

## When the Going Gets Tough: Improving Outcomes of Colonoscopy

Jenifer R. Lightdale, MD, MPH, FAAP  
Division Chief, Gastroenterology  
Chief Quality Officer  
UMass Memorial Children's Medical Center  
Professor of Pediatrics  
University of Massachusetts



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## Faculty Disclosures

- Mead-Johnson
- Perrigo
- Norgine
- Medtronic

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## Objectives

- Identify core skills required to perform pediatric colonoscopy
- Discuss evidence-based estimates of procedural volume required to achieve competence
- Review basic and advanced measures which may help during “difficult colonoscopy”
- Recognize the value of implementing CQA/CQI to improving procedural outcomes

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## Colonoscopy

- A common and established endoscopic procedure for the diagnosis and treatment of many large bowel disorders
- Often perceived by patients as inconvenient and painful
- Recognized by physicians to be variably challenging to perform

Witte, Enns, 2007;  
Bourque, Rex, 2012

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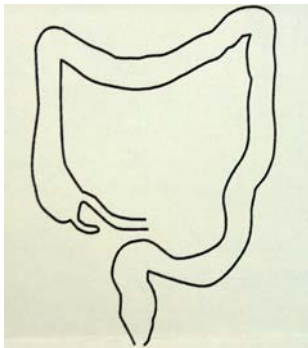
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A “typical” colon is rarely configured like this...



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Rather more often something like this!



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## Indications for Pediatric Colonoscopy

Procedure Type	Clinical Indication
<i>Diagnostic</i>	Abdominal pain (clinically significant) Anemia (unexplained) Diarrhea (chronic, clinically significant with weight loss, fevers, anemia) Failure to thrive/weight loss Hematochezia/melena Lower-GI tract lesions seen on imaging studies? Polyposis syndrome (diagnosis and surveillance) Rejection of intestinal transplant
<i>Therapeutic</i>	Dilation of strictures Foreign-body removal Lower-GI bleeding control Polypectomy

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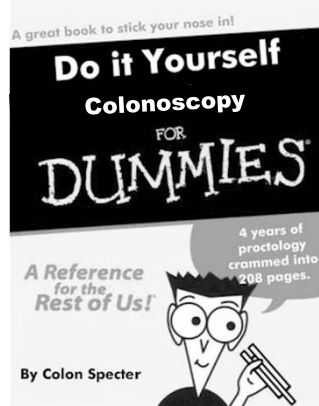
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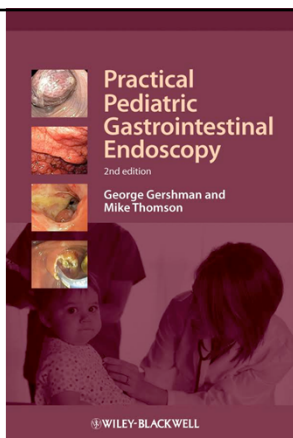
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ASGE, Colonoscopy Core Curriculum, 2012

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- Gastrointestinal Endoscopy Competency Assessment Tool for pediatric colonoscopy (GIECAT<sub>KIDS</sub>)
- Developed by Catharine M. Walsh, MD, PhD
- Via a Delphi method
  - 40 pediatric gastroenterologists from across North America
  - Heterogeneous group with broad expertise
  - 5 rounds of surveys (~76% participants all 5!)

Walsh, GIE, 2014; Walsh, 2014, JPGN; Walsh, JPGN, 2014

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- 3 main competency domains
  - Technical (psychomotor skill)
  - Cognitive (knowledge)
  - Integrative (judgment, clinical reasoning)



Walsh, GIE, 2014; Walsh, 2014, JPGN; Walsh, JPGN, 2014

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## GiECAT<sub>KIDS</sub> Global Rating Scale

