

Title

- the enteric nervous system, the paravertebral ganglia of the autonomic nervous system, and the cerebrospinal axis.
- support of local muscle tone

Source:

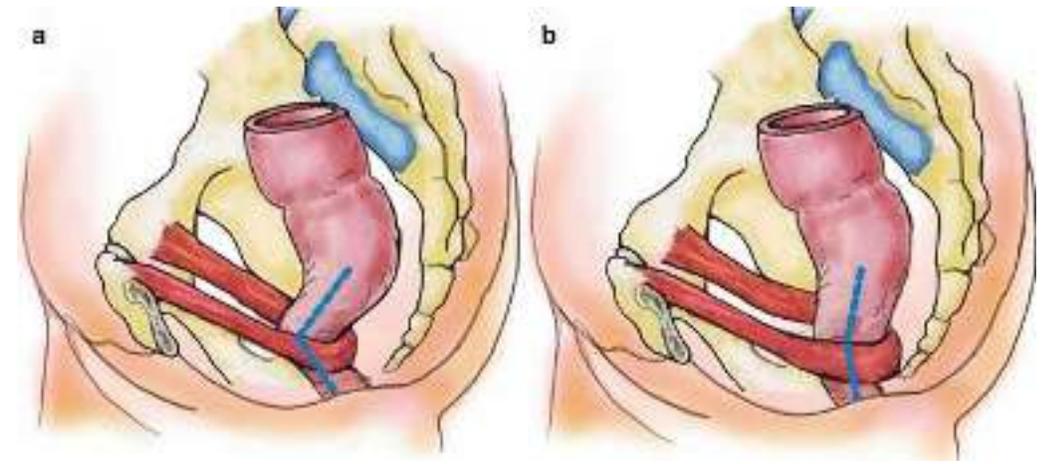
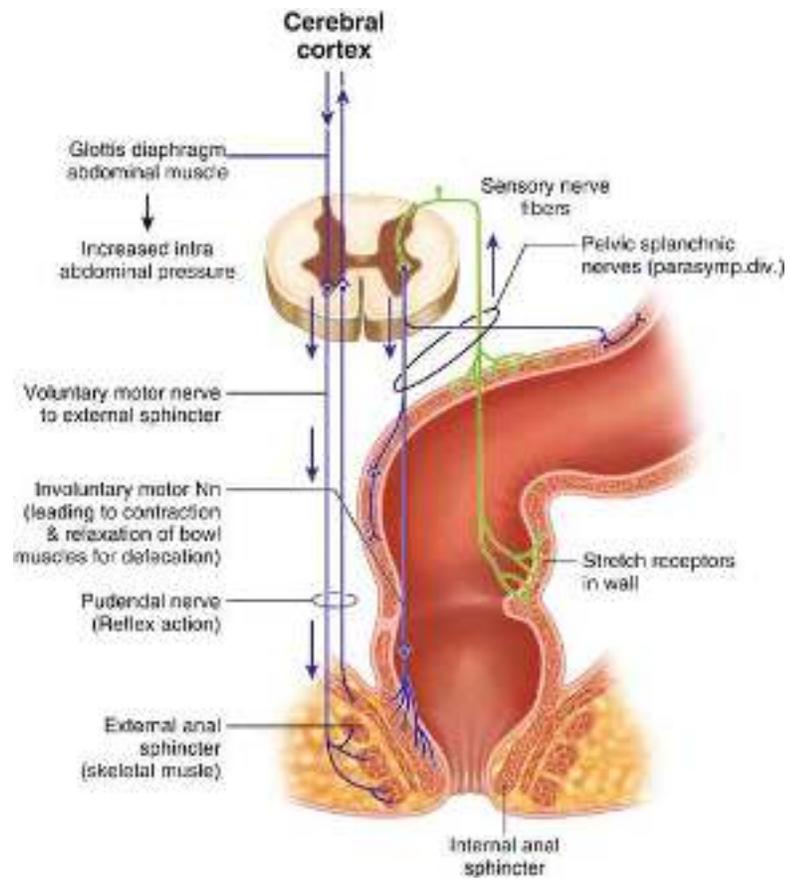
 **MECHANISMS**

Slow-transit constipation is attributed to a reduced frequency or absence of contractions that normally induce propulsive mass movements in the colon

 Rectal evacuation disorders are caused by the inability to coordinate the abdominal muscles, pelvic floor muscles and the anal sphincter to evacuate stools owing to structural or functional defects. Dysynergic defecation is the most common evacuation disorder and is caused by functional defects; it is the consequence of, for example, faulty toilet habits, painful defecation and dysfunction of the gut-brain axis.

