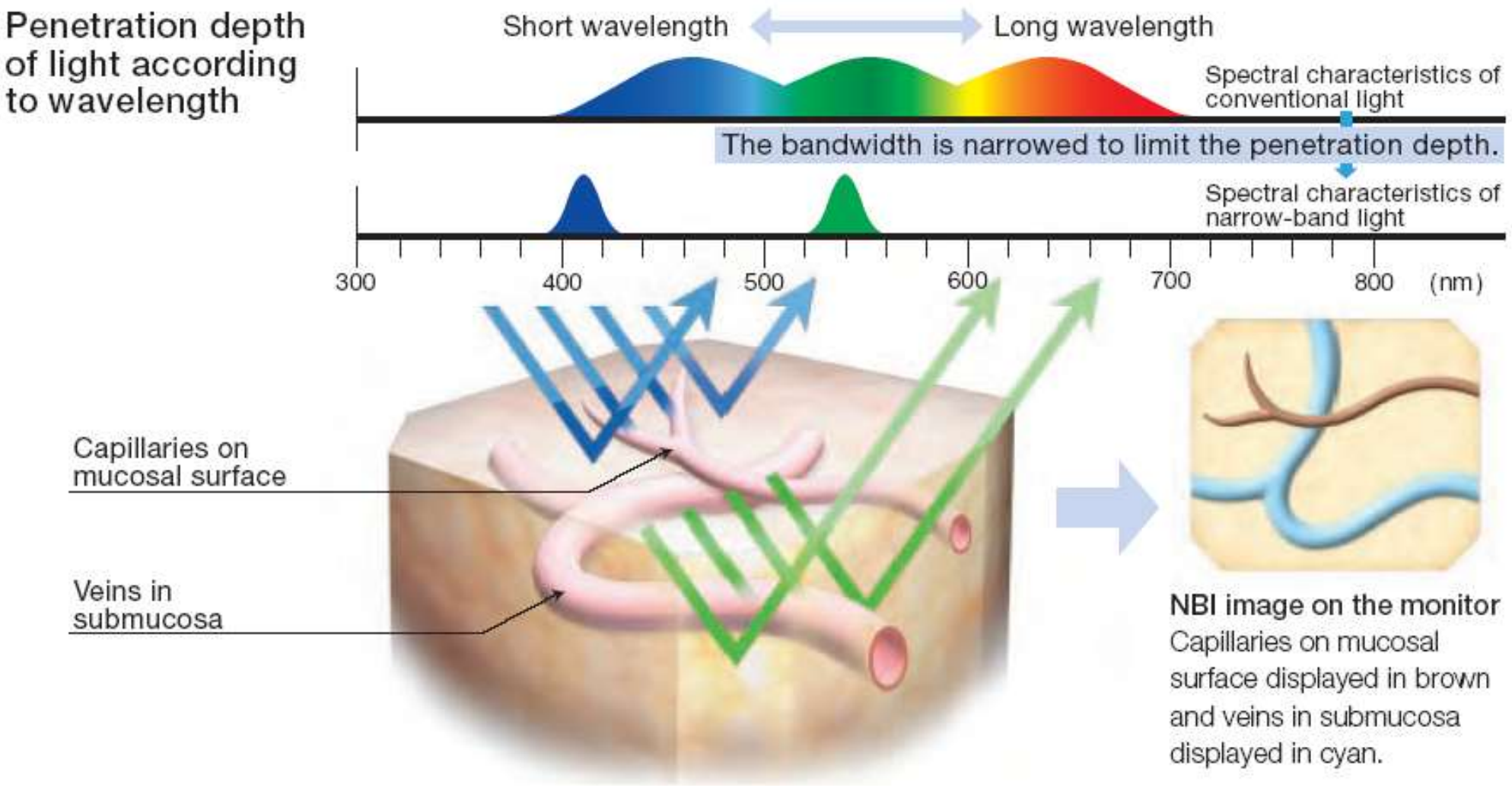
Medical Expert Training

Narrow Band Imaging (NBI)

Adaptation of standard endoscopic image by :

- **Using special filter on red wavelenghts**
- **Only green and blue wavelenghts remain**

NBI


Penetration depth of light according to wavelength
Short wavelength
Long wavelength
Spectral characteristics of conventional light
The bandwidth is narrowed to limit the penetration depth.
Spectral characteristics of narrow-band light
300
400
500
600
700
800
(nm)
Capillaries on mucosal surface
Veins in submucosa
NBI image on the monitor
Capillaries on mucosal surface displayed in brown and veins in submucosa displayed in cyan.

NBI: Colon adenoma

With conventional white light



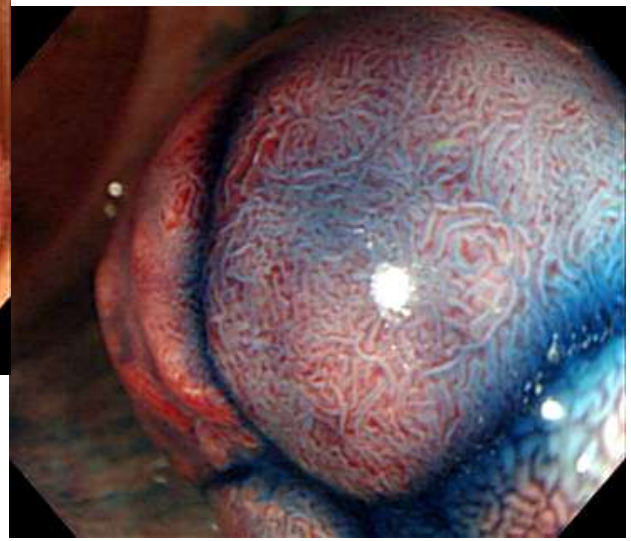
Provided by National Cancer Center East Hospital

NBI: Colon adenoma

With conventional white light



Dye (Chromo-endoscopy)



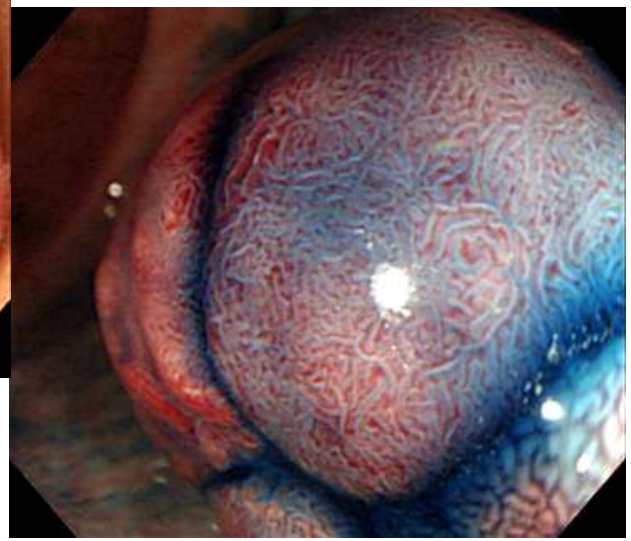
Provided by National Cancer Center East Hospital

NBI: Colon adenoma

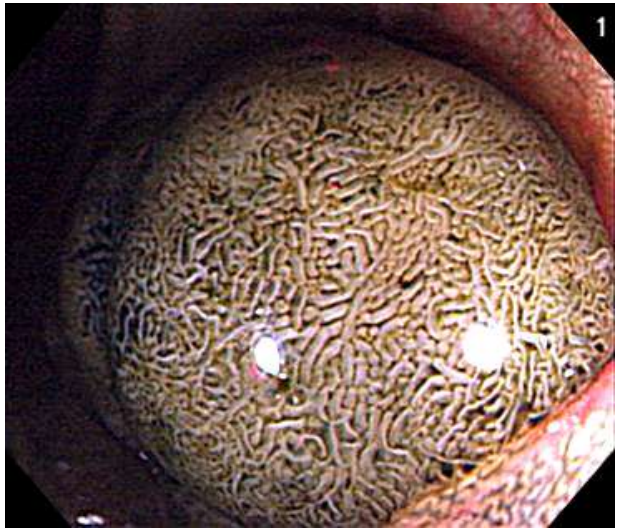
With conventional white light



Dye (Chromo-endoscopy)



