



FUNCTIONAL CONSTIPATION

SOME BASICS OF EVALUATION AND MANAGEMENT

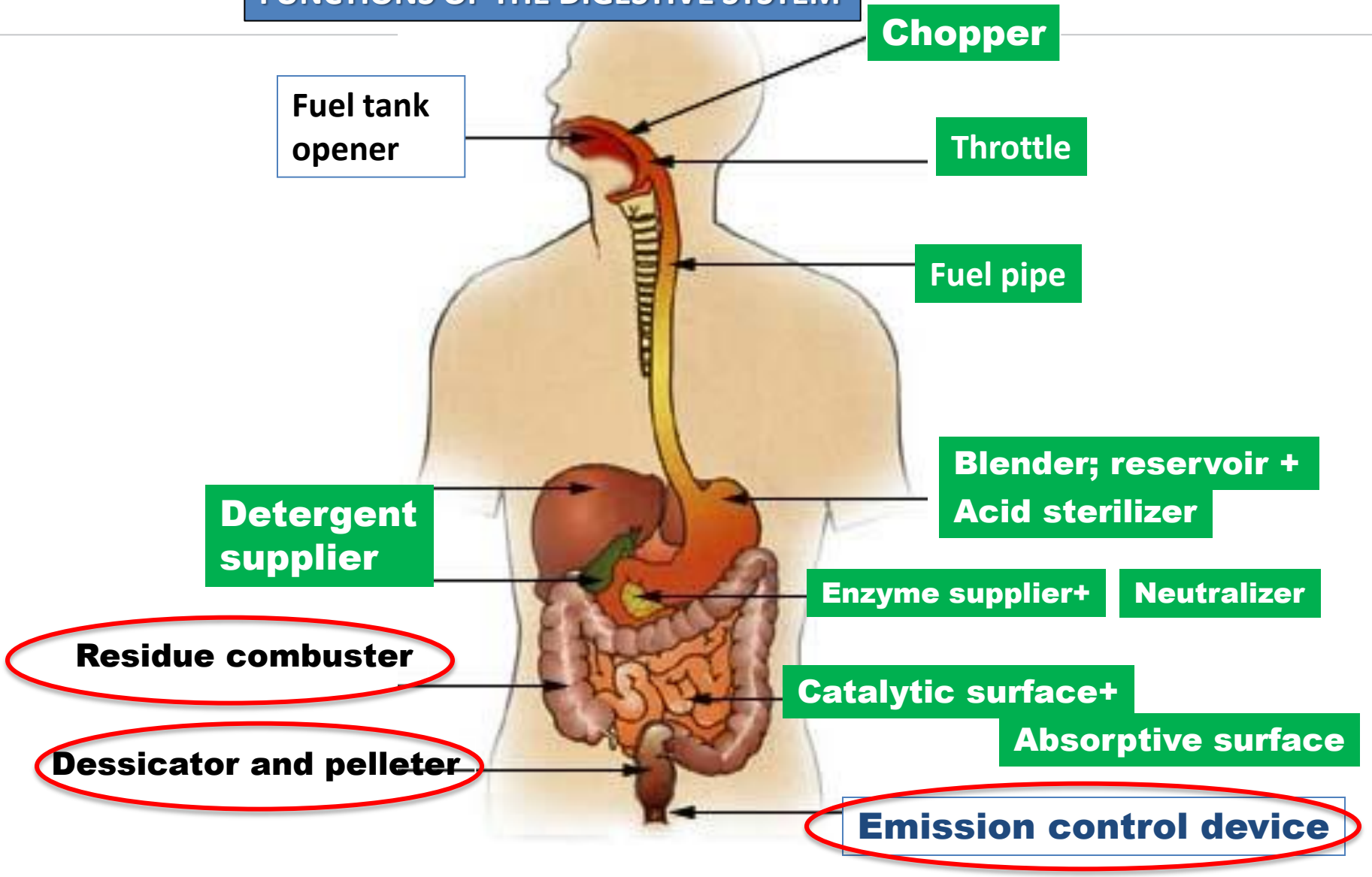


CONSTIPATION

Just a nice way of saying
"You're Full of Crap!"

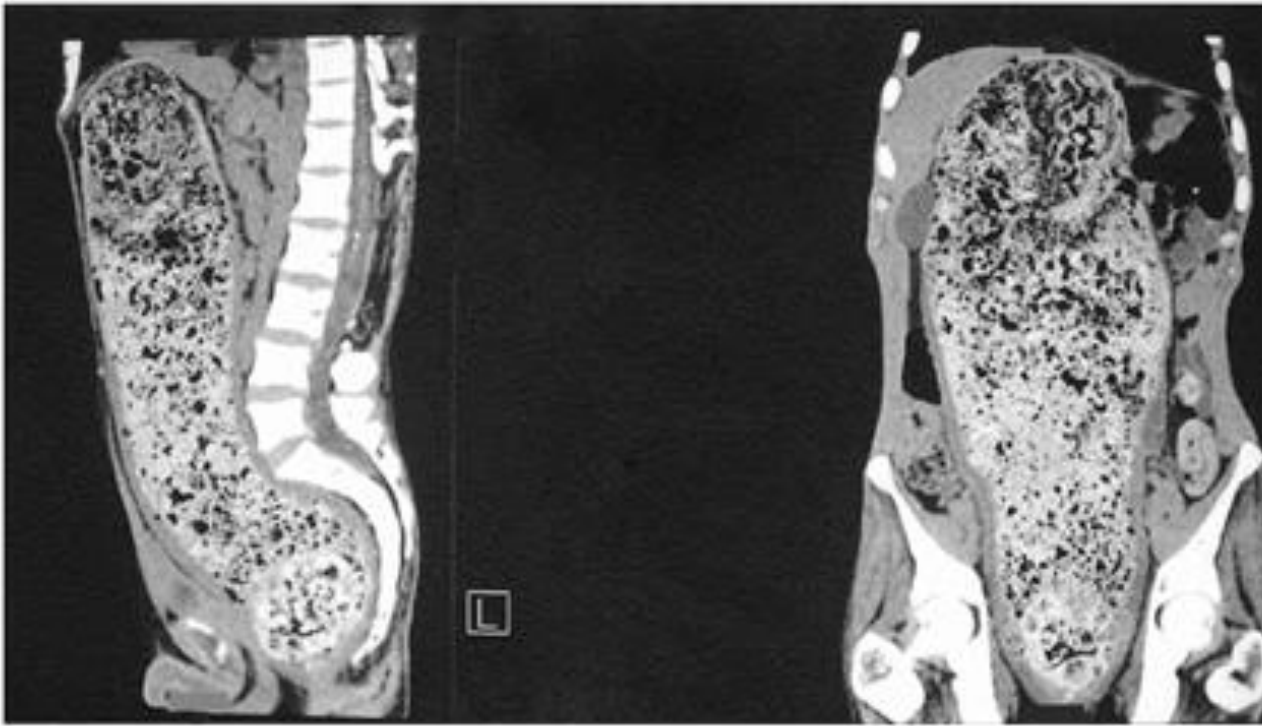
COSC CONFERENCE
11/12/2015

FUNCTIONS OF THE DIGESTIVE SYSTEM



POOP HAPPENS

WHAT HAPPENS IF IT DOES NOT HAPPEN?



CAN WE HAVE STOOL IF WE DO NOT EAT?

What percentage of the stool coming from food?

Fiber content and bacterial mass, which make up one **half of the dry weight** of stool, are probably the major components of these fecal solids.

The other half is ?

from SHEDDED intestinal epithelial cells

HOW THE STOOL LOOKS LIKE?

Slow gut transit

Type 1



Separate hard lumps

Type 2



Sausage-like but lumpy

Type 3



Sausage-like but with cracks in the surface

Type 4



Smooth and soft

Type 5



Soft blobs with clear-cut edges

Rapid gut transit

Type 6



Fluffy pieces with ragged edges, a mushy stool

Type 7



Watery, no solid pieces

Lewis SJ, Heaton KW. *Scand J Gastroenterol.* 1997;32:920-924.

HOW THE POOP IS FORMED IN THE COLON

- Liquid small intestinal content reaches the colon through ileo-cecal valve
- It may contain up to 3-5% of the digested nutrients that makes colonic bacteria healthy and happy (our colon is the incubator for our bacteria)
- They ferment the nutrient and form short chain fatty acids
- Short chain fatty acids can re-absorb and provides additional calories. Butyric acid is the main metabolic fuel for the colonic epithelial cells.
- As the content moves down the consistency changes.
- The **distal third of the colon** is the main site of water re-absorption
The stool normally formed here.
- The typical colonic transit time range 24-96hours

WHAT IS THE DEFINITION OF CONSTIPATION?

THERE IS NO SINGLE GOOD DEFINITION

Rome III criteria: functional Constipation

- 2 or more of the following in a child with a developmental age of at least 4 years with insufficient criteria for diagnosis of IBS:
 - Two or fewer defecations in the toilet per week
 - At least one episode of fecal incontinence per week
 - History of retentive posturing or excessive volitional stool retention
 - History of painful or hard bowel movements
 - Presence of a large fecal mass in the rectum
 - History of large diameter stools which may obstruct the toilet

ROME III DOES NOT HAVE A DEFINITION OF WHAT IS NORMAL!!

MY “OWN” PRACTICAL DEFINITION- INCOMPLETE FECAL EVACUATION!



Functional Constipation

Infant & toddler (<4 yrs. of age)

Must include 1 month of at least 2 of the following in infants up to 4 years of age:

1. Two or fewer defecations per week
2. At least 1 episode per week of incontinence after the acquisition of toileting skills
3. History of excessive stool retention
4. History of painful or hard bowel movements
5. Presence of a large fecal mass in the rectum
6. History of large-diameter stools that may obstruct the toilet



Children (>4 yrs. of age)

Must include 2 months of 2 or more of the following with insufficient criteria for diagnosis of IBS:

1. Two or fewer defecations in the toilet per week
2. At least 1 episode of fecal incontinence per week
3. History of retentive posturing or excessive volitional stool retention
4. History of painful or hard bowel movements
5. Presence of a large fecal mass in the rectum
6. History of large diameter stools that may obstruct the toilet

Frequency of stools

- **Normal defecation**
 - **Infants: 4 per day (range 1 - 7x/day)**
 - **Children (2 years old): 1.2 - 2x day**
 - **Adults: 3 per week - 3 per day**
 - **Pattern attained by ~4 years of age**

Based on published papers

- Croffie JM. Pediatric Gastrointestinal Disease. Fourth ed; 2004.
- Lemoh JN. Arch Dis Child 1979.
- Weaver LT. Arch Dis Child 1984.
- Weaver LT. J Pediatric Gastroenterology Nutrition 1988.

“A regular pattern of defecation is considered by many to be a sign of good health”

- **Epidemiology:**

- 3 million Americans/year receive medications for constipation from their physicians
 - (US population estimate: 314 million)
 - 250 million dollar a year spent for OTC constipation medications

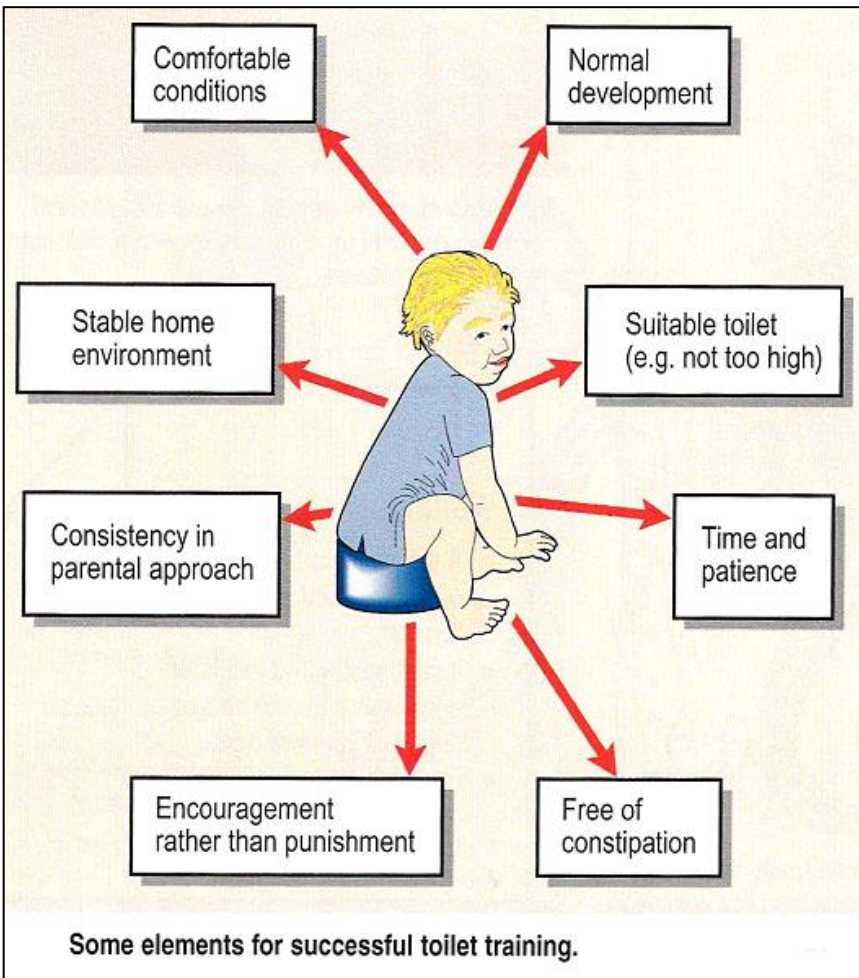
- **Constipation:**

- 3% visits to general pediatrician
- 10-25% visits to pediatric GI

•Croffie JM. Pediatric Gastrointestinal Disease. Fourth ed; 2004.
•Sonnenberg A. Dis Colon Rectum 1989.
•Loening-Baucke V. Gastroenterology 1993.
•Fleisher PR. Pediatric Annals 1976.

In 17% to 40% of children, constipation starts in the first year of life!

THE KEY ELEMENTS OF POTTY TRAINING TO PREVENT CONSTIPATION

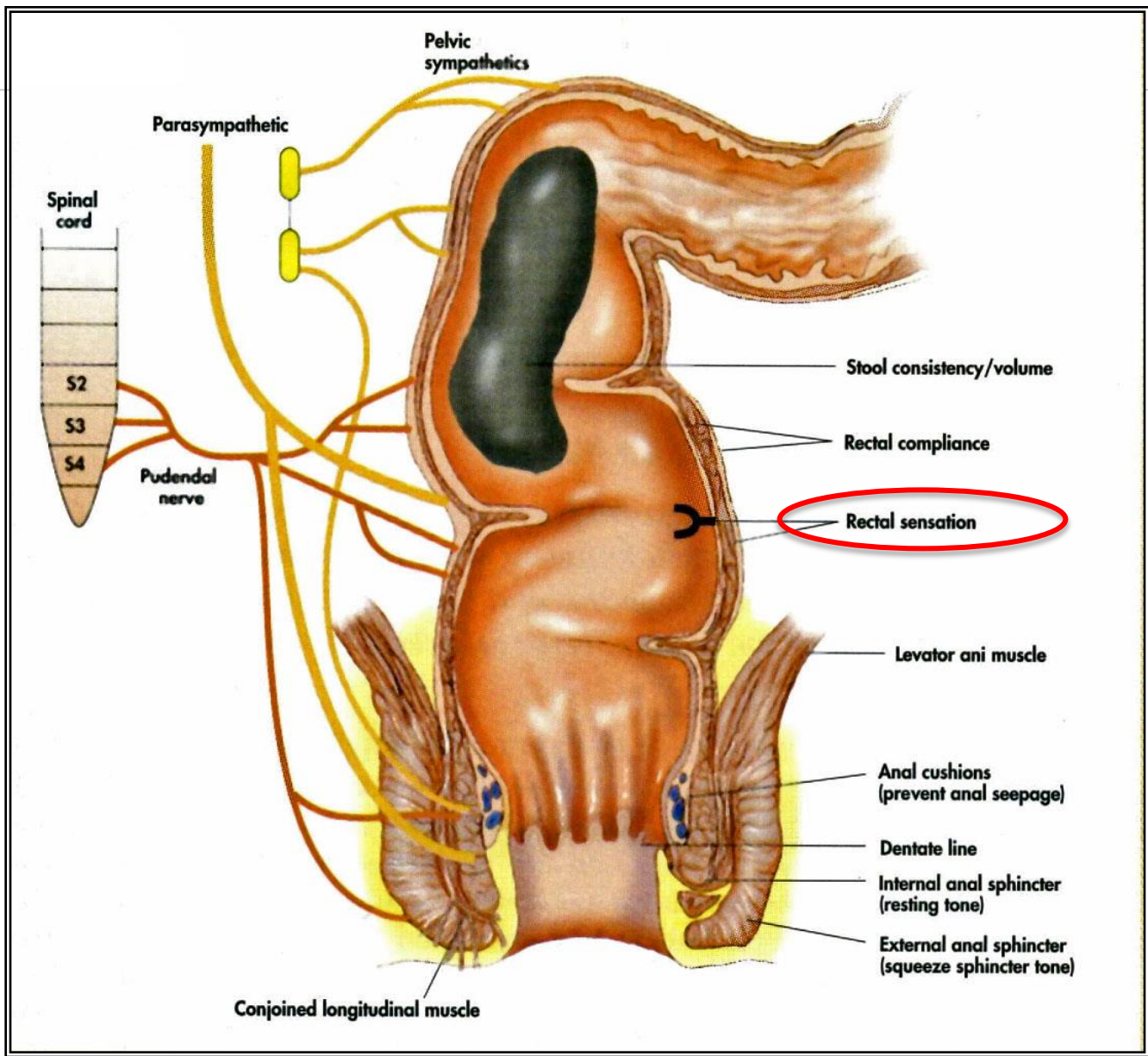


MY SUBJECTIVE NOTES:

1. THE STOOLING IS A CONDITIONAL REFLEX
2. IF THE MOM PUTS THE TODDLER TO THE POTTY AFTER THE SAME MEAL HE/SHE WILL DEVELOP A REGULAR PATTERN

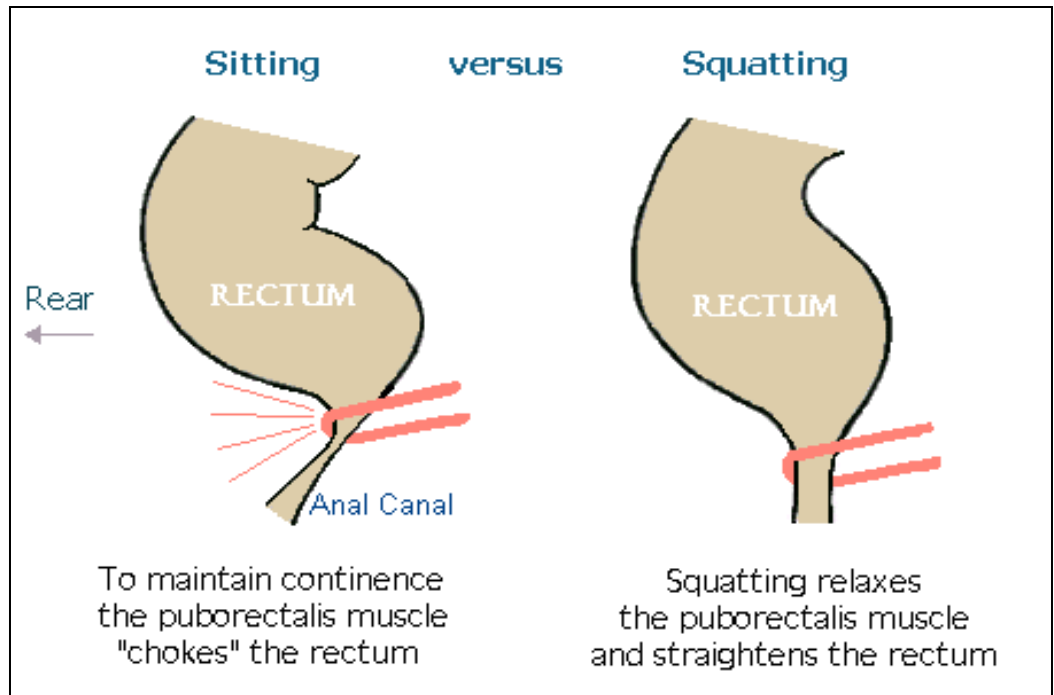
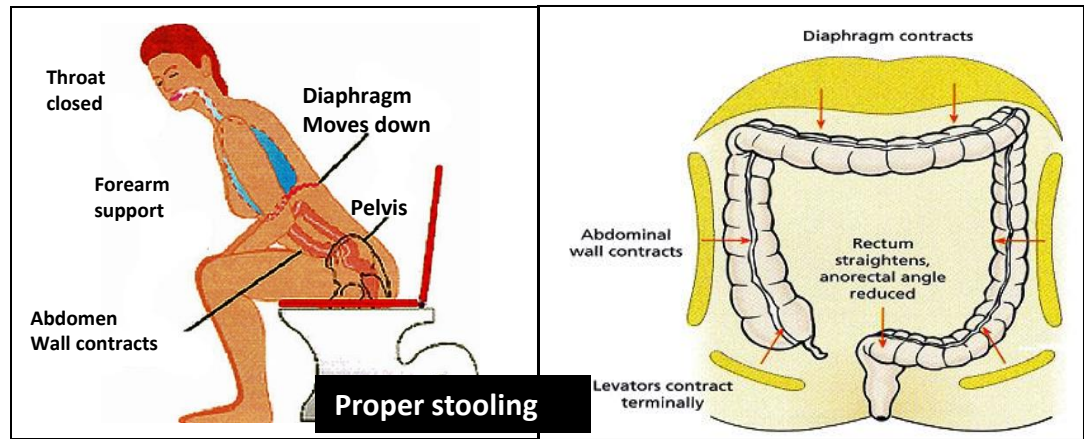
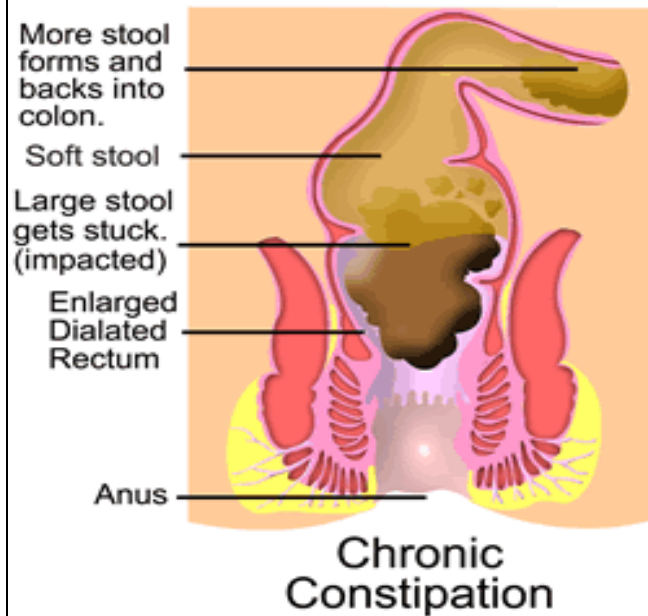
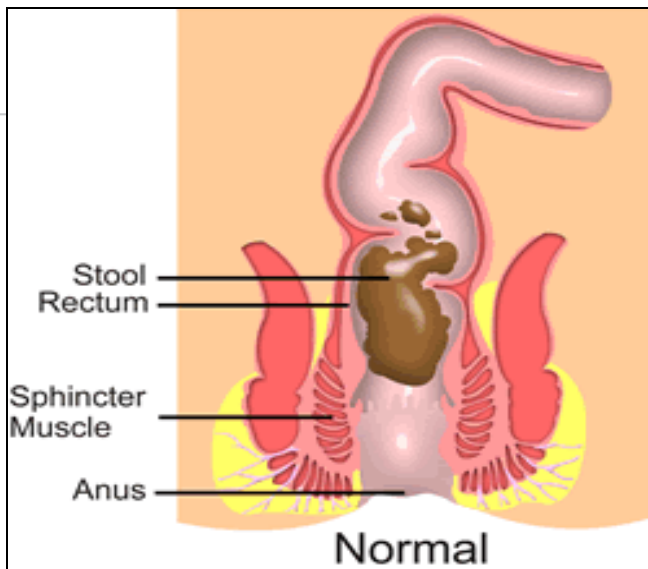
PLUS

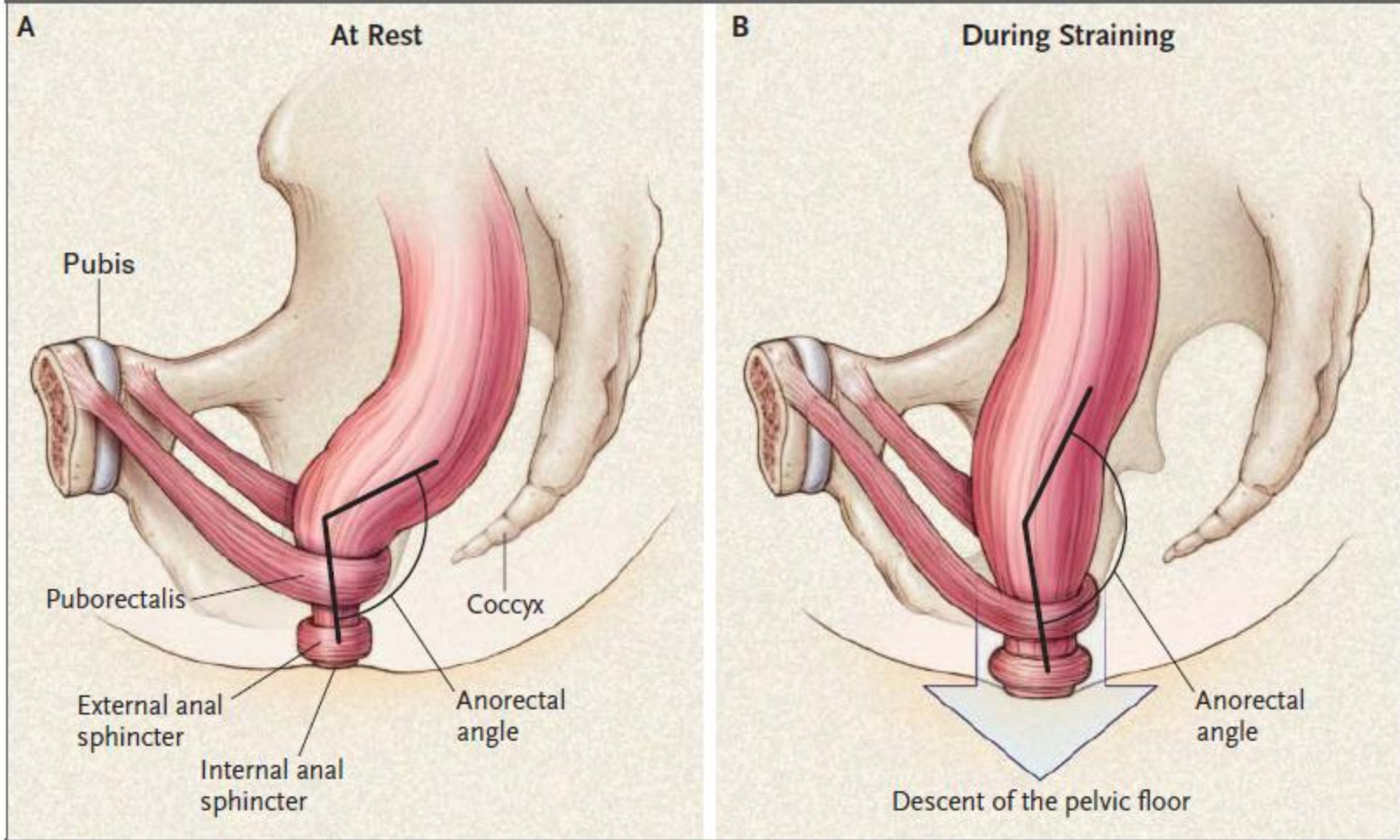
3. IF THE CHILD GETS AGE APPROPRIATE FIBER AND DAILY FLUID HE/SHE UNLIKELY WILL HAVE CONSTIPATION.
4. IF THE MOM RECOGNIZES AND ACTS TIMELY IF A CHILD HAS ACUTE CONSTIPATION HE/SHE WILL NOT BE SEEN BY US WITH THIS PROBLEM!



**POTTY TRAINING
ACHIEVED IF THE
CHILD CONNECTS
THE RECTAL SENSATION
WITH THE ACTION
OF STOOLING!!**

HOW TO POOP?



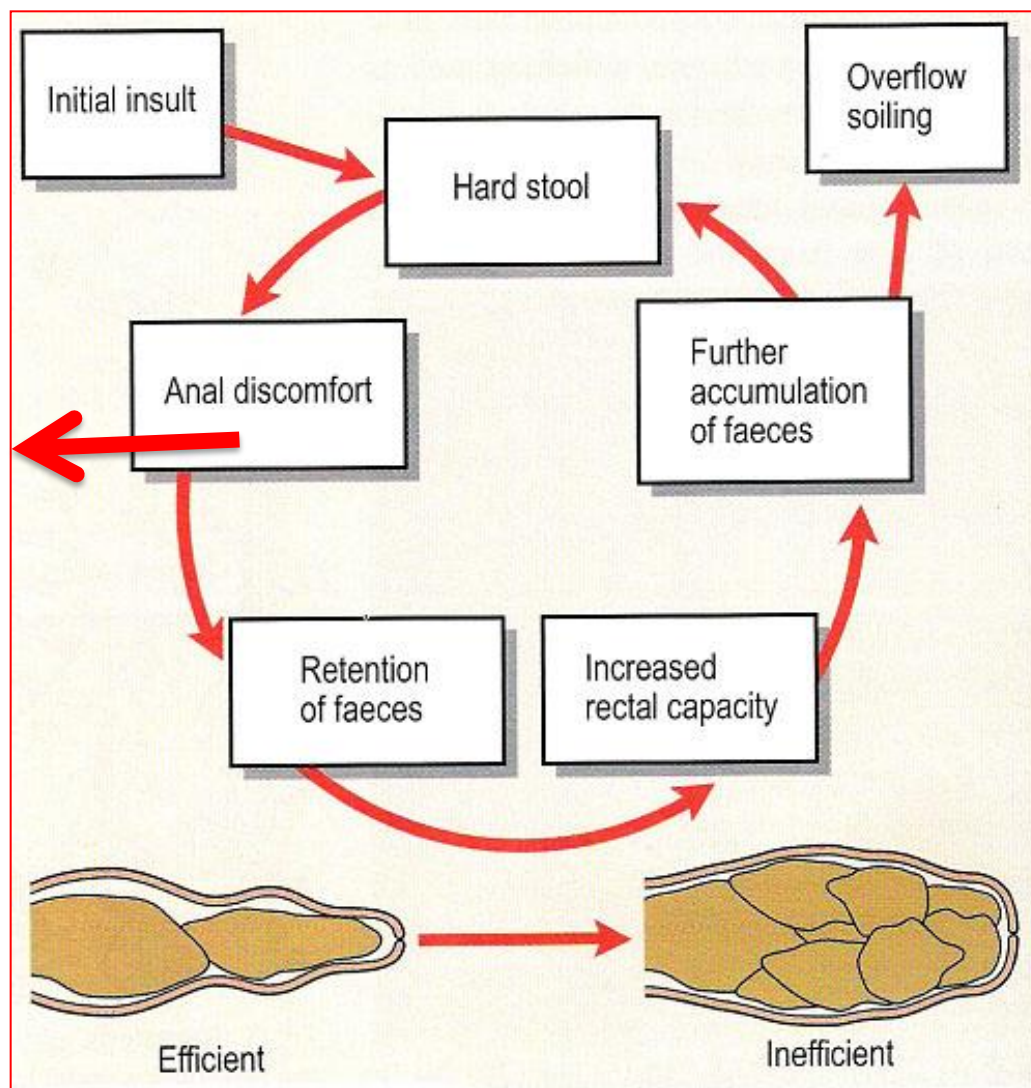


Sagittal View of the Anorectum at Rest (Panel A) and during Straining to Defecate (Panel B). Continence is maintained by normal rectal sensation and tonic contraction of the internal anal sphincter and the puborectalis muscle, which wraps around the anorectum, maintaining an anorectal angle between 80 and 110 degrees. During defecation, the pelvic-floor muscles (including the puborectalis) relax, allowing the anorectal angle to straighten by at least 15 degrees, and the perineum descends by 1.0 to 3.5 cm. The external anal sphincter also relaxes and reduces pressure on the anal canal.

THE DEVELOPMENT OF CONSTIPATION and PROGRESSION TO ENCOPIRESIS

Dehydration,
Poor diet, Drug,
Withholding,
stooling only at
home, etc.

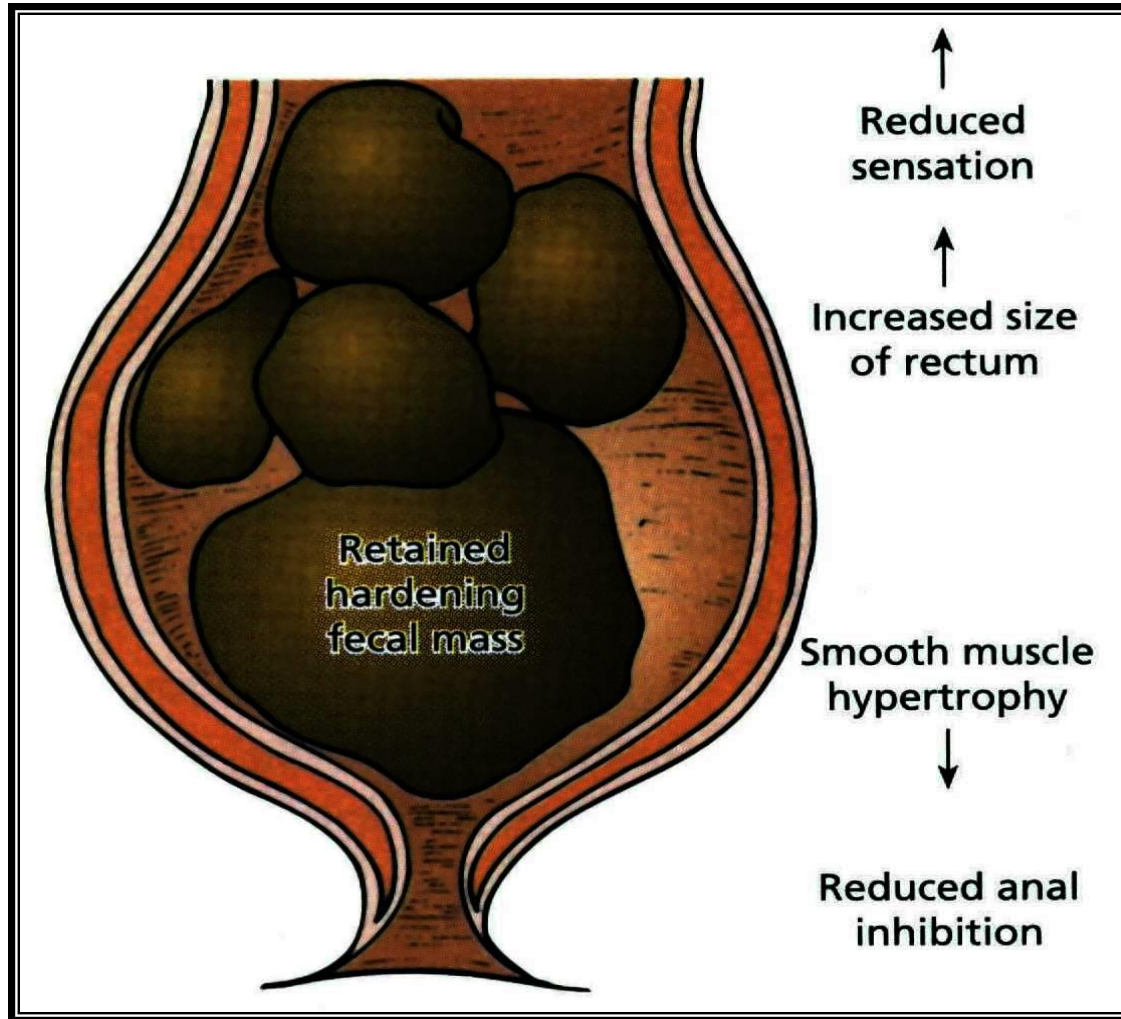
Withholding
behavior in young
children



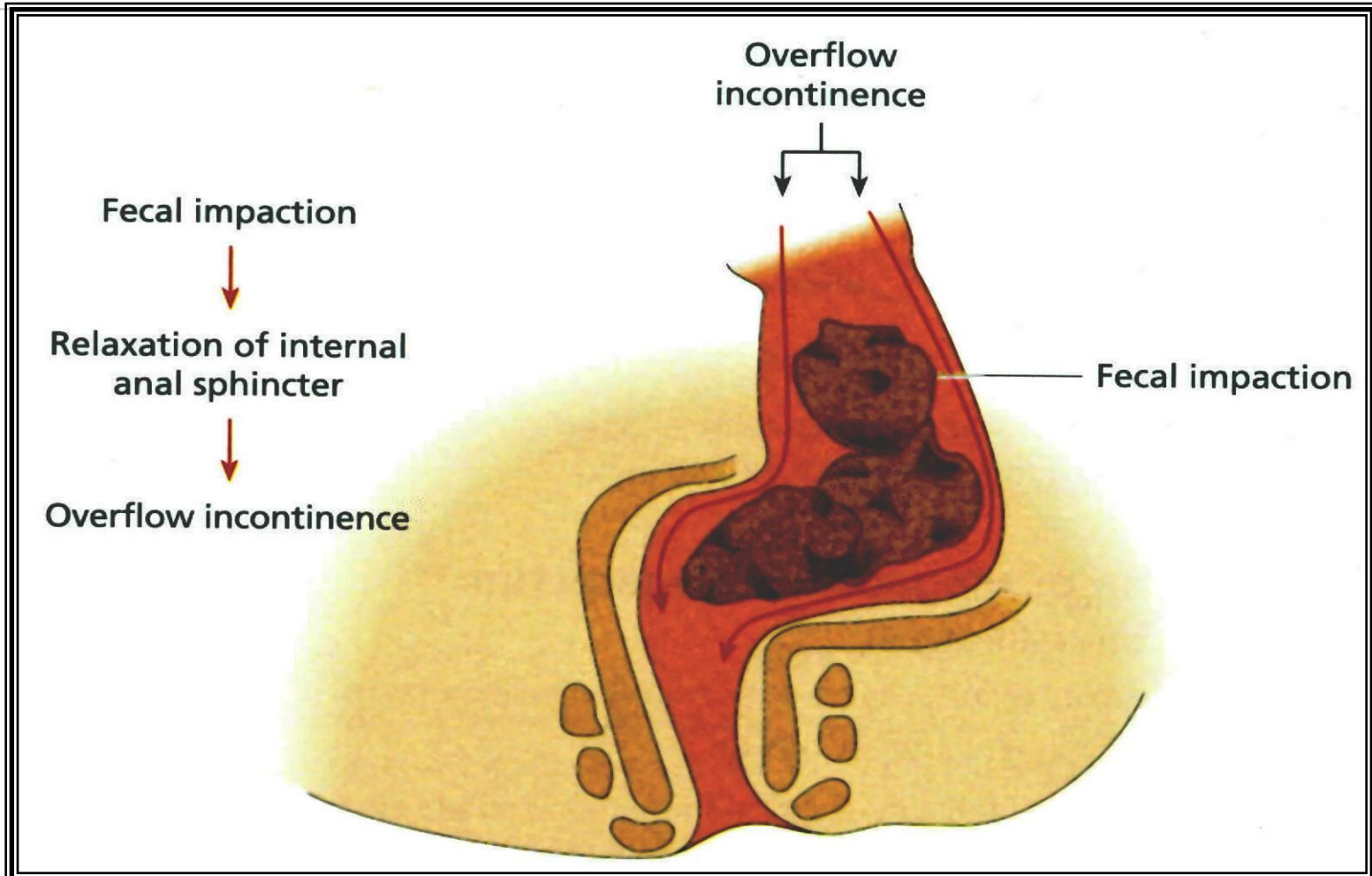
Loss of sensation

Colonic wall
Distension;
**SMOOTH
MUSCLE !!!**

MEGARECTUM



OVERFLOW INCONTINENCE-ENCOPRESIS



OVERFLOW DIARRHEA IF IMPACTION IS TREATED WITHOUT CLEAN-OUT!!

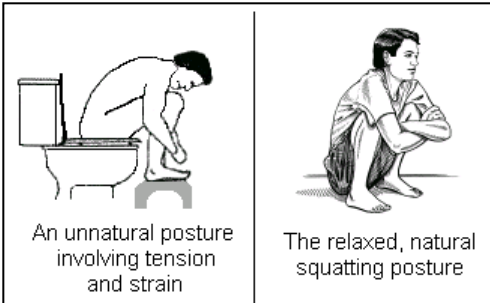
Fecal Incontinence: Encopresis

- Definition: incontinence of stool **not** resulting from organic defect/illness
 - Fecal incontinence followed by expulsion of megastool
 - Incontinence due to organic pathology is not the same!
 - Mean age: 7.4 - 9 yo
 - Male/Female: 2 to 1
 - Parents often do not understand why their child is soiling themselves

WHAT IS THE PHYSIOLOGIC POSITION FOR STOOL EVACUATION?



Squatty Potty



THE TWO COMMON COMPLAINS AT THE GI CLINIC

1. PERIUMBILICAL ABDOMINAL

It happens in the middle and end of the meal = gastrocolic reflex

2. POSTPRANDIAL SINGLE VOMITING

He/She is able to eat again shortly after !!

**The reasons not reporting stooling problem:
“PRIVACY”, “SHY” TO TALK ABOUT STOOL,
I DO NOT LOOK AT MY STOOL- “it is disgusting...”**

Functional vs. Organic

- **Organic causes - fewer than 5 % of children with constipation**
 - Anatomic anal malformations
 - Metabolic and endocrine anomalies
 - Spinal cord abnormalities
 - Intestinal nerve and muscle disorders
 - Abnormal abdominal musculature
 - Connective tissue disorders
 - Drugs
 - Opiates, Phenobarbital, Antacids, Sucralfate, Bismuth, Iron, Cholestyramine, Psychotropics, Anticholinergics



Functional vs. Organic

- **Other**
 - **Lead ingestion**
 - **Vitamin D Intoxication**
 - **Botulism**
 - **Cow's milk protein intolerance**



Organic Causes of Constipation

- **Hirschsprung disease**

- 1 in 5000 live births, male:female ratio of 4:1
- Absence of ganglion cells in the myenteric, submucosal plexus
- Affects a short segment in the rectosigmoid in approximately 75 % of patients, entire colon in approximately 10 % of patients
- 90% of affected do not pass meconium in 1st 24 hours of life
- Can present with bilious vomiting, abdominal distension, fever, explosive and sometimes bloody diarrhea (enterocolitis)
- Short segment disease may go undiagnosed until childhood

Organic Causes of Constipation

- **Hirschprung disease**
 - Contracted anal sphincter and rectum, rectum usually devoid of stool
 - May have explosive discharge of foul-smelling liquid stool with withdrawal of finger on rectal exam
 - Gold standard for diagnosis is rectal biopsy
 - Anorectal manometry - no relaxation of internal anal sphincter
 - Barium enema may show transition zone (except total colonic and ultra-short segment disease)

Organic Causes of Constipation

- **Intestinal Pseudo-Obstruction**

- Impaired intestinal and colonic motility in the absence of a mechanical obstructive lesion
- Neuropathic and myopathic causes
 - Intestinal neuronal dysplasia, visceral myopathy/neuropathy of intestine
- Majority of affected children have urologic abnormalities- megacystis microcolon hypoperistalsis syndrome
- In moderate form with subacute presentation, 70% have constipation

Organic Causes of Constipation

- **Cystic fibrosis**

- Meconium ileus is the presenting problem in 10 to 20 % of newborns with CF
- Distal ileal obstructive syndrome or "meconium ileus equivalent"

- **Hypothyroidism**

- Congenital or acquired hypothyroidism
- Growth delay, altered school performance, lethargy, cold intolerance, constipation, dry skin, brittle hair

- **Celiac disease**

- 20% of the celiac cases over 2 years of age

Approach

- **History**

- Psychosocial history

- Interactions with family, peers
- Possibility of abuse
- Uses school restrooms or not

- **Medications**

- Previous treatments for constipation

- Diet

- Development

- Family history-Hirschsprung's, thyroid, CF, celiac disease

A thorough history and complete physical examination are usually adequate to accurately diagnose functional constipation



Perianal examination

Approach

- **Thorough physical examination** (including deep palpation for stool mass)
 - **Anorectal examination**
 - Anal position
 - Skin tags, anal fissures, evidence of trauma
 - Perianal sensation
 - **Presence of anal wink:** reflexive contraction of the external anal sphincter upon stroking of the skin around the anus. Absence is suspicious of neurological problem (spine, reflex arch)
-
- **Anal tone** (It can be low with megarectum)
 - **Size of rectum** (dilated and empty indicates hard stool above your finger)
 - **Rectal mass** (can be stool, polyp, duplication cyst, etc)
 - **Amount, consistency, location of stool in rectum**
 - **Explosive stool on withdrawal of finger** (short segment Hirschsprung's disease)
 - **Stool hemocult**

Medical work-up

- **History and physical exam - 1st visit**

- **Labs:**
 - Serum Calcium
 - TSH/T4
 - Celiac panel
 - Lead level
 - CBC
- **Imaging**
- **Manometry**

If not improving

Approach if no improvement

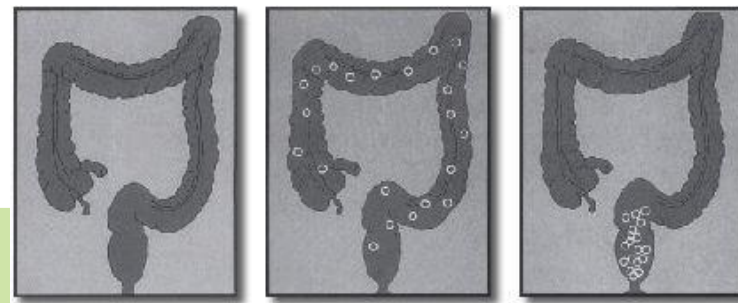
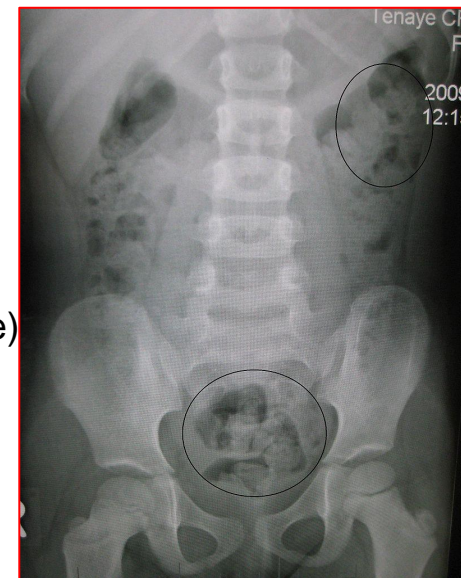
- **CBC**
 - E.g. anemia in celiac disease associated with constipation
- **Thyroid panel**
- **Urinalysis and urine culture**
 - E.g. UTI's due to the mechanical effects of the distended rectum compressing on the bladder
- **Plain abdominal film** to document retained stool when the physical examination is equivocal
- Unprepped barium enema (If suspicion of Hirschsprung's disease)
- Colonic transit studies (**Sitz marker study**)
- **MRI** of the lumbosacral spine
- Anorectal and colonic manometry (at Motility center)

A total of 130 children with intractable constipation and 28 with nonretentive fecal incontinence **underwent MRI that revealed that 3% had lumbosacral spine abnormalities** and the neurologic examination revealed no abnormalities in these patients.

Evaluation and Treatment of Functional Constipation in Infants and Children: Evidence-Based Recommendations From ESPGHAN and NASPGHAN. JPGN 2014;58: 258-274

Imaging studies

- **KUB:** to establish fecal impaction in child refusing rectal exam or in obese child
- **Un-prepped barium enema** (to look for transition zone)
- **MRI lumbosacral spine** (to evaluate for tethered cord)
- **Sitz marker study** (capsule contains 24 markers)
 - Passage of 80%: normal transit
 - Scattered throughout: **colonic inertia**
 - In rectum: **outlet dysfunction**



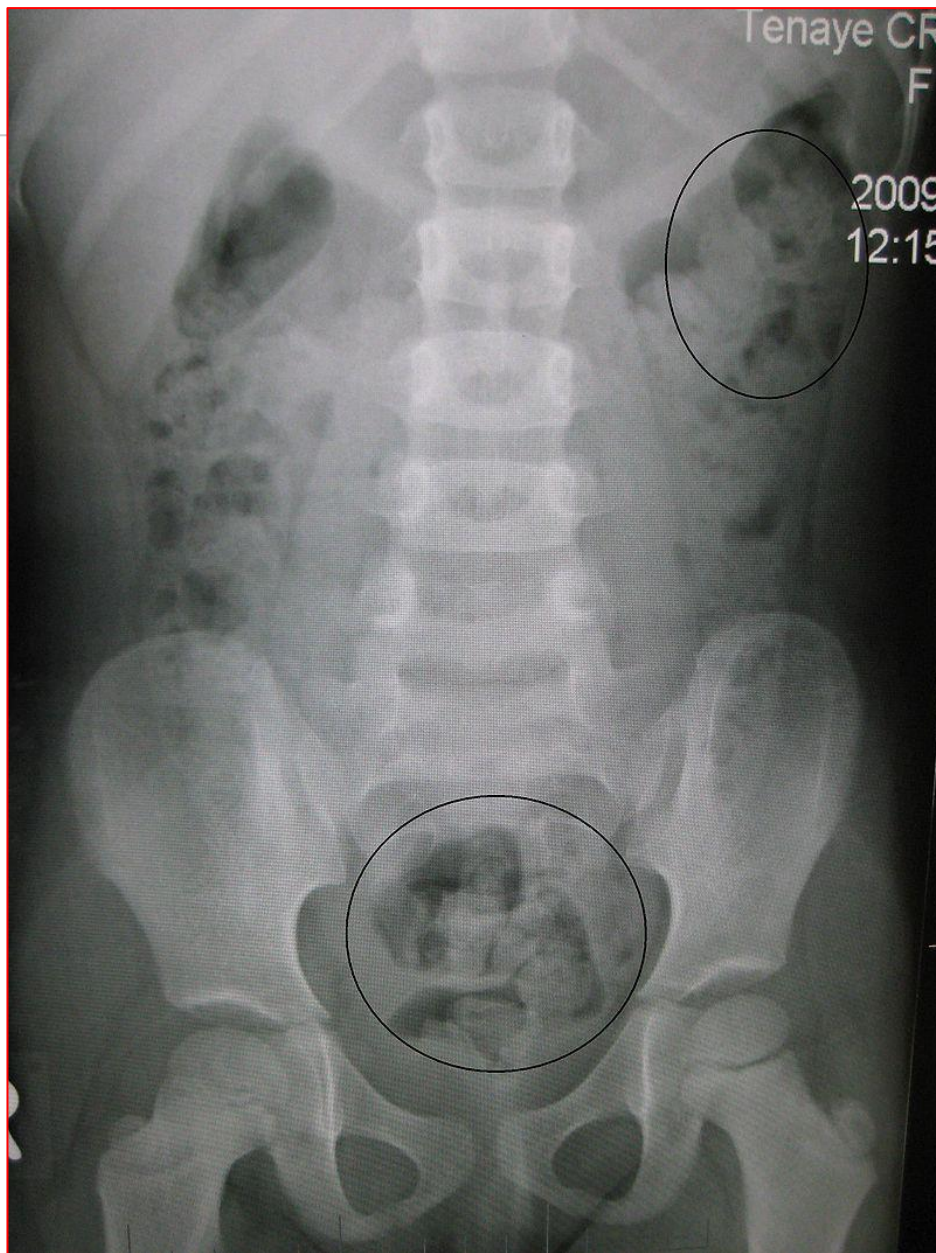
Croffie JM. Pediatric Gastrointestinal Disease. Fourth ed; 2004.



<http://www.sitzmarks.com/howtointerpretasitzmarkstest.aspx>

For Children

Supported by Arnold Palmer Medical Center Foundation

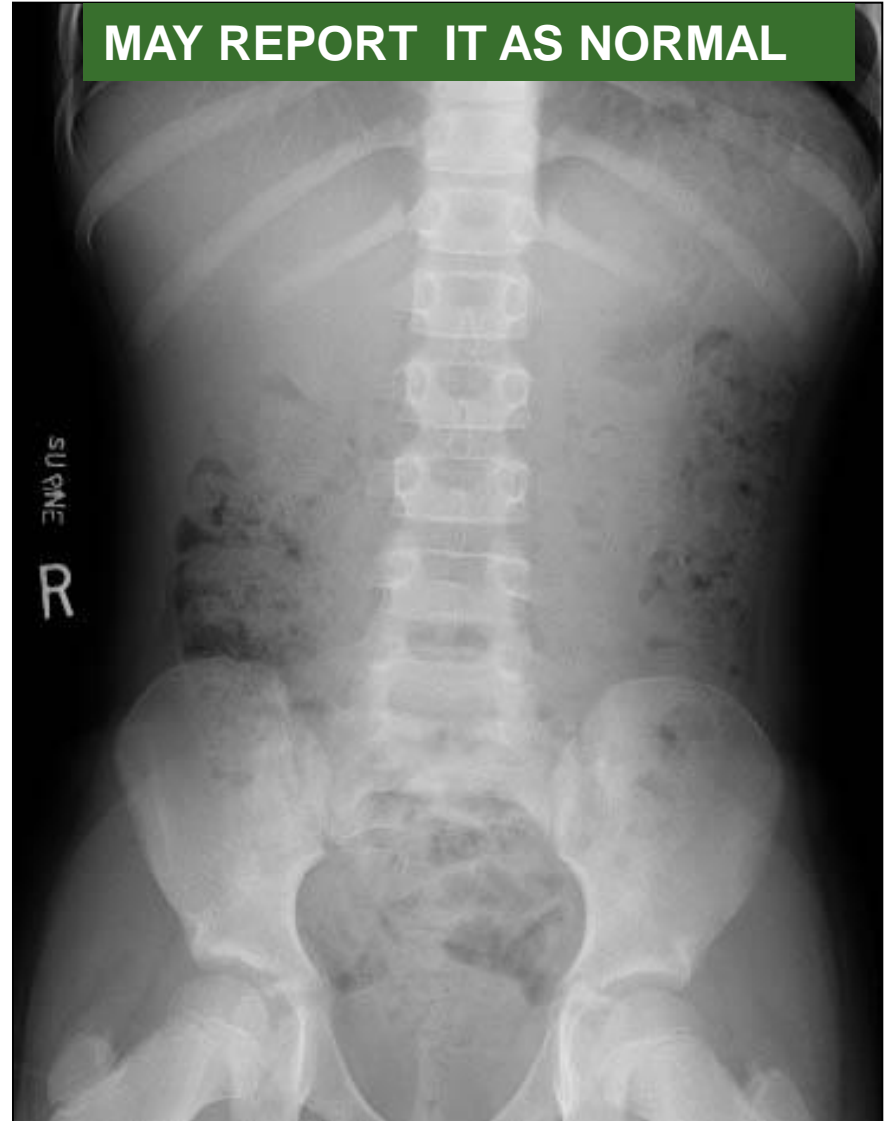


Radiologist may report it as
“Non-obstructive abdomen”.

You cannot trust RADIOLOGY REPORT unless you are specifically asking for fecal impaction

MAY REPORT FECALOMA

MAY REPORT IT AS NORMAL



History and Physical examination

Red flags:

- **History:** fever, anorexia, weight loss, vomiting, bloody diarrhea, constipation since infancy,
- Encopresis without fecal impaction
- **Physical exam:** abnormal perianal exam (erythema, fistula), abnormal anal tone, absence of anal wink, sacral tuft of hair

(my) 5 STEPS OF TREATMENT

- 1. COLONIC CLEAN-OUT:** (just like for colonoscopy)
- 2. KEEP THE STOOL SOFT** (PEG-3350, lactulose,
Milk of magnesia)
- 3. AGE APPROPRIATE FIBER INTAKE:** age+ 5g/day
- 4. AGE APPROPRIATE FLUID INTAKE:**
at least maintenance fluid daily
- 5. TOILET TRAINING REGIMEN** (proper stooling position!):
“Stooling is a conditional reflex” (Pavlovian reflex)

Treatment Options for Constipation

Treatment Option	Pros	Cons
Lubricants/Mineral oils	Facilitates bowel movements Promotes soft bulk	Fat-soluble vitamins may not be absorbed Patient may become deficient in vitamins A, D, E, K Larger doses may cause rectal leakage Oil may interact with warfarin and birth control pills
Emollients (Colace, Dialose, Docusate, Surfak)	Penetrates, wets stool Often effective for painful anal fissures	May cause bloating and flatulence
Hyperosmolar laxatives (GlycoLax, lactulose, Miralax, sorbitol)	Promotes water retention in stool Does not alter electrolyte balance	May cause bloating and flatulence
Saline laxatives (Fleet, Milk of Magnesia, Magnesium Citrate, Visicol)	Softens, bulkens stool Rapid acting, used in bowel cleansing	Potentially dangerous electrolyte disturbance, dehydration or hypovolemia; Rare nephrocalcinosis and renal failure possible
Stimulants (Aloe, Cascara, Castor oil, Correctol, Dulcolax, Ex-Lax, prunes, Senna, Senokot)	Increases water in stool	Prolonged use may lead to peristaltic dependence
Herbs (Green tea)	May contain polyphenol stimulant laxative or anthranoid stimulant	May lead to colonic peristaltic dependence May reduce water absorption in colon
Bulking agents (Benefiber, Citrucel, Equilactin, fiberall, fibercon, Konsyl, Metamucil, Modane Bulk, psyllium, Serutan)	Often relieves constipation Absorbs water, bulkens and softens stool	Abdominal bloating, flatulence

CONSTIPATION DRUG DOSES

TREATMENT	COMPOSITION	DOSAGE
Fleet ENEMA	Na-phosphate, Na-biphosphate	30 ml/5 kg BW; 135 ml over 20 kg
Fleet Phospho Soda-oral	Na-phosphate, Na-biphosphate	colon prep: 48 ml after 10 yrs (+8 ounces of water)
Lactulose (66%)	undigestible disaccharide	1-3 ml/kg BW/day (b.i.d)
Sorbitol (70%)	polyalcoholic sugar	2-11 yrs: 2 ml/kg >12 yrs: 30-150 ml 1-3 ml/kg BW/day (b.i.d)
Mineral oil	converted into hydroxy fatty acids	1-3 ml/kg BW/day (b.i.d.)
Milk of magnesia	Mg-hydroxide	1-3 ml/kg BW (b.i.d.)
Miralax	Polyethylene-glycol	0.8-1g/kg/day, b.i.d.
Senna syrup		1-5 yr: 5 ml q.d. or b.i.d. 5-15 yr: 10 ml q.d. or b.i.d
Dulcolax	Bisacodyl tannex	3-12 years: 0.3 mg/kg/day orally >12 yrs: 5-15 mg Q.D. orally Suppository: 5 - 10 mg/day
Docusate (Colace) do not use with mineral oil	Diocetyl Ca- or Na sulfosuccinate	<3 yrs: 10-40 mg/day (1-4x) 3-6 yrs: 20-60 mg/day 6-12 yrs: 40-150 mg/day
Castor oil	Oleum ricini	Infant: 1-5 ml or (15 ml/m ² D.D.) 2-11 yr: 5-15 ml Q.D. >12 yrs: 15-60 ml Q.D.
Malt soup extract or Karo syrup		5-10 ml in 2-4 oz of water or fruit juice b.i.d. (Breast-fed) 7.5-30 ml/day to bottle fed babies

MANAGEMENT

1. Always start with clean-out
2. Keep the stool soft with stool softener
3. Improve fiber intake (age+5g/day)
4. Appropriate fluid intake
5. Teach how to POOP.
6. Build regular stooling pattern

HOW MUCH FIBER AND FLUID?

A normal **FIBER** intake is recommended (age + 5 grams/day, max 25g)

A normal **FLUID** intake is recommended (at least maintenance fluid)

We recommend a normal **PHYSICAL ACTIVITY** in children with constipation.

The routine use of **PREBIOTICS** is not recommended in the treatment of childhood constipation.

The routine use of **PROBIOTICS** is not recommended in the treatment of childhood constipation.

*Evaluation and Treatment of Functional Constipation in Infants and Children:
Evidence-Based Recommendations From ESPGHAN and NASPGHAN.
JPGN 2014;58: 258-274*

HOW LONG TO TREAT?

- **At potty training age: “in the developmental stage of toilet training, medication should only be stopped once toilet training is achieved.”**
- **In potty trained children “for least for 2 months and all symptoms of constipation symptoms should be resolved for at least 1 month before discontinuation of treatment. Treatment should be decreased gradually”**

Evaluation and Treatment of Functional Constipation in Infants and Children: Evidence-Based Recommendations From ESPGHAN and NASPGHAN. JPGN 2014;58: 258-274

- **My endpoint:**
NORMAL DAILY FLUID AND FIBER INTAKE and DEVELOPED A REGULAR STOOLING PATTERN
- **THEN**
- SLOW TAPERING OF STOOL SOFTENER

To the rescue!!!



**Direct stimulant
It works within 15-60 minutes**



What Is the Prognosis and What Are Prognostic Factors in Children With Functional Constipation?

- *primary care physicians **tend to undertreat** childhood constipation, **delay in treatment**, defined as time between age at onset and first presentation at the department of pediatric gastroenterology, is negatively related to recovery*
- *duration of **symptoms <3 months** before presentation had a positive effect on recovery*
- *recovery rates of 50% after 5 years of follow-up without laxatives after 6 to 12 months*

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ANORECTAL MANOMETRY

Indications

1. Diagnose **non-relaxing internal anal sphincter**
2. Assess anorectal motility in children with **chronic constipation and/or fecal incontinence with persistent symptoms** despite treatment
3. **Persistent symptoms** (incontinence or obstruction) **after surgery** for **Hirschsprung disease** and to evaluate need for botulinum injection to sphincter
4. Evaluate **anorectal function** in patients with **imperforate anus repair**
5. **Biofeedback** therapy

VERY GOOD VIDEO FOR PARENTS FROM PROFESSIONAL SOURCE

<https://www.youtube.com/user/GIKidsNASPGHAN>



GI Kids uploaded a video 1 year ago



The Poo in You - Constipation and Encopresis Educational Video

by GI Kids

1 year ago • 459,868 views

If your child is having problems with soiling accidents (encopresis, "poo accidents," "poo-ing" in pants), you're certainly not alone. This is one of the most common problems seen by both...

THE END