Most patients with chronic constipation do not have evidence of slow colonic transit or rectal evacuation disorders; this type of constipation is called functional constipation

 **QUALITY OF LIFE**



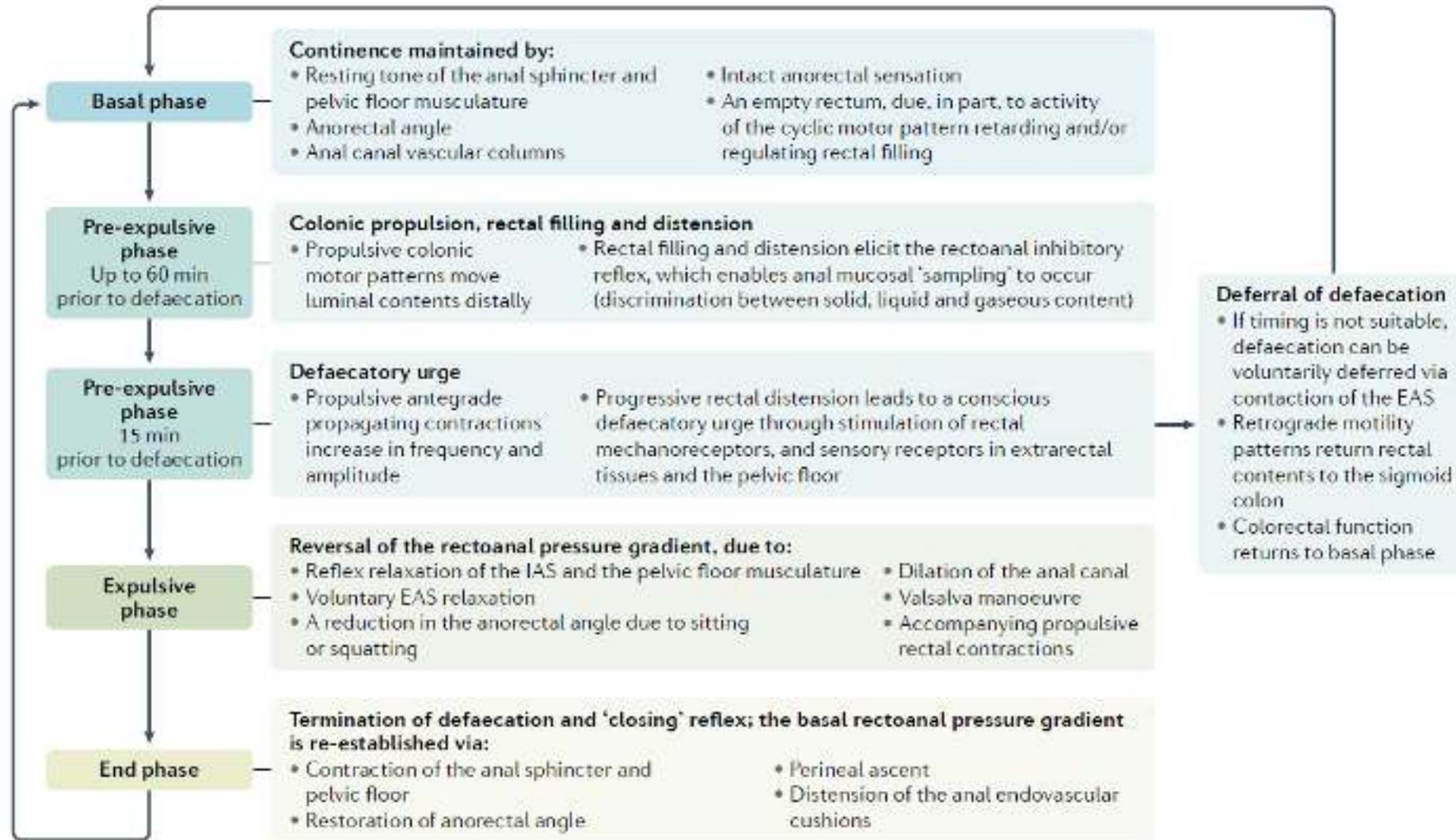
Key aspects of

- Distention
- Abnormal neu
- pilonidal dimple
- tuft
- abnormal pigm
- lower spine
- perianal skin t

RED FLAGS – for immediate referral to paediatrician

- Symptoms that commence from birth or in the first few weeks
- Failure or delay (>first 48 hours at term) in passing meconium
- Ribbon stools, leg weakness or locomotor delay
- Abdominal distension with vomiting
- Abnormal examination findings including:
 - Abnormal appearance of anus
 - Gross abdominal distension
 - Abnormal gluteal muscles, scoliosis, sacral agenesis, discoloured skin, naevi or sinus, hairy patch, or central pit
 - Lower limb deformity including talipes
 - Abnormal lower limb reflexes or neuromuscular signs unexplained by existing conditions
- Other symptoms that cause concern

Tit'



Source:

Title

- 'gastrocolonic
- reflex'²⁴³. More recently, the colonic meal response was
- hypothesized to be a neurohormonal response to gastric
- distension in humans, causing the release of neuropeptides
- including cholecystokinin, serotonin, neurotensin
- and gastrin²⁴⁴.

Source:

Title

- The colon receives approximately
- 1,500 ml of liquid enteric content (chyme) per day
- Mean colonic transit time
- is ~24 h, ranging between ~4 and 50 h
- 'to- and- fro' motions.
- regional
- transit time in the colon is not evenly distributed^{74,75}
- (Supplementary Fig. 1)

Source:

Title

- The motor patterns responsible for these
- movements might include low- amplitude propagating
- contractions, high- amplitude propagating contractions
- (HAPCs), the cyclic motor pattern and colonic
- pressurizations⁶⁹.

Source:

Title

- both propagating and non-propagating activity begins to increase up to 1 h prior to defaecation