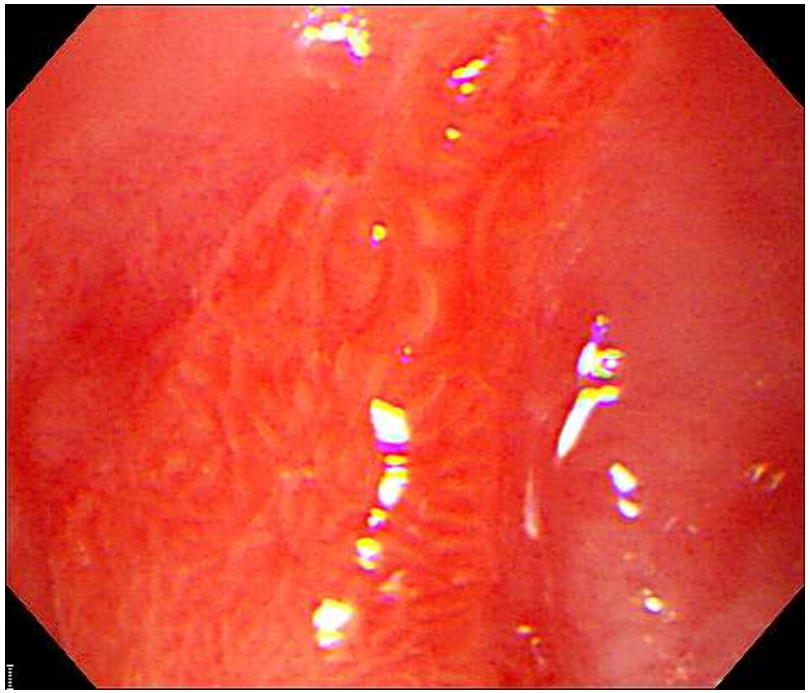
NBI



Provided by National Cancer Center East Hospital

NBI: Barrett's esophagus

- NBI = instrument to define leasions

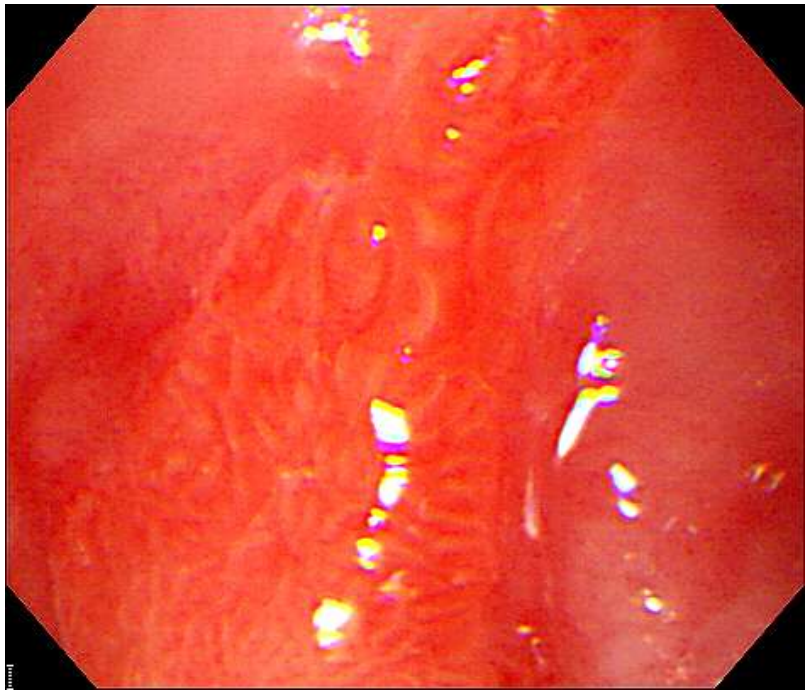


Conventional white light

Data courtesy of Dr. Endo of Sapporo Medical University

NBI: Barrett's esophagus

- NBI = instrument to define leasions



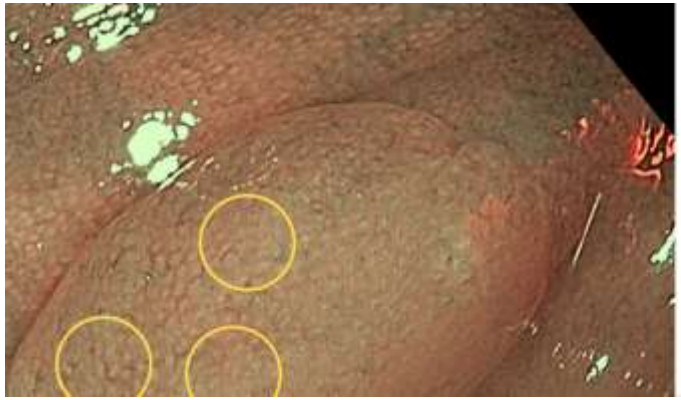
Conventional white light



NBI

Data courtesy of Dr. Endo of Sapporo Medical University

NBI and NICE classification



Color: Type 1
Same or lighter than background

⊕

Vessels: Type 1
None, or isolated lacy vessels coursing across the lesion

⊕

Surface pattern: Type 1
Dark or white spots of uniform size, or homogeneous absence of pattern

=

NICE Type 1



Color: Type 2
Brownish relative to background (verify color arises from vessels)

⊕

Vessels: Type 2
Brown vessels surrounding white structures

⊕

Surface pattern: Type 2
Oval, tubular or branched white structures surrounded by brown vessels

=

NICE Type 2



Color: Type 3
Brown to dark brown relative to background, sometimes patchy whiter areas

⊕

Vessels: Type 3
Has area(s) of disrupted or missing vessels

⊕

Surface pattern: Type 3
Amorphous or absent surface pattern

=

NICE Type 3

OLYMPUS
Your Vision, Our Future

Medical Expert Training

New technologies to enhance diagnosis (EVIS X1)

- **Next steps in improvement of image**
- **3th generation Narrow Band Imaging (NBI)**
- **New color patterns thanks to LED-technology**