Global Rating Item	Definition	Competency Domain	Round 5 Mean (SD) (maximum score n=5)	Round 5 Consensus Level (% rating item ≥ 4)
1. <b>Technical Skill</b>	Demonstrates an ability to manipulate the endoscope using angulation control knobs, advancement/withdrawal, and torque steering for smooth navigation.	Technical	4.9 (0.56)	96.8%
2. <b>Strategies for Scope Advancement</b>	Demonstrates an ability to use insufflation, pull-back, suction, loop-reduction, external pressure and patient position change to advance the endoscope independently, expeditiously and safely.	Technical	4.7 (0.60)	93.6%
3. <b>Visualization of Mucosa</b>	Demonstrates an ability to maintain a clear luminal view required for safe scope navigation and complete mucosal evaluation.	Technical	4.8 (0.37)	100.0%
4. <b>Independent Procedure Completion (Need for Assistance)</b>	Demonstrates an ability to complete the procedure expeditiously and safely without verbal and/or manual guidance.	Technical	4.4 (0.61)	93.6%
5. <b>Knowledge of Procedure</b>	Demonstrates general procedural knowledge including procedural sequence, endoscopy techniques, equipment maintenance and trouble-shooting, indications and contraindications, and potential complications.	Cognitive	4.7 (0.60)	93.6%
6. <b>Interpretation and Management of Findings</b>	Demonstrates an ability to accurately identify, interpret and appropriately manage pathology and/or complications.	Integrative	4.7 (0.51)	96.8%
7. <b>Patient Safety</b>	Demonstrates an ability to perform the procedure in a manner that minimizes patient risk (atraumatic technique, minimal force, minimal red-out, recognition of personal and procedural limitations, safe sedation practices).	Technical and Integrative	4.9 (0.42)	96.8%

Walsh, 2014, JPGN

## GiECAT<sub>KIDS</sub> GRS Likert Scale

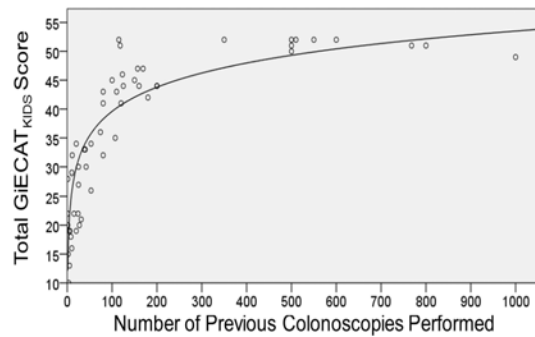
- 1 Unable to achieve tasks despite significant verbal and/or hands-on guidance
- 2 Achieves some of the tasks but requires significant verbal and/or hands-on guidance
- 3 Achieves most of the tasks independently, with minimal verbal and/or manual guidance
- 4 Competent for independent performance of all tasks without the need for any guidance
- 5 Highly skilled advanced performance of all tasks

Walsh, GIE, 2014; Walsh, 2014, JPGN; Walsh, JPGN, 2014

## GiECAT<sub>KIDS</sub> Checklist Items (1=Y, 0=not done/N)

- Pre-procedure
  - Technical (1)
    - i.e. Item 5: Checks that equipment is functioning
  - Cognitive (n=3)
    - i.e. Item 1: Reviews and obtains patient history
  - Integrative (2)
    - i.e. Item 2: Takes action in response (i.e. SBE prophylaxis)
- Procedure
  - Technical (6); Cognitive (3); Integrative (3)
- Post-procedure
  - Integrative (2)
    - i.e. Item 18: Education patient/caregivers about findings and makes follow-up plan

## GiECAT<sub>KIDS</sub> Scores vs. Procedural Experience




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### ORIGINAL ARTICLE: Clinical Endoscopy

#### Training to competency in colonoscopy: assessing and defining competency standards

Robert E. Sedlack, MD, MHPE  
Rochester, Minnesota, USA

**Background:** How to define competency in colonoscopy, how to assess it, and how much training is required are questions that experts in endoscopy have grappled with since the advent of the procedure.

**Objective:** To describe methods to assess core endoscopy skills in trainees and learning curves for these parameters and to define competency thresholds for these skills.