- Importantly, these changes are not associated with any conscious awareness or urge. A series of antegrade propagating contractions sequentially originate at a more distal location
- distal transit of the capsule from the descending colon to the sigmoid colon 30–60 min prior to defaecation

Title

- The compliance of the rectal wall allows passive distension, but also adaptive reductions in rectal tone in response to distension, permitting storage of increasing volumes of content with minimal alteration in intraluminal pressure
- Rectal distension is detected by mechanoreceptors or rectal intraganglionic laminar endings¹¹⁰, which transmit this information along S2–S4 parasympathetic neurons in the pelvic splanchnic nerves to the spinal cord

Title

- Sensory receptors are also present in the extrarectal tissues and pelvic floor, as the defaecatory urge can still be perceived in patients following rectal excision with coloanal or ileoanal anastomoses
- rectal contractions are required to generate a conscious defaecatory urge
- Distension of the rectum beyond a threshold initiates the rectoanal inhibitory reflex (RAIR)¹¹⁶, that causes reflex relaxation of the IAS and contraction of the EAS.

Title

- The RAIR is an intramural reflex mediated by the myenteric plexus and is characteristically absent in Hirschsprung disease, in which the affected segment of rectum and/or colon lacks myenteric ganglia
- preservation of the RAIR in patients following spinal cord injury or following extrinsic denervation of the rectum

Source:

Title

- luminal content to be ‘sampled’ by the mucosa of the anal canal
- Sampling of content allows sensory discrimination between solid, liquid and/or gas
- The sensory information gathered from anal canal sampling is relayed to the lumbosacral defaecation centre in the spinal cord via parasympathetic neurons within the pelvic splanchnic nerves (S2–S4)
- A spinal cord reflex arc can mediate contraction of the EAS⁵⁶, while sensory information is additionally relayed to the brainstem and cerebral cortex via the spinothalamic tracts