New series since 2020 ：EVIS X1

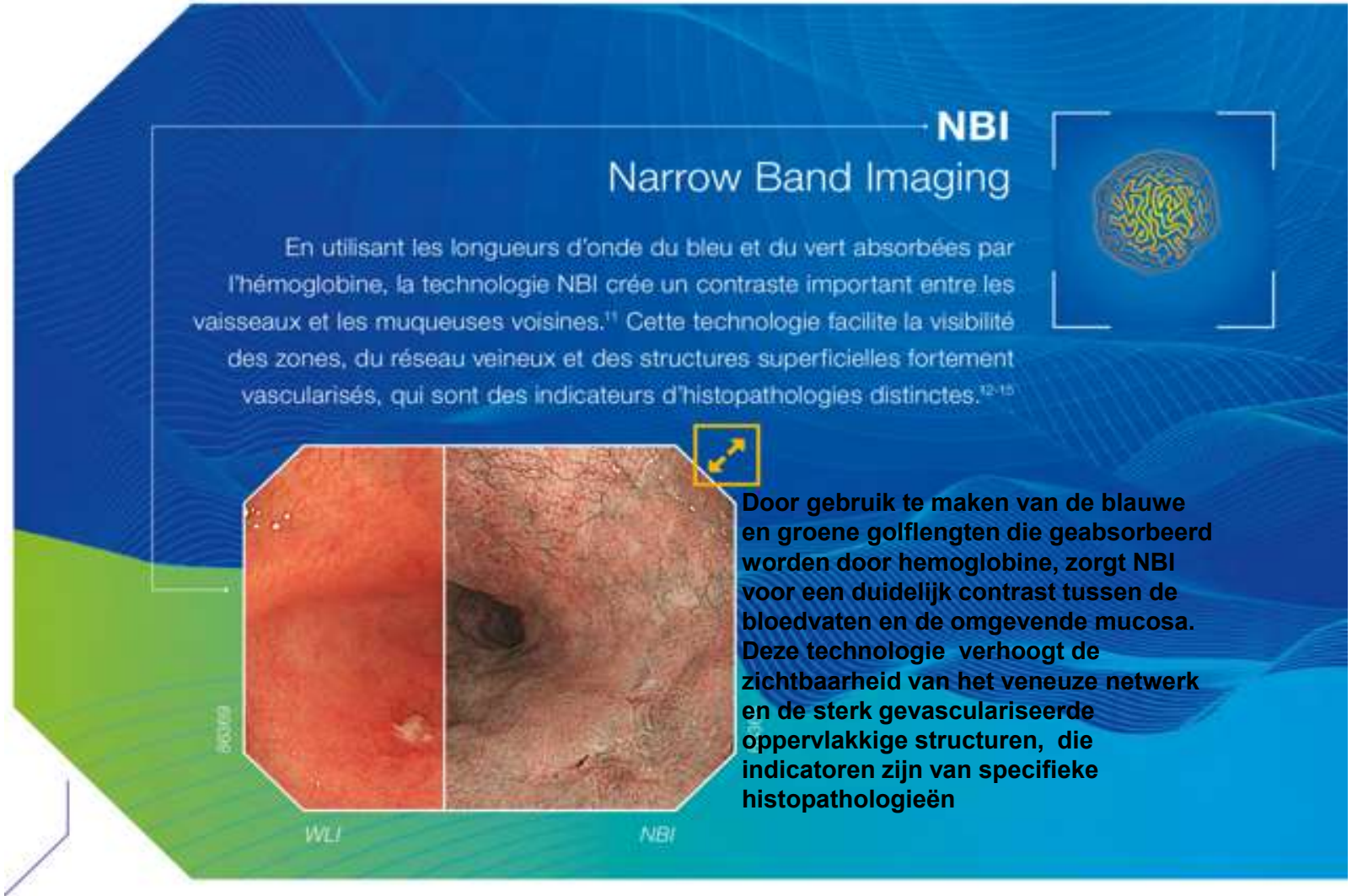
NEW !

- NBI
- TXI
- RDI
- EDOF



NBI

EVIS X1

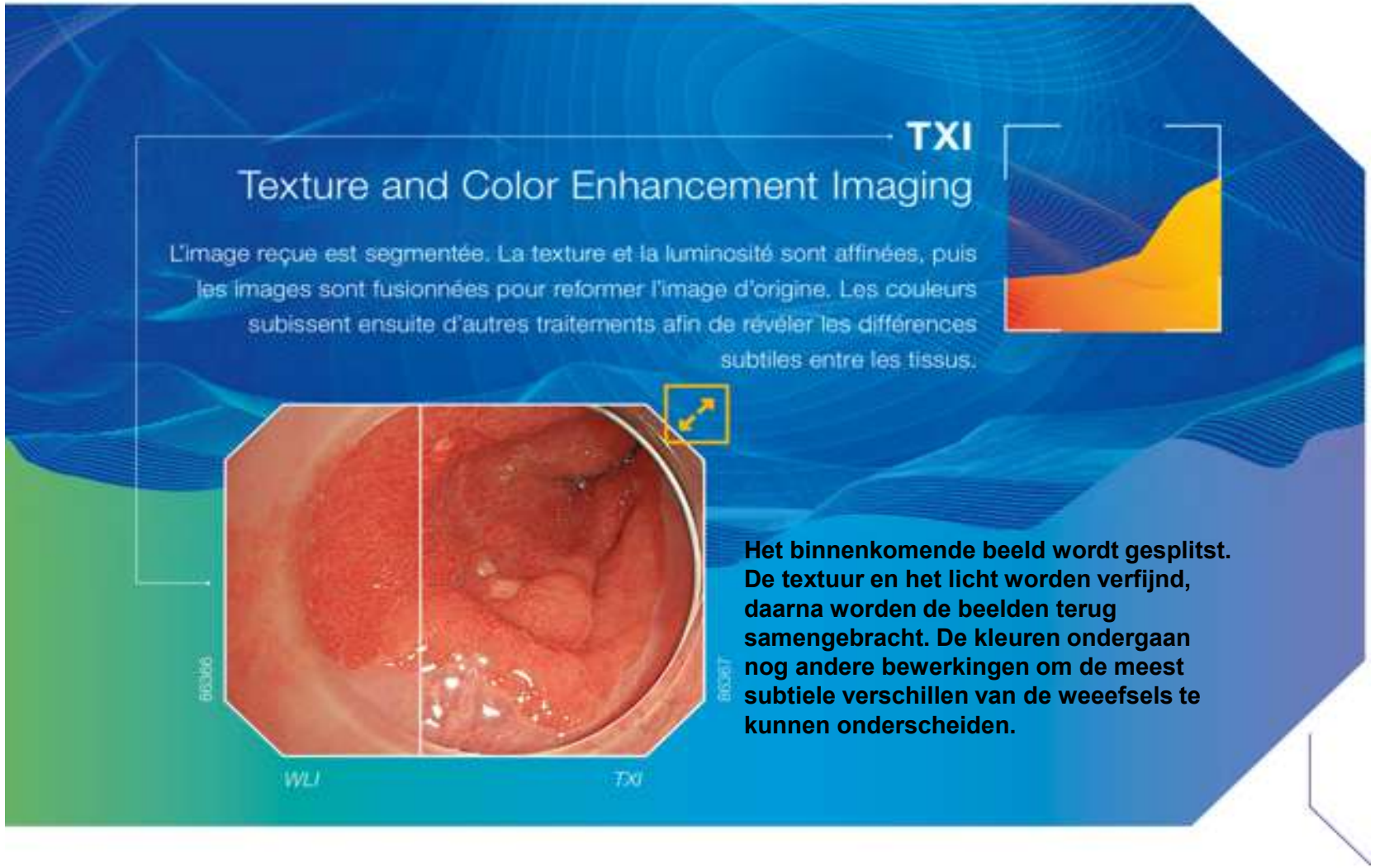


Door gebruik te maken van de blauwe en groene golflengten die geabsorbeerd worden door hemoglobine, zorgt NBI voor een duidelijk contrast tussen de bloedvaten en de omgevende mucosa. Deze technologie verhoogt de zichtbaarheid van het veneuze netwerk en de sterk gevascularisseerde oppervlakkige structuren, die indicatoren zijn van specifieke histopathologieën

TXI

EVIS X1

NEW !

