Diagnostic and Therapeutic Colonoscopy
Indications for Colonoscopy

**Diagnostic**
- Unexplained GI symptoms and signs
- Unexplained rectal bleeding
- IBD
- Stricture or colonic narrowing
- Diverticular disease
- Infectious, radiation or ischemic colitis
- Endometriosis
- Pneumatosis cystoides intestinalis

**Screening and Surveillance**
- Average, high risk
- Polyp and cancer follow-up

**Therapeutic**
- Polypectomy
- Foreign body removal
- Bleeding site localization
- Hemostasis
- Tumor resection
- Colonic decompression
Predictable Areas of Loop Formation

- Retroperitoneal
- Below Peritoneal Space

= Areas at Risk for Loop
Lumenal Hints in the Colon
Fig. 9.45 (a) Choosing the correct path can be difficult in diverticular disease . . .

Fig. 9.73 The longitudinal bulge of a taenia coli shows the axis of the colon.
Luminal Hints

Colon Video 11
Anatomy of the Sigmoid
Positioning
Anal Intubation

1. Introduce the device.
2. Insert through the anus.
3. Advance to the desired position.
Anatomy of the Sigmoid

- Anterior
- Posterior
- Midline
Normal Anatomy of Rectosigmoid
Traversing Rectosigmoid Junction
Walking Stick

Colon Video 12
Abdominal Pressure In Suprapubic Area
Video 1
Value of Straightening Scope
Pain/Resistance on Colonoscopy

Loop in shaft

• Causes pain
• Impedes further intubation
  Push with a loop = bigger loop
• Always tends to form

There is only one way to remove a loop:

Pull back
Pulling Back the Shaft...

- Removes loops
- Changes vector forces from loop to straight
- Decreases patient discomfort
- Permits tip deflection when controls are maximally deflected and further deflection is desired
- Removes tip from contact with mucosa
- Pleats colon on shaft of scope
Alpha Loop

Anticlockwise

Clockwise
Alpha Loop

Colon Video 13
Formation of an "N" Loop
“N” Loop
Traversing Junction of Sigmoid and Descending Colon

Going well, but lots of scope

Acute angle, tough going
Reducing Loops

Alpha Loop

Withdrawal with clockwise rotation

“N” Loop

Withdrawal without clockwise rotation
Loops Involving Sigmoid Colon
Abdominal Pressure

Suprapubic Pressure

Force Vector = white arrow
# Abdominal Pressure

<table>
<thead>
<tr>
<th>TIP LOCATION</th>
<th>PRESSURE AREA</th>
</tr>
</thead>
<tbody>
<tr>
<td>20-25 cm</td>
<td>suprapubic</td>
</tr>
<tr>
<td>25-35 cm</td>
<td>left lower quadrant</td>
</tr>
<tr>
<td>35-50 cm</td>
<td>left mid-abdomen</td>
</tr>
<tr>
<td>hepatic flexure</td>
<td>splenic flexure (sandwich)</td>
</tr>
</tbody>
</table>
Splenic Flexure

- Fluid filled area
- Represents half time point in colonoscopy
- Scope should be 50cm from anus if straight
- If straight scope only few minutes to cecum
Repositioning to Traverse Splenic Flexure

Left Lateral Decubitus

Right Lateral Decubitus
Splenic Flexure

Colon Video 15
Transverse Colon and “U” Loop
Transverse Colon and Gamma Loop
Transverse “U” and Gamma Loops

Colon Video 16
Ascending Colon and Cecum
Straighten the Colonoscope

- The force vector aligns with the shaft when scope is straight
- Sigmoid configuration always tends to loop
- Advance requires multiple attempts at straightening
Intubation of Terminal Ileum
Intubating Terminal Ileum
Withdrawal of Scope

- View coming out
- Take 10-15 min
- Watch blind spots
Electrocautery

Monopolar Circuit

- small surface active electrode
- large surface return electrode

Fig. 1
Principles of Electrocautery

**Cutting**

Typical Cutting Waveform

Freq. 500 KHz

Fig. 2

**Coagulation**

Typical Coagulating Waveform

Base freq. 500 KHz

Fig. 3
Principles of Electrocautery

\[ P = I^2 R \]

\[ C = \frac{I}{A} \]

\( P \) = power, \( I \) = current, \( R \) = resistance, 
\( C \) = current density, \( A \) = area
Concept of Current Density

The temperatures are approximately those achieved by the application of 5 watts for 1 sec. to tissue of pedicle-like shape and dimensions shown.
Principles of Electrocautery
Electrocautery / Polypectomy

**Air**

![Image of Air composition chart]

- Oxygen
- Water Vapour
- Carbon Dioxide

*Figure 1. Mass spectrometer tracing of air.*

**Colon Gas**

![Image of Colon Gas composition chart]

- Nitrogen
- Nitric Oxide
- Carbon Dioxide + Nitrous Oxide
- Methane
- Hydrogen

*Figure 2. Mass spectrometer tracing of typical colonic gas sample.*
Clear Liquids

Overnight Fast

Prep Procedure
Explosion of hydrogen gas in the colon during proctosigmoidoscopy

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CASE REPORT A 71-year-old man was referred for proctosigmoidoscopy as part of an evaluation of vague abdominal discomfort of several years' duration. The procedure was performed 2 hours after his noon meal, and he was prepared with a single sodium phosphate enema which resulted in thorough cleansing of the rectosigmoid area. With the patient in the flexed prone position, the proctosigmoidoscope was easily passed to 20 cm without use of air insufflation or suction. On withdrawing the instrument, a 4 mm sessile polyp was noted at 18 cm which we elected to fulgurate using a standard blunt cautery electrode. With the cautery tip in contact with the lesion, the cautery machine was activated and there was an immediate, loud explosion. The patient's head and chest were pushed into the cushion of the examining table, and the examiner and assistant were thrown backward by the concussion. The patient felt no pain, and looking backward at the examiner who was standing with his arms raised in the air, he exclaimed, "You know, a doctor could get hurt doing that!!"
Simple Polypectomy
Video 2
Pedunculated Polyp Removal
Positioning Snare for Polypectomy
Use of Hot Biopsy Forceps
Torque Scope to Position Lesion

[Diagram showing a circular area with 'no' and 'yes' labels]
Rotating Scope to 5 O’clock
Polypectomy
Pillow Sign
Polypectomy
Polypectomy
Marking the Polypectomy Snare

(a) 1cm

(b)

Yes 15mm

(a)  

No

(b)  

No

(c)
Tips on Polypectomy
Video 5
Sessile Polyp Saline Lift
SESSILE POLYP
SINGLE RESECTION
Video 7

Methylene Blue Saline Lift
Polypectomy with Large Stalk
Video 4

Large Pedunculated Polyp Removal
Use of Endoloop for Polypectomy
Video 8

Use of Endoloop for Polypectomy

DETACHABLE SNARE
Piecemeal Polypectomy

A
B
C
D
Piecemeal Polypectomy
Video 6
Saline Lift Piecemeal Resection
The End

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