**Design:** A prospective descriptive assessment of trainee colonoscopy performance.

**Setting:** Mayo Clinic, Rochester, Minnesota.

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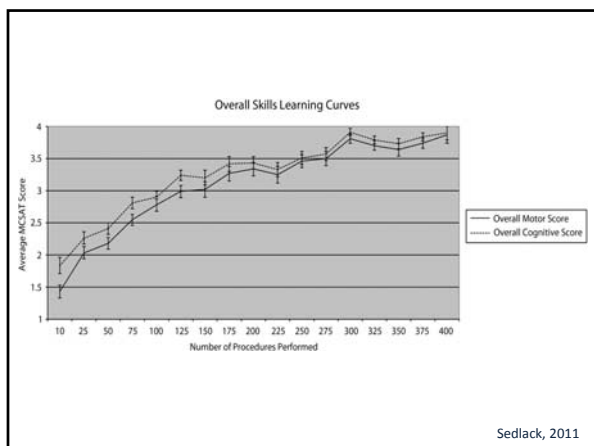
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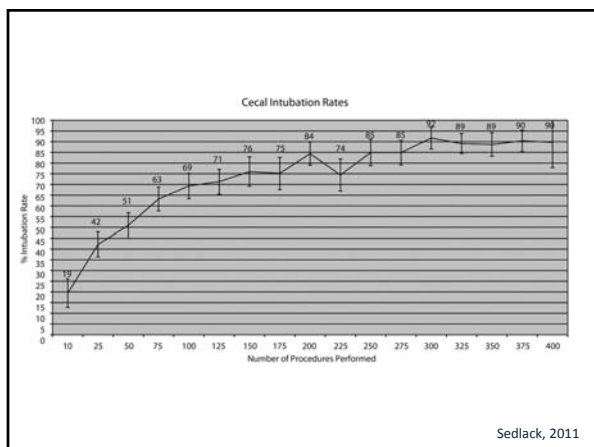
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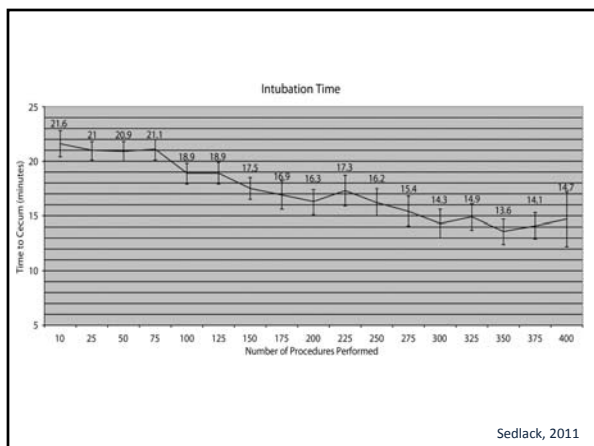
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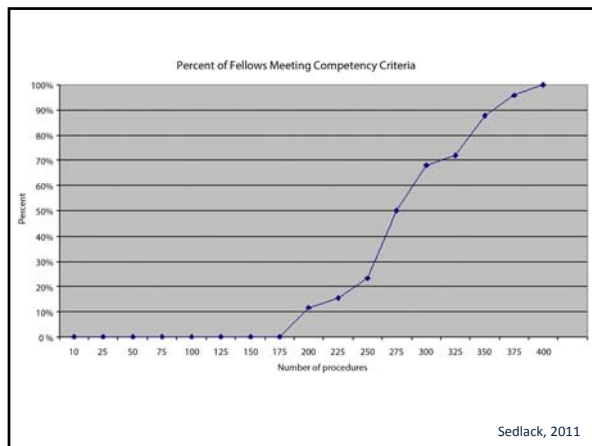
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## Automaticity [/ˌɔːtəməˈtɪsɪti/](#)

- The ability to do things without occupying the [mind](#) with low-level details required, allowing it to become an automatic response pattern or [habit](#)
- Usually the result of [learning](#), [repetition](#), and practice.