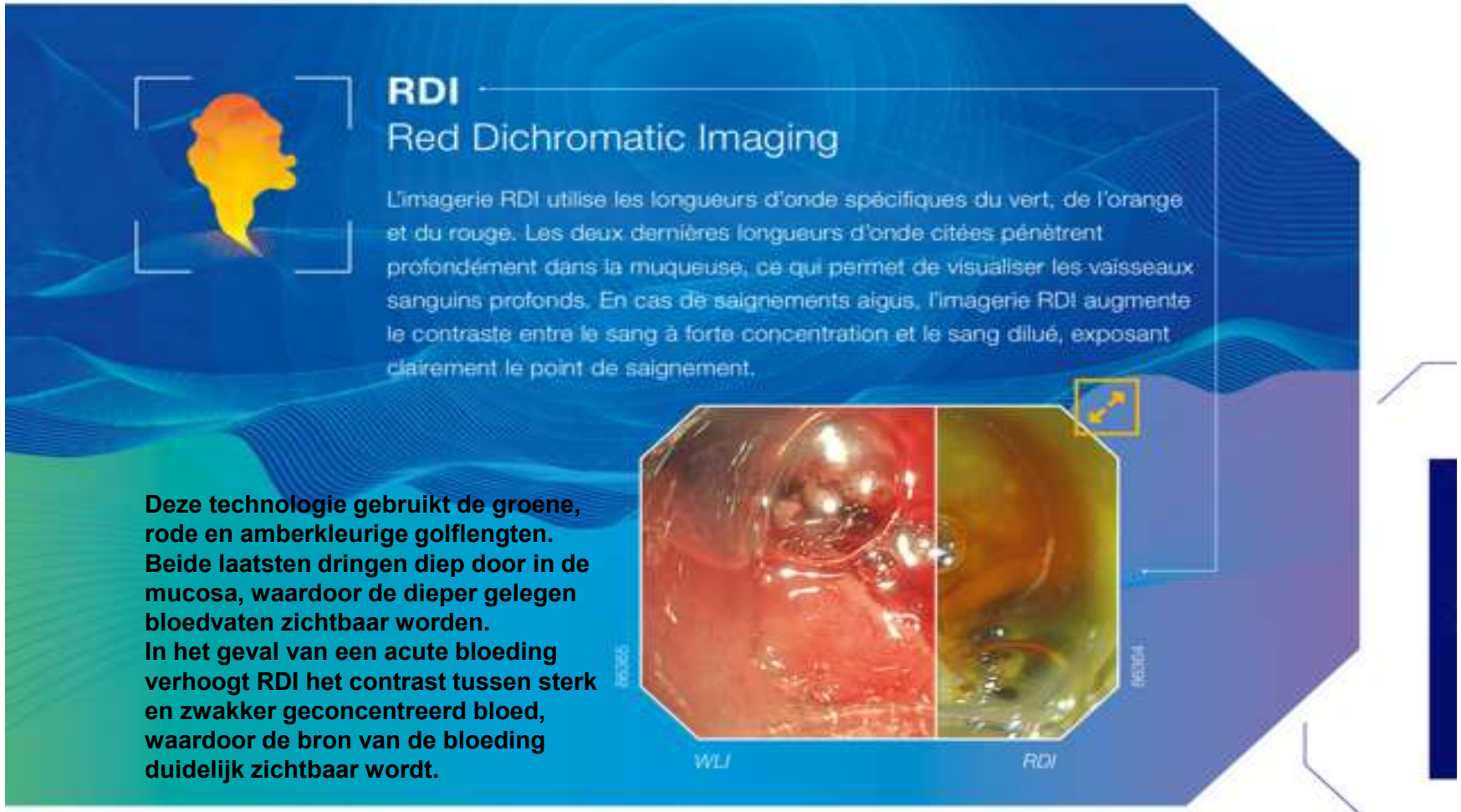


Het binnenkomende beeld wordt gesplitst. De textuur en het licht worden verfijnd, daarna worden de beelden terug samengebracht. De kleuren ondergaan nog andere bewerkingen om de meest subtiele verschillen van de weeefsels te kunnen onderscheiden.

– RDI

EVIS X1

NEW !



Deze technologie gebruikt de groene, rode en amberkleurige golflengten. Beide laatsten dringen diep door in de mucosa, waardoor de dieper gelegen bloedvaten zichtbaar worden.
In het geval van een acute bloeding verhoogt RDI het contrast tussen sterk en zwakker geconcentreerd bloed, waardoor de bron van de bloeding duidelijk zichtbaar wordt.

RDI

EVIS X1

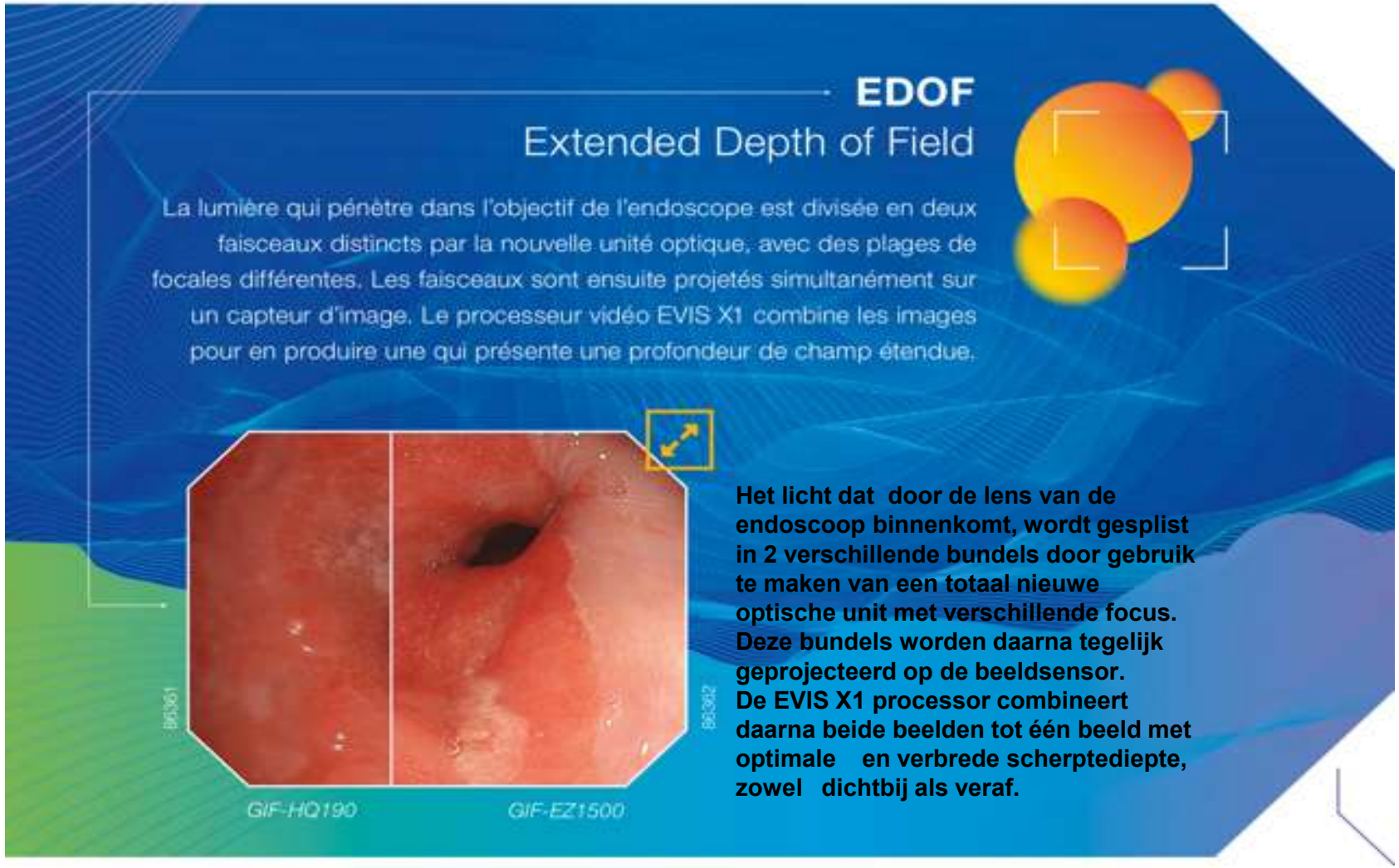
NEW !