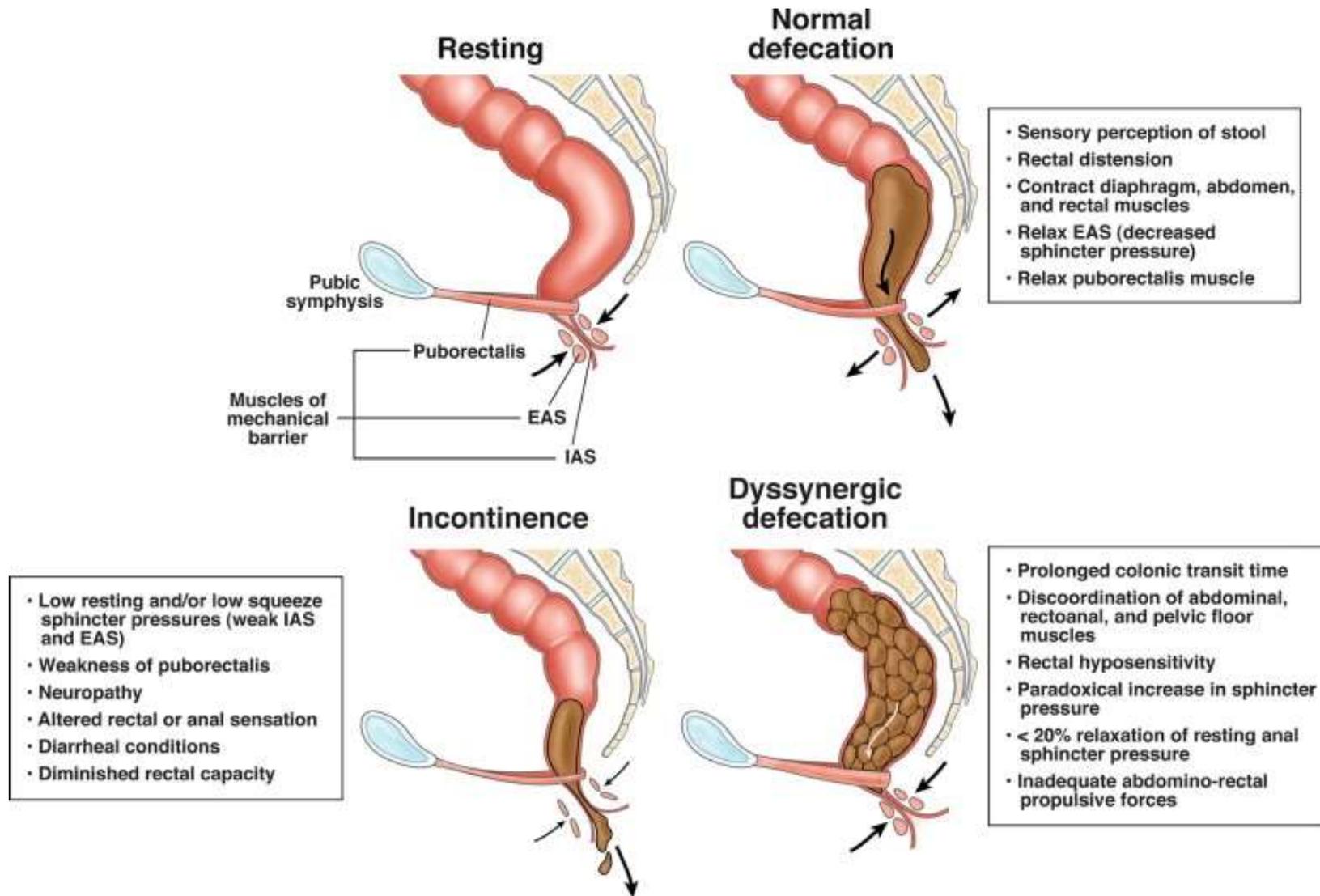
Source:

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- The conscious perception of rectal distension involves multiple cortical areas
- Cortical input is critical to both voluntary inhibition or initiation of defaecation; notably, patients with spinal cord injury who lack cortical input require stimulation via manual digitation to initiate defaecation