<http://wikipedia.com>, 2015

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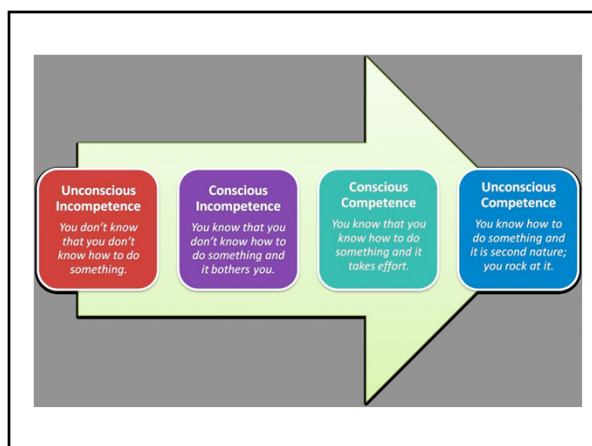
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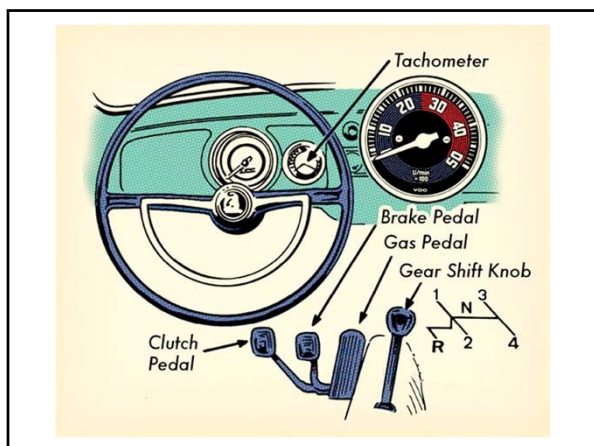
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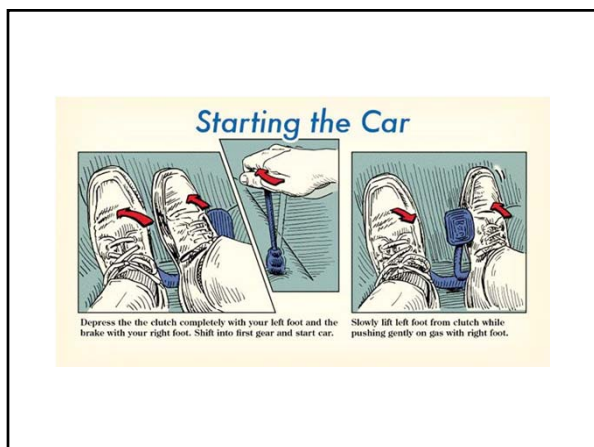
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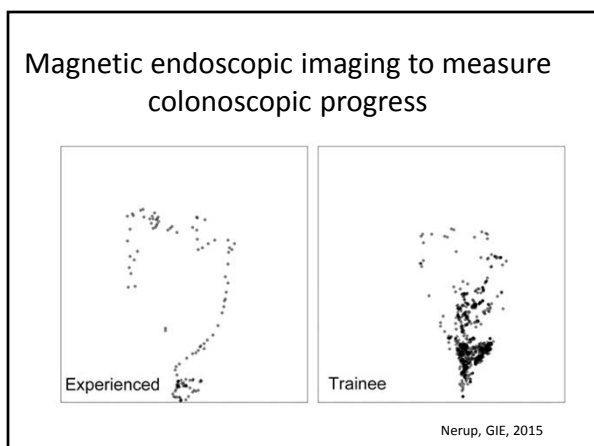
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## Challenge Presented by Colonoscopy

- Can be “difficult” even for experienced colonoscopists
- Definition of “difficult” is subjective
  - Varies across endoscopists
  - Generally involves challenges in completing the intended procedure (i.e. reaching the cecum, intubating the terminal ileum, etc)
- May be measured
  - Duration of time required
  - Amount of physical exertion required
  - Discomfort of the patient

Witte, Enns, 2007;  
Bourque, Rex, 2012

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## A “difficult” colon

- Assumed to be rooted in embryology
  - Variations in rotation and fixation during gestation
- Begins when embryo is 10mm long
  - Elongation of the intestinal tube
  - Separation of the yolk stalk
  - Stepwise herniation of the duodenojejunal loop into the umbilical cord
- May be “a done deal” when the embryo is 40mm long
  - Counterclockwise rotation around the SMA allows packaging of the intestine back into the peritoneum
  - Fusing of mesenteries to fix the colon in place

Gershman, Thiomson, 2012

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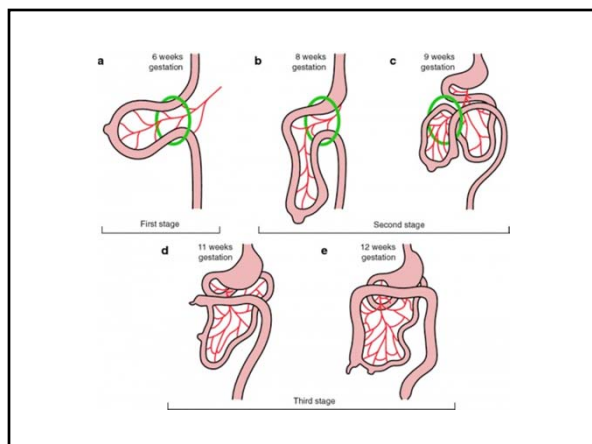
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## Results if rotation is “normal”