EDOF

EVIS X1

NEW !

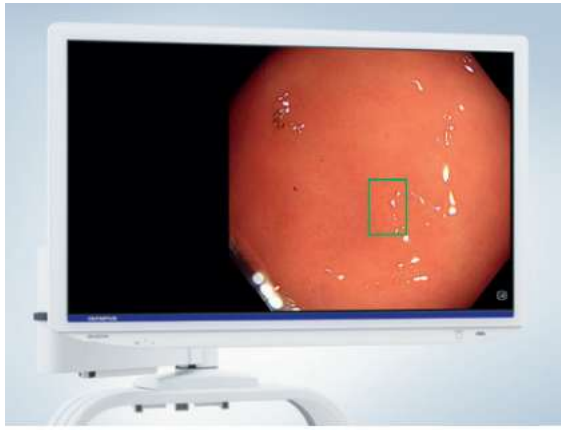


Het licht dat door de lens van de endoscoop binnenkomt, wordt gesplist in 2 verschillende bundels door gebruik te maken van een totaal nieuwe optische unit met verschillende focus. Deze bundels worden daarna tegelijk geprojecteerd op de beeldsensor. De EVIS X1 processor combineert daarna beide beelden tot één beeld met optimale en verbrede scherptediepte, zowel dichtbij als veraf.

Artificial Intelligence in Endoscopy

NEW

- CAD-System = Computer Aided Diagnosis System
- De OIP-1 processor analyseert de inkomende videobeelden en vergelijkt ze met de interne database
- Op basis van het interne geheugen wijst OIP-1 de plekken aan waar abnormale weefsels zichtbaar zijn (veel sneller dan de arts zelf kan zien)
- Op de monitor verschijnt een (of meedere) groene rechthoek(en) in het centrale beeld of in een tweede kleiner beeld



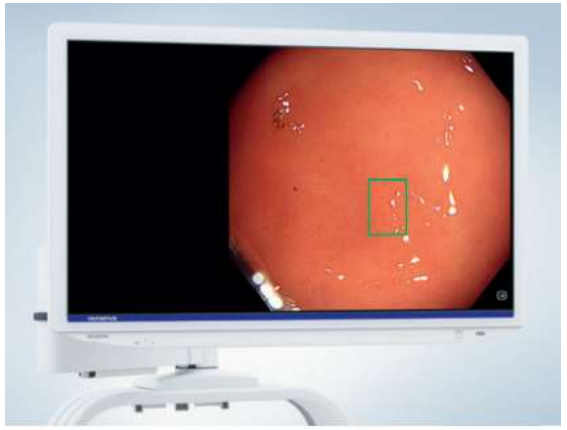


Artificial Intelligence in Endoscopy

NEW

<u>Voordelen van ENDO-AID</u> :

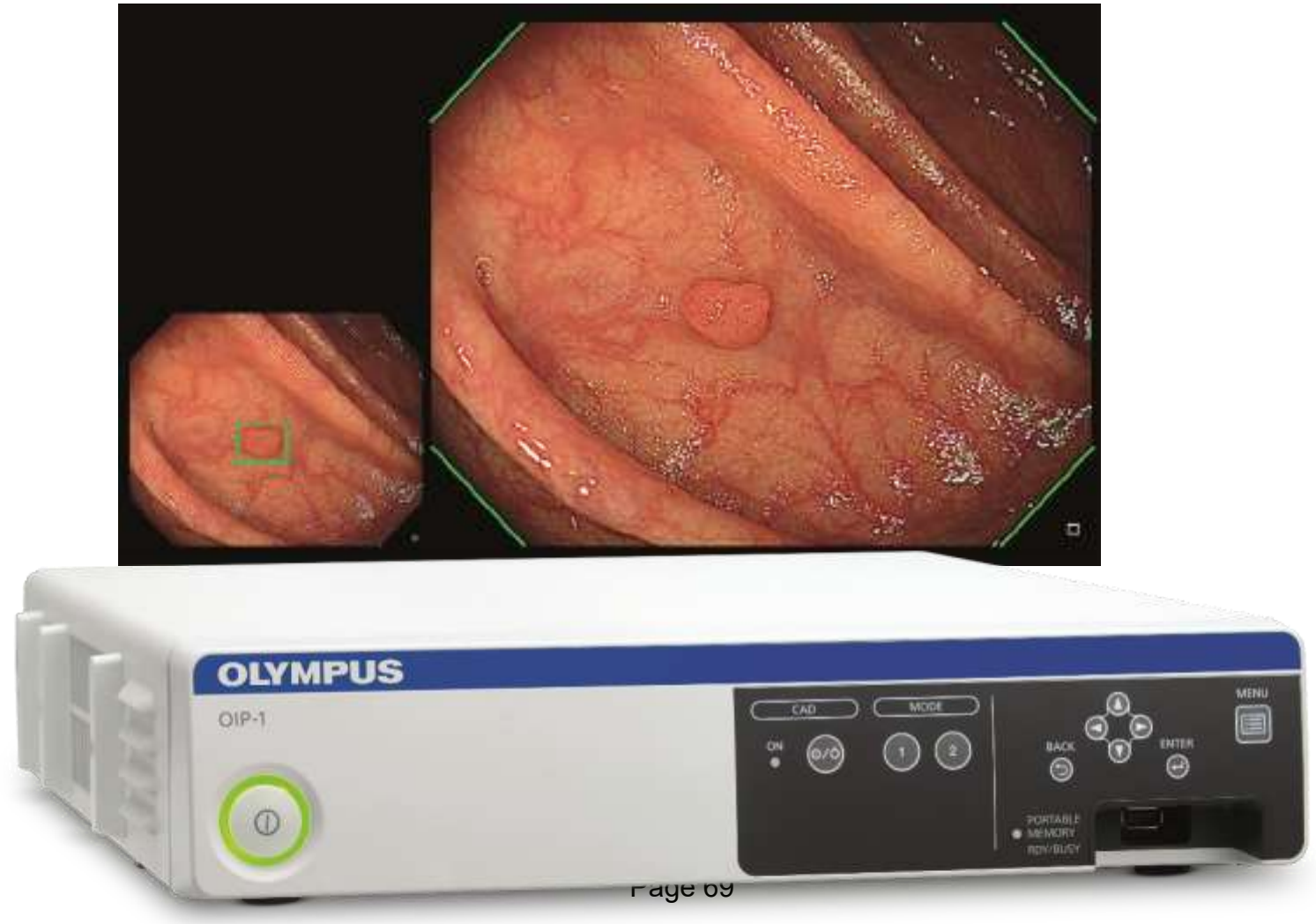
- Verhoging van de ADR (Adenoma Detection Rate) : het aantal gedetecteerde adenoma's per 100 colonoscopieën (kwaliteitsnorm)
- Verminderde oogvermoeidheid (concentratie op beeldscherm)
- Ondersteuning van het screeningsproces van CRC (colorectaal kanker)





Artificial Intelligence in Endoscopy : ENDO-AID

NEW



New technologies to enhance diagnosis

i-scan: Different i-scan modes

We introduced i-scan to offer digital image processing on all our video processors. The INSPIRA and OPTIVISTA video processors are additionally equipped with i-scan Optical Enhancement (OE) which adds bandwidth-limiting light for further improved visualization.

i-scan

The digital enhancements consist of three different image algorithms:

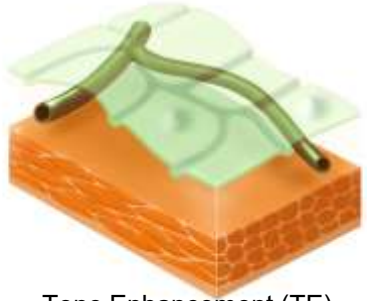
- **Surface Enhancement** (SE): enhances the mucosal structure in a natural color tone to support detection, especially of flat lesions by highlighting abnormalities.
- **Tone Enhancement** (TE): enhances the changes of vascular and mucosal structure with a color tone change, supporting pattern characterization.
- **Contrast Enhancement (**CE): enhances depressed areas and differences in structure by adding blue color to the edges.