Source:

Title



Source:

Factors affecting defecation process

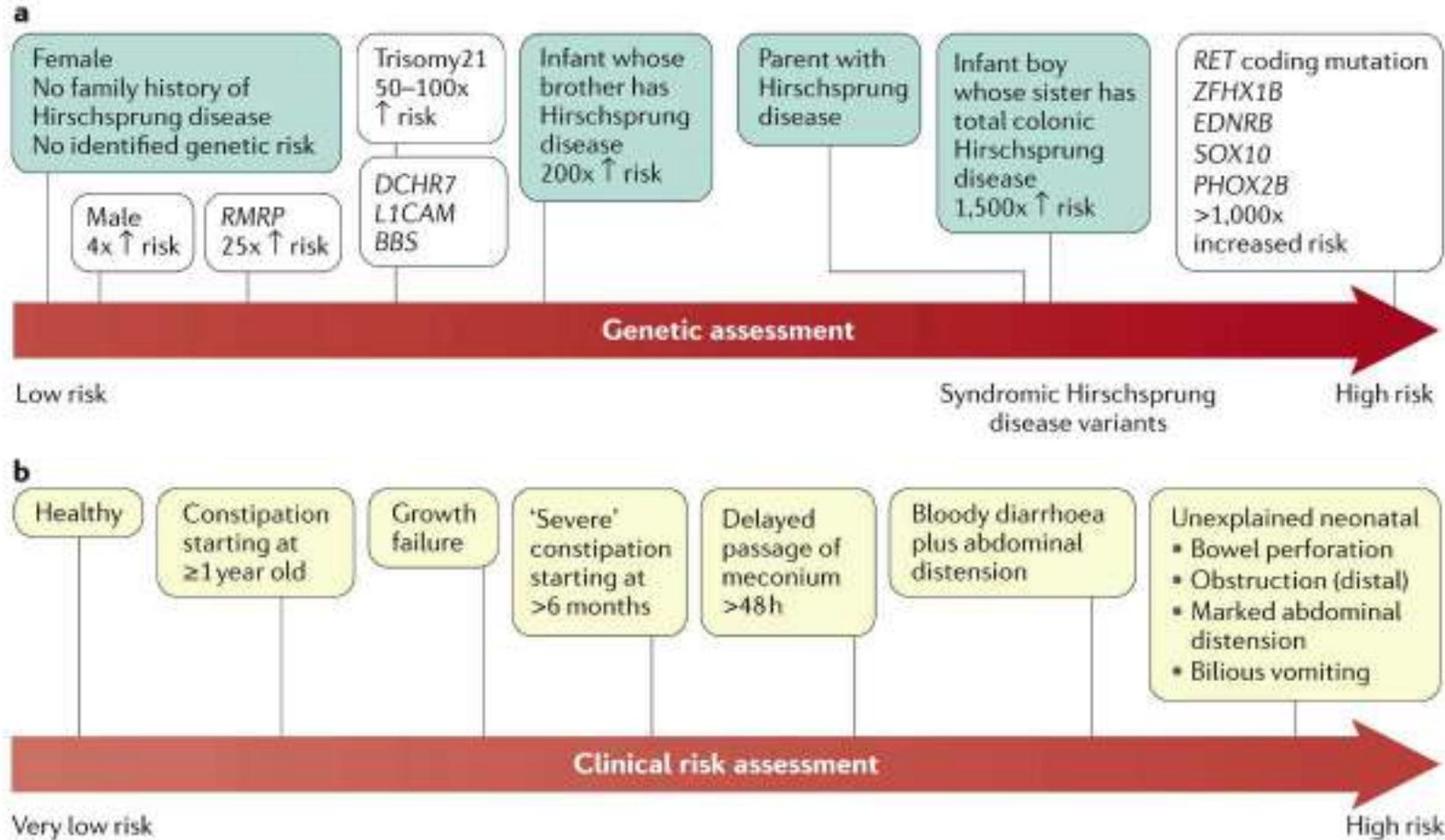
- Voluntary suppression or stool withholding
 - associated with painful or unpleasant defaecation
 - can result in faecal retention, constipation and overflow incontinence
- Stress, psychologic disorders, abuse
 - alterations in autonomic function, gastrointestinal motility, visceral afferent signalling
 - Symptoms can be compounded by hypervigilance, somatization and maladaptive illness behaviours
- Posture
 - Squatting increases hip flexion and posterior pelvic tilt, facilitating straightening of the anorectal angle
- Colonic transit, stool volume and consistency