- Two zones of full fixation
  - Ascending and descending colon
- Two areas of partial fixation
  - Cecum and rectum
- Ligamentous attachments
  - Splenic flexure (phrenocolic ligament)
  - Hepatic flexure (hepatorenal ligament)
- Independent mesenteries
  - Sigmoid and transverse colons




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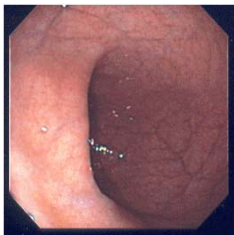
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## Basic and Ideal Colonoscopy Manuevers

- Important to follow luminal “hints”
- Use torque steering
- Rarely use right/left dials



Waye, 2001; Witte, Enns, 2007; Bourque, Rex,

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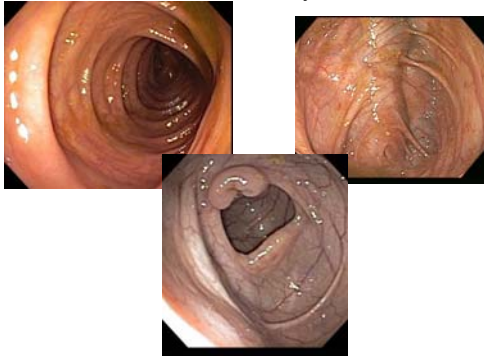
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Be able to identify landmarks...!



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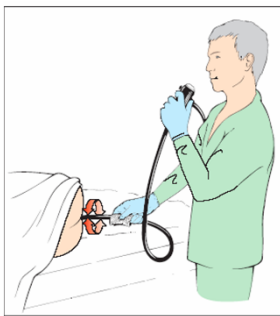
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Optimal positioning for colonoscopy



Waye, 2001; Witte, Enns, 2007; Bourque, Rex,

- Left lateral side
- Common to reposition patients during procedures to allow successful completion

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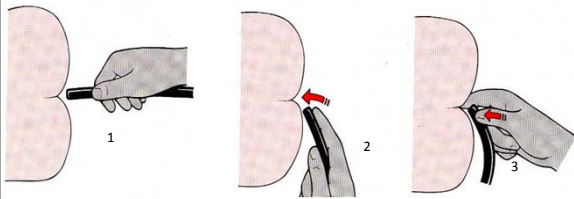
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Inspection and Intubation

- Important *before* exam
  - Inspect perianal area
  - Perform digital exam
  - Helps with tip insertion (several options)



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## Insertion Techniques

- Key to successful, “easy” colonoscopy
- Involves navigating through the rectum and sigmoid
- Sigmoid colon
  - Not as long in children as in adults
  - Also with relatively short mesentery – with less stretching
- Prone to looping
  - Studies suggest loops occur in >90% of all colonoscopies (adult and pediatric)

Waye, 2001; Bourque, Rex, 2012; Gershman, Thomson, 2012

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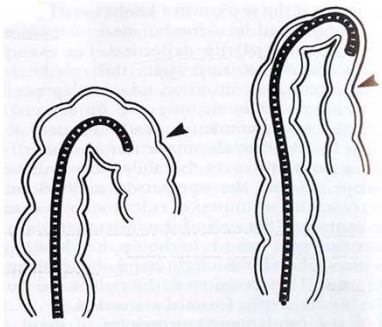
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## Looping During Colonoscopy



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## Looping During Colonoscopy

- Causes pain
- Impedes further intubation
- **Can place patient at risk**
- Push with a loop = bigger loop
  - Always tends to form

***There is only one way to remove a loop:  
Pull back scope!!***

Waye, 2001; Bourque, Rex, 2012; Gershman, Thomson, 2012

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## Pulling the Scope Back...

- Removes loops
- Changes vector forces from loop to straight
- Decreases patient discomfort
- Keeps patient safe
- Removes tip from contact with mucosa
- Pleats colon on shaft of scope

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## Main Types Loops in the Sigmoid colon: N and alpha



Fig. 6.34 Fixed (iatrogenic) hairpin bend at the sigmoid-descending colon junction.

Fig. 6.35 The length of the mesentery and the extent of retroperitoneal fixation determine the acuteness of the sigmoid-descending junction.

Fig. 6.36 An alpha loop—a beneficial iatrogenic volvulus.