All i-scan modes can be applied individually or in combination with one another.

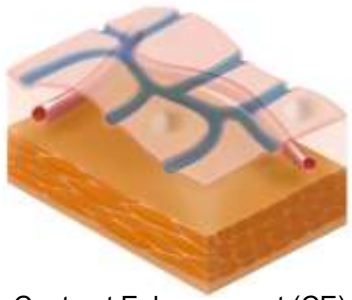
Switching the levels or modes of enhancement can be performed on a real-time basis, without any time lag, by pushing an endoscope button, enabling efficient endoscopic observation.



Surface Enhancement (SE)



Tone Enhancement (TE)



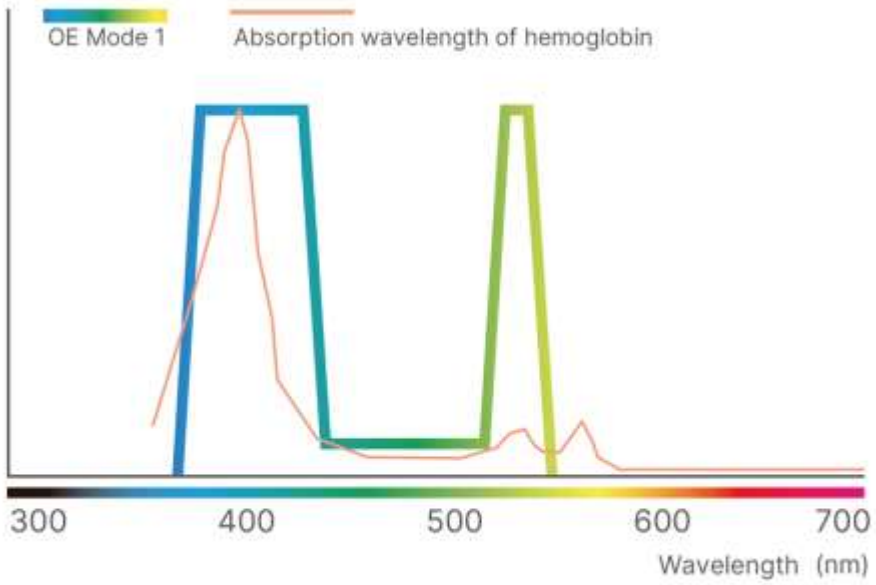
Contrast Enhancement (CE)

New technologies to enhance diagnosis

i-scan: Different i-scan modes

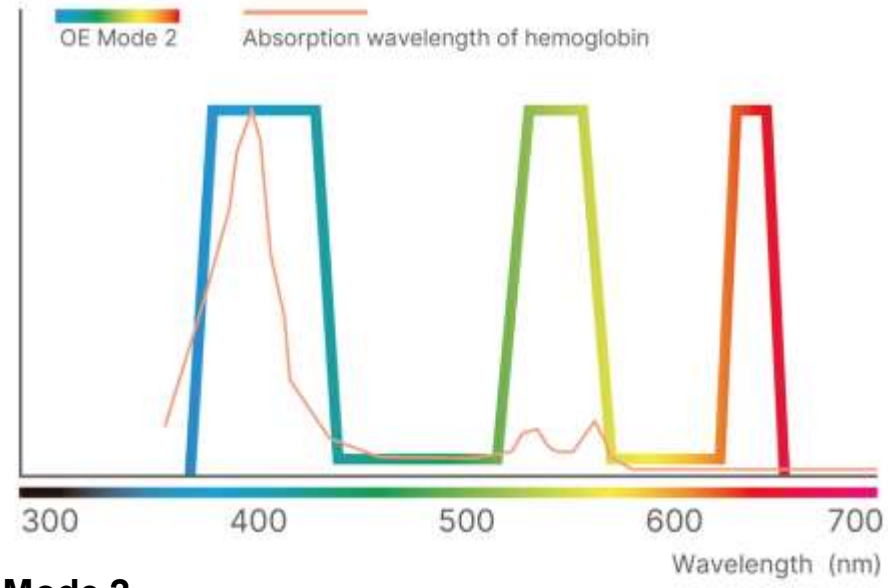
Optical enhancement

i-scan OE combines bandwidth-limiting light with digital image processing technology.
This allows for higher contrast display of the surface structures of blood vessels, glandular ducts and mucosal membranes compared to white light.
i-scan OE is designed to support physicians to improve characterization, detection and diagnosis of gastrointestinal lesions more precisely.
i-scan OE supports the screening and detailed examination of lesions using two modes:



Mode 1

Provides sufficient light and highlights blood vessels.

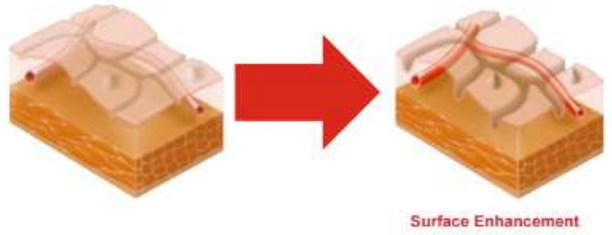


Mode 2

Enhances the blood vessels and mucosa in natural white light, potentially advancing screening procedures.

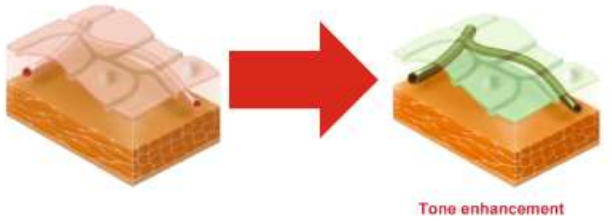
New technologies to enhance diagnosis

i-scan: Different i-scan modes

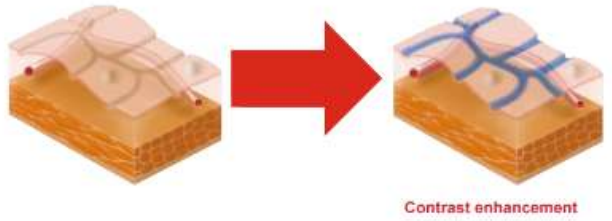


i-scan 1

i-scan SE
Supporting the detection of flat lesions and subtle abnormalities in a natural color tone

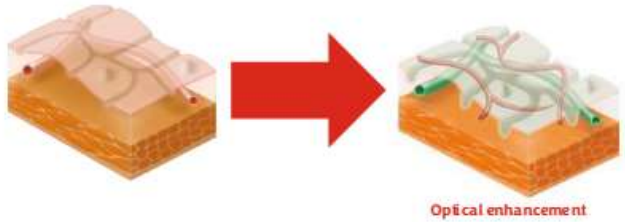


i-scan TE
Digitally enhancing the visibility of mucosal structures, vascular patterns and subtle changes in colour to support characterization and demarcation



i-scan CE
Supporting the observation of subtle irregularities and mucosal vascular pattern morphology

i-scan 2



i-scan 3

i-scan OE
Optically enhancing the surface structures of the blood vessels, glandular ducts and mucosal membranes, supporting vessel characterization.

New technologies to enhance diagnosis

i-scan

i-scan and i-scan OE, a unique combination of digital and optical enhancements to support the clinical pathway

Detection and delineation support with i-scan 1 – Surface Enhancement (SE)

Accentuates tissue structures supporting the detection of flat lesions and subtle abnormalities in a natural color tone.



Pit-pattern characterization with i-scan 2 – Tone Enhancement (TE)

Accentuates the display of minute mucosal structures and subtle changes in a color tone, supporting pit-pattern characterization and demarcation.



Vessels characterization with i-scan 3 – Optical Enhancement (OE)

Accentuates the display of the surface structures of the blood vessels, glandular ducts and mucosal membranes in a color tone, supporting vessel characterization.



New technologies to enhance diagnosis

Auto-HDR: Brighten darker areas without increasing image noise

OE mode1
Auto-HDR: OFF
D-range Expansion: OFF



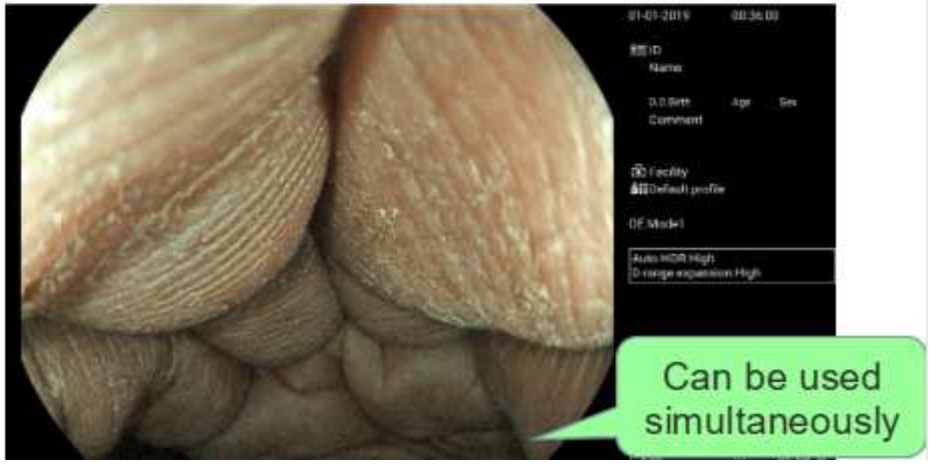
Auto-HDR (High)



D-Range Expansion(High)



Auto-HDR (High)



D-Range Expansion(High)

New technologies to enhance diagnosis

Twin-Mode: simultaneous comparison of side by side endoscopic images.

PENTAX Medical's unique Twin Mode function displays a normal white light image and an i-scan image simultaneously, side by side. Switching between the white light and i-scan modes can be done in real time.

The Twin Mode function aids in both routine, everyday procedures and in educational applications.



Teach and assess with the unique TwinMode

- TwinMode is useful in teaching the appropriate interpretation of image enhanced endoscopy, providing simultaneous comparison of side by side endoscopic images.
- Among experts, TwinMode is respected appreciated as an educational tool for non-experts in "building the bridge" between HD+ white light images and the different i-scan modes and findings.
- The simultaneous comparison of enhanced clinical images is useful in teaching the appropriate characterization of lesions.





Colon adenoma

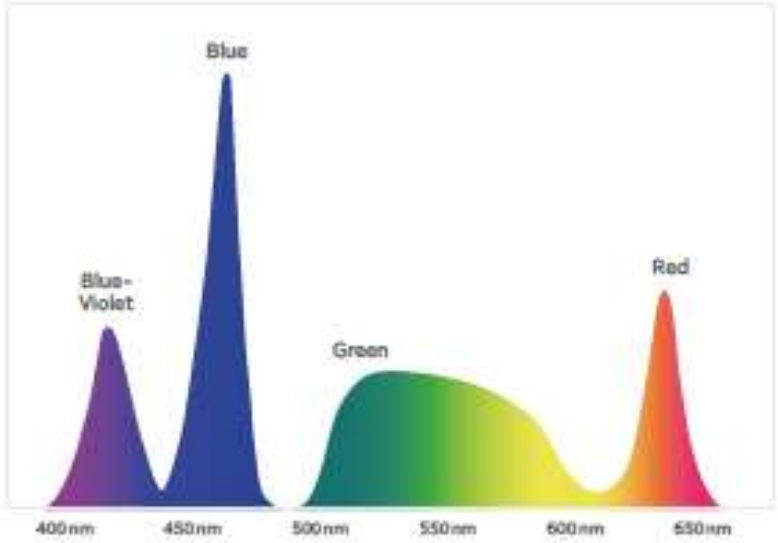
Light Modes Fujifilm

- **Multi Light technology**: Illumination suitable for observation using variable LED light intensity.
- **LCI (Linked Color Imaging):** Increased contrast in red color leads to improved visibility of abnormalities, inflammation and delineation.
- **BLI (Blue Light Imaging):** The combination of special light wavelengths results in improved contrast imaging for characterisation.
- **ACI (Amber-red Colored Imaging):** Enhances the visualisation of slight color tone differences of blood color (e.g. for the localization of the bleeding source). Available with all 860, 840, 760 & 740 series endoscopes together with processor EP-8000.

Light Modes Fujifilm

White Light Imaging

The endoscopic system provides high image quality in terms of sharpness and brightness to gather optimal visual information for diagnostic and therapeutic procedures in daily clinical practice.

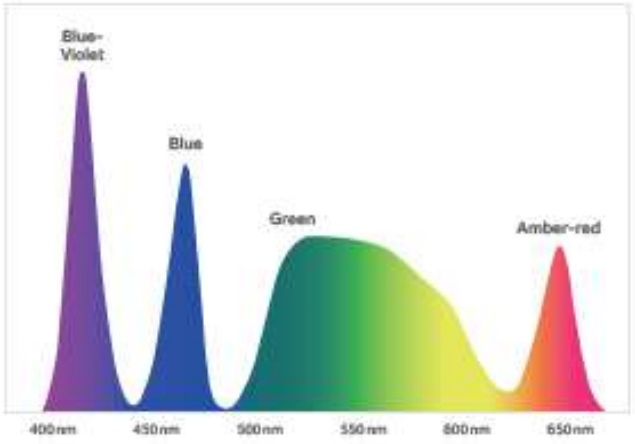




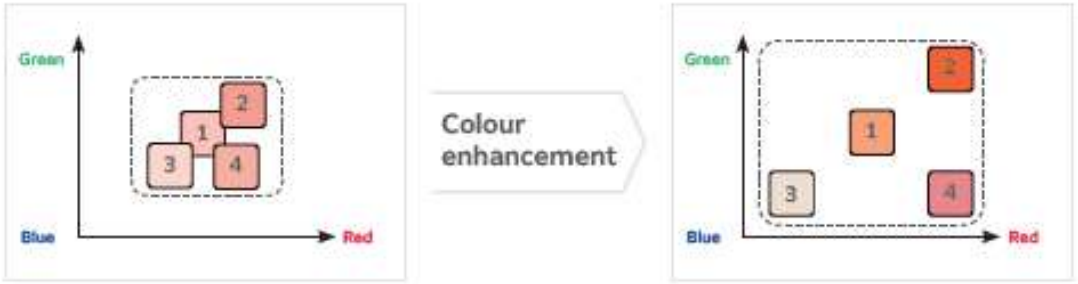
Light Modes Fujifilm

LCI (Linked Color Imaging) mode LCI

LCI differentiates the red colour spectrum more effectively than White Light Imaging thanks to its preprocess composition of light spectrum and Fujifilm's original signal processing. The increased colour contrast in red colour leads to improved visibility of abnormalities, inflammation and delineation.