Title

- whole- gut transit time was most strongly correlated with stool consistency, followed by stool volume
- Colonic transit and stool consistency are interrelated with colonic microbiota composition, diversity and metabolism
- colonic
- microbiota profile has a 94% accuracy for discriminating
- between healthy adults and patients with constipation
- (25 women in each group)228

Source:

Hirschsprung disease risk assessment



Role of labs - celiac



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Original Article

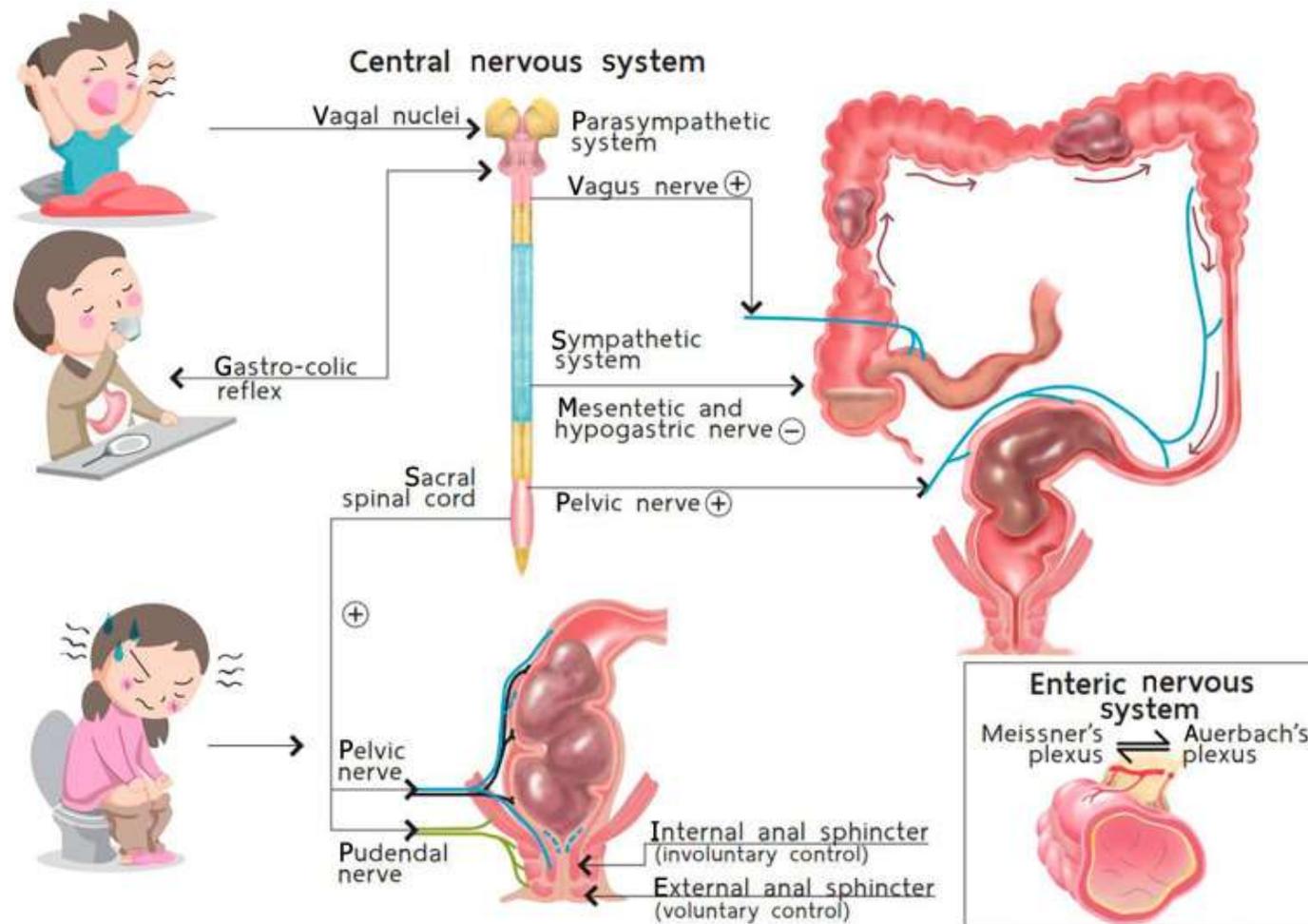
Celiac Disease in Children with Functional Constipation: A School-Based Multicity Study

[Amanda C. Fifi MD¹](#), [Carlos Velasco-Benitez MD^{2,3}](#), [Miguel Saps MD¹](#)

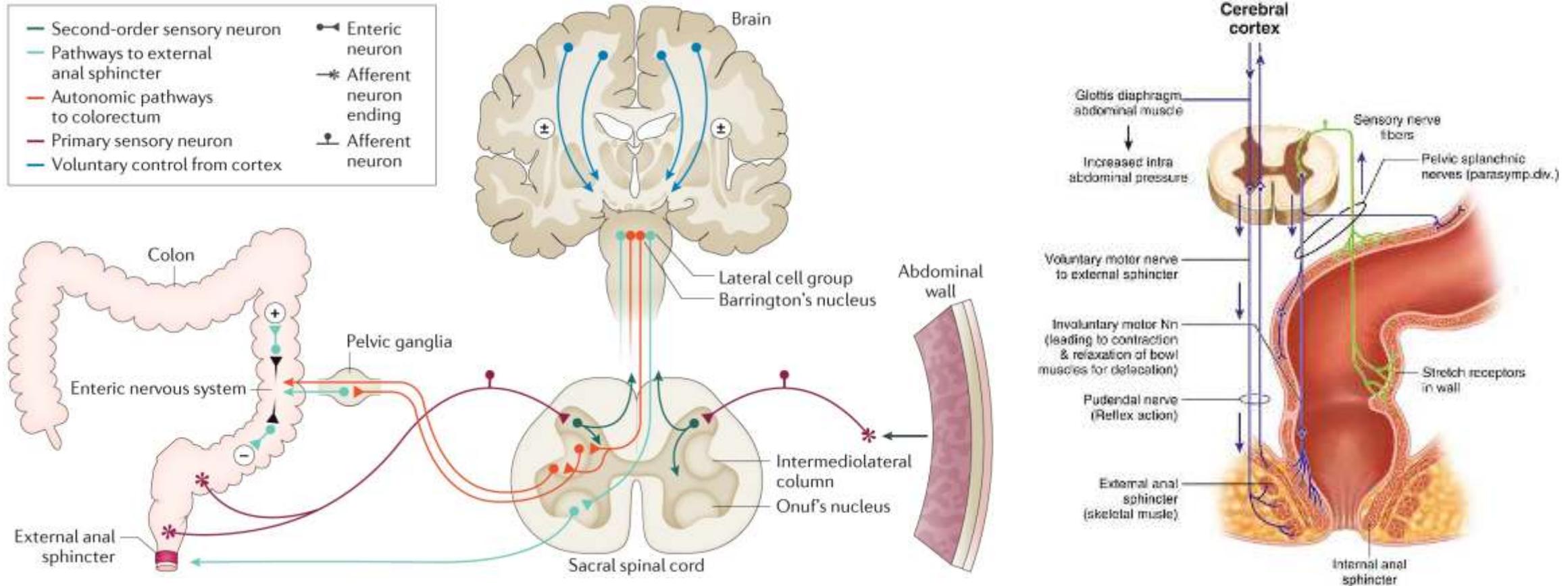
- 1809 schoolchildren in Colombia
- Rome questionnaire
- 203 with functional constipation and 419 controls screened for celiac disease
- 1 (0.5%) in constipation group and 3 (0.7%) in control group diagnose with celiac disease

Physiology of defecation

- dependent on the coordination of neural, muscular, hormonal and cognitive systems.
- factors influence including gastrointestinal transit, stool volume and/or consistency, and dietary intake
- intrinsic neural innervation from the enteric nervous system
- extrinsic innervation (sympathetic and parasympathetic) from the lumbar nerves, and extrinsic innervation from the vagus nerve (proximal colon) and pelvic splanchnic nerves

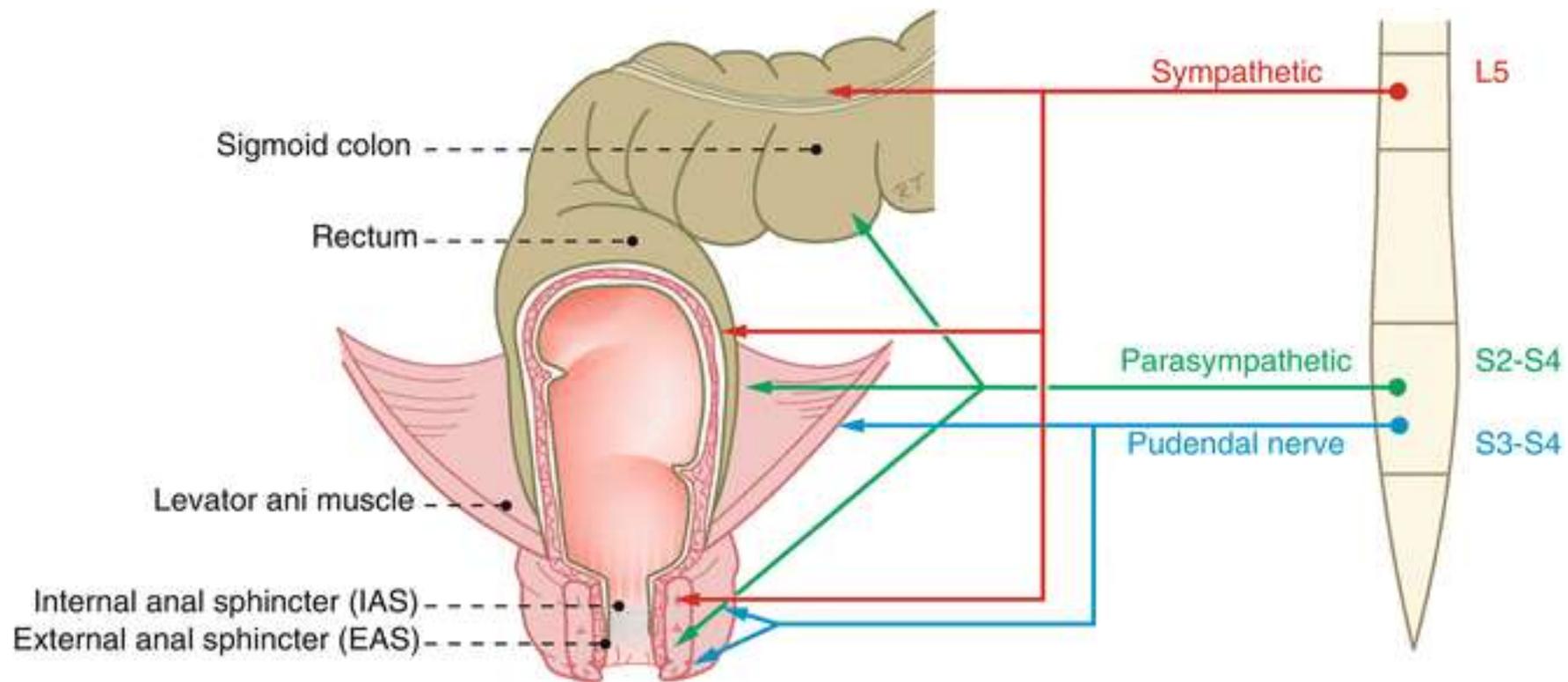


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Understanding the physiology of human defaecation and disorders of continence and evacuation