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## N loop of the sigmoid

- Most common configuration
- Iatrogenic
- Should be shortened in descending colon

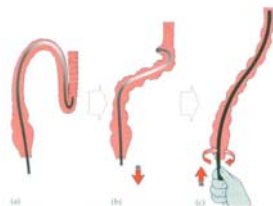


Fig. 6.45 (a) The tip is hooked into the retroperitoneal descending colon, then pulled back. (b) and when the endoscope is maximally straightened (sometimes "kinked") the tip is re-dissected (c) and the endoscope pushed in, usually with clockwise twist, up the descending colon.

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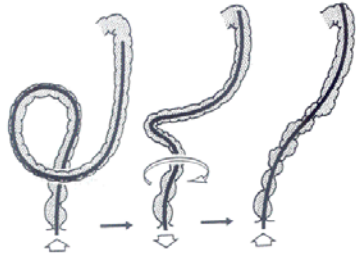
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## Alpha loop of the sigmoid

- Shortened in transverse colon



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## Sigmoid Loops

- May also be mitigated using manual pressure



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## Manual compression of abdomen

- Only needs to be applied for short periods of the procedure (15 seconds/application)
- Shortens procedure time
- Minimize the angle of turns in the colon
- Prevents looping
- May help to prevent perforation

Waye, 2001; Bourque, Rex, 2012

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Applying pressure at the  
sigmoid/transverse colon




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Applying pressure at the  
sigmoid/hepatic flexure




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Transverse colon –  
Gamma loop

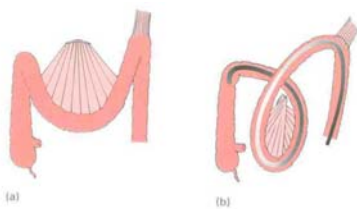


Fig. 6.67 (a) Transverse mesocolon. (b) A gamma loop.

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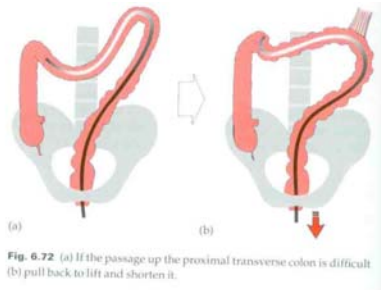
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## Proximal transverse colon




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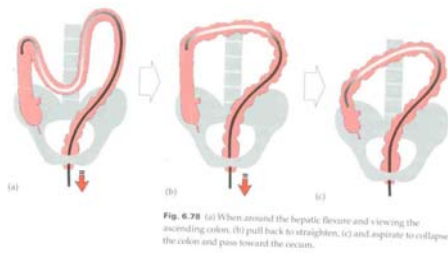
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## Hepatic flexure




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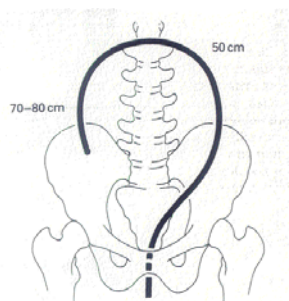
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## Cecum




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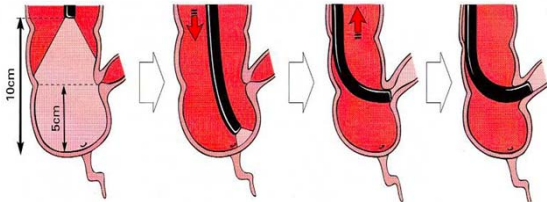
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## Intubating the Terminal Ileum

- Number 1 Tip: *Practice makes perfect!*



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## Tricks to the Trade

- Inflate as little as possible
- Push as little as possible
- Pull back often
- Loop and deloop continuously
- Use torque steering
- Use luminal hints
- Focus on safety and comfort

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got competence?