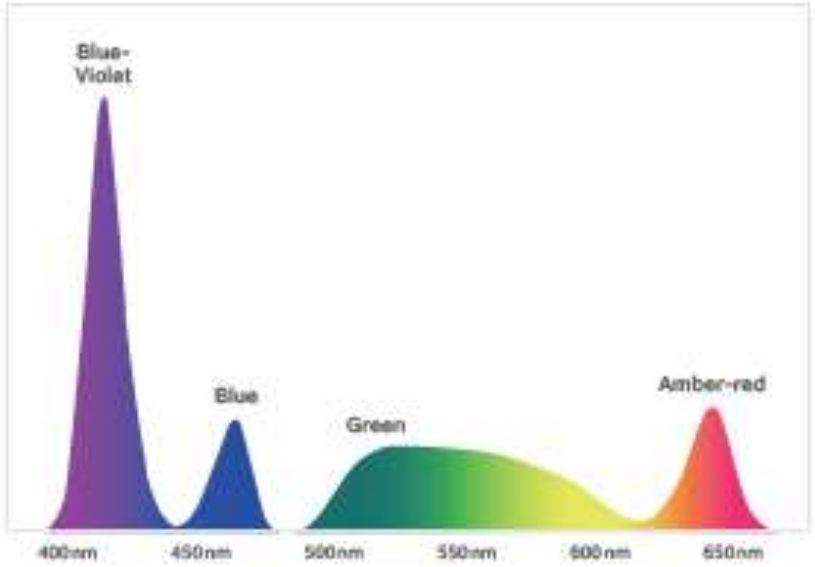




Light Modes Fujifilm

BLI (Blue Light Imaging) mode

High-intensity contrast imaging with BLI is expected to be helpful for improved visualisation of superficial vascular and mucosal patterns. Focusing on the characteristics of short wavelength absorption of haemoglobin (at 410 nm) combined with specific white light spectral colours results in improved contrast imaging.

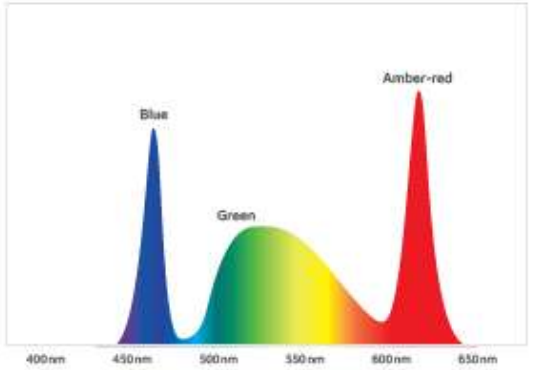


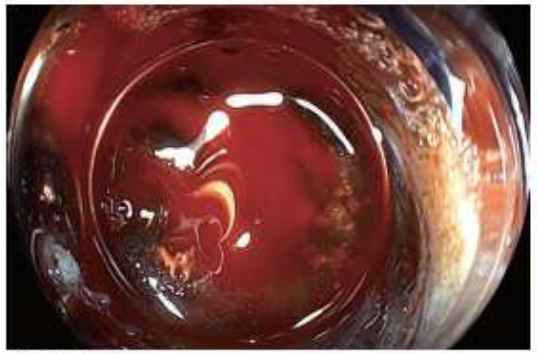


Light Modes Fujifilm

ACI (Amber-red Color Imaging) mode

ACI is an observation mode that combines LCI colour enhancement technology with brightness enhancement technology. ACI specifically aims to visualise subtle nuances in red colouration while maintaining a colour tone similar to White Light Imaging, potentially making it a tool for identifying bleeding sources during ESD and other 3rd space endoscopy treatments.

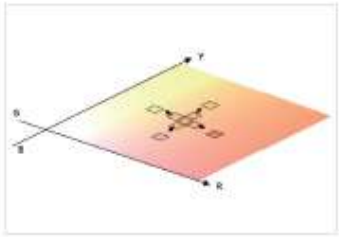


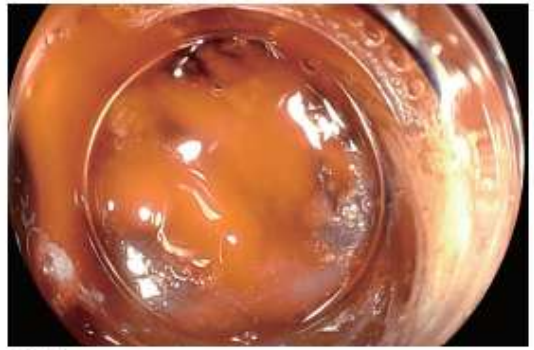


White Light Imaging

Colour enhancement

LCI employs a red colour tone as a reference that is close to the mucous membrane, whereas ACI references red colour tones similar to blood. In both observation modes the contrast of red colour tones is increased in a post-processing step.

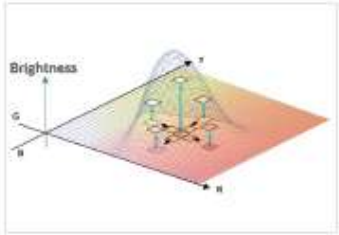




ACI Mode

Brightness enhancement

ACI emphasises the difference in colour shade by adjusting the brightness. This further enhances the contrast of the red colour tones closest to blood.



Switching observation modes

With a simple push of a button, you can easily switch between the following observation modes. The order and settings can be changed as desired.

Observation modes compatibility

Endoscope	BLI	LCI	ACI	FICE
800 / 700 series endoscopes	●	●	●*	●
600 series endoscopes				●
580 series endoscopes				●
530 series endoscopes**				●

Improve your skills with Mikoto

Next generation synthetic training simulator*

The mikoto colonoscopy model is a revolutionary medical simulator designed to help doctors enhance their skills more efficiently through detailed evaluation and scoring of their procedures.

Easy to handle
- Portable size 417 x 327 x 290 mm (W x H x D), weight 8.9 kg
- Simple preparation
- No post-cleaning required

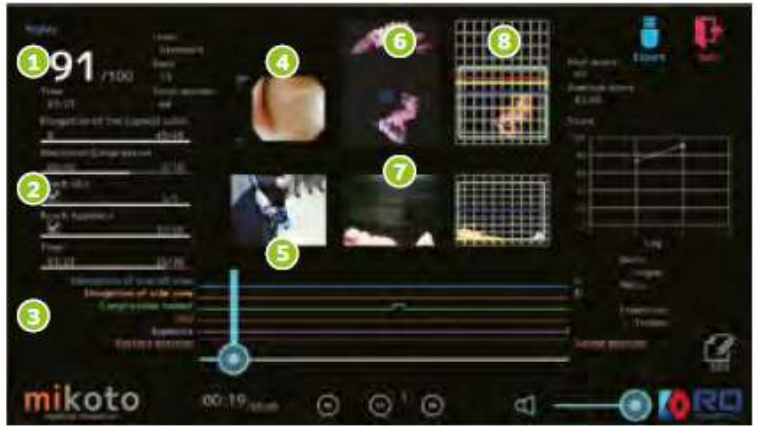


Advanced artificial model
- Realistic colon texture with simulated colonic folds
- Soft and smooth surface
- Multiple polyps inside

Automatic evaluation & recording for self-learning
- Procedure scoring
- Recording of multiple procedure metrics
- 4 levels of difficulty available







Functions showed on display
1. Score of procedure
2. Details of scores
3. Waceform graph of scores
4. Endoscopy image
5. Procedure recording image
6. Upper camera images
7. Side camera images
8. Color image analysis screen

*Mikoto also exists in colonoscopy, gastrointestinal & ERCP model