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### Maintenance of Certification (MOC)

**+ 4 Modules**

- Colonoscopy
- Upper Endoscopy
- Failure to Thrive
- Informed Consent




Resources will provide registrants with ALL that is needed to engage in self-directed Quality Improvement (QI) activities and to receive 40 MOC Part IV credits per cycle to maintain American Board of Pediatrics Maintenance of Certification (MOC)

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### IQ=E and Measuring Quality

- Initial Round of 58 participants (Oct 2014)
  - Completed first of three required data entry steps for the colonoscopy Module



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### Colonoscopy – Data Entry 1

1. Average compliance with documentation requirements across reported 10 charts	91.3%
2. Average total colonoscopy time	35.7 minutes
3. Average total time to the cecum	20.9 minutes
4. Average % successful terminal ileum intubation among cases in which terminal ileum intubation was the goal	91.8%
5. Average % colonoscopies performed that resulted in change in clinical management	68.0%

NASPGHAN, 2014

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## Preps

- Use documentation to identify adequacy of your institutional bowel prep
- No FDA approved pediatric preps

CLINICAL REPORT

CME

### Bowel Preparation for Pediatric Colonoscopy: Report of the NASPGHAN Endoscopy and Procedures Committee

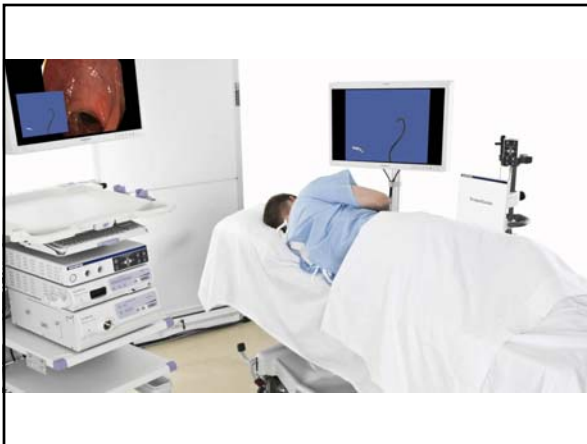
<sup>1</sup>Harpreet Pall, <sup>2</sup>George M. Zucur, <sup>3</sup>Robert E. Kramer, <sup>4</sup>Richard A. Lirio, <sup>5</sup>Michael Manfredi, <sup>6</sup>Manoj Shah, <sup>7</sup>Thomas C. Stephen, <sup>8</sup>Neil Tucker, <sup>9</sup>Troy E. Gibbons, <sup>10</sup>Benjamin Sahn, <sup>11</sup>Mark McOmber, <sup>12</sup>Joel Friedlander, <sup>13</sup>J.A. Quiros, <sup>14</sup>Douglas S. Fishman, and <sup>15</sup>Petar Momula

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## Improving Procedure Times

- Focus
- Transparency
- Simulation
  - Emphasize “games”
- Practice






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### Ileal Intubation Success

- Focus, practice
- Extra training
  - i.e. ESPGHAN Endoscopy Summer School
- New techniques




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### Conclusions

- Core skills required to perform pediatric colonoscopy
  - Technical, cognitive and integrative
- Possible to measure
- Should seem improvement over time
- Variation in how many procedures to achieve competence
  - Clear that this is more than 100-150 generally performed during fellowship

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## Conclusions

- Difficult colonoscopy should be seen as a colonoscopist issue, rather than a “patient problem”
- A number of basic measures and advanced techniques which can be learned
- Excellent and succesful colonoscopy
  - Timely
  - Efficient
  - Safe
  - Comfortable

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## Conclusions

- Continuous career goal should be to become/maintain automaticity for the skills needed to perform the procedure
  - Unconsciously competent
- May be value to implementing CQA/CQI at the individual, as well as the unit level
  - Can be used to identify targets for improvement

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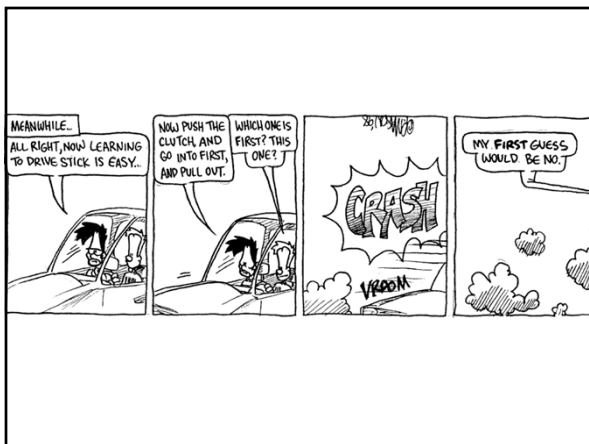
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## Acknowledgements



- NASPGHAN
- Endoscopy and Procedures Committee
- Jeannie Huang, MD, MPH
- Catharine M. Walsh, MD, PhD
- Doug Fishman, MD



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THANK YOU!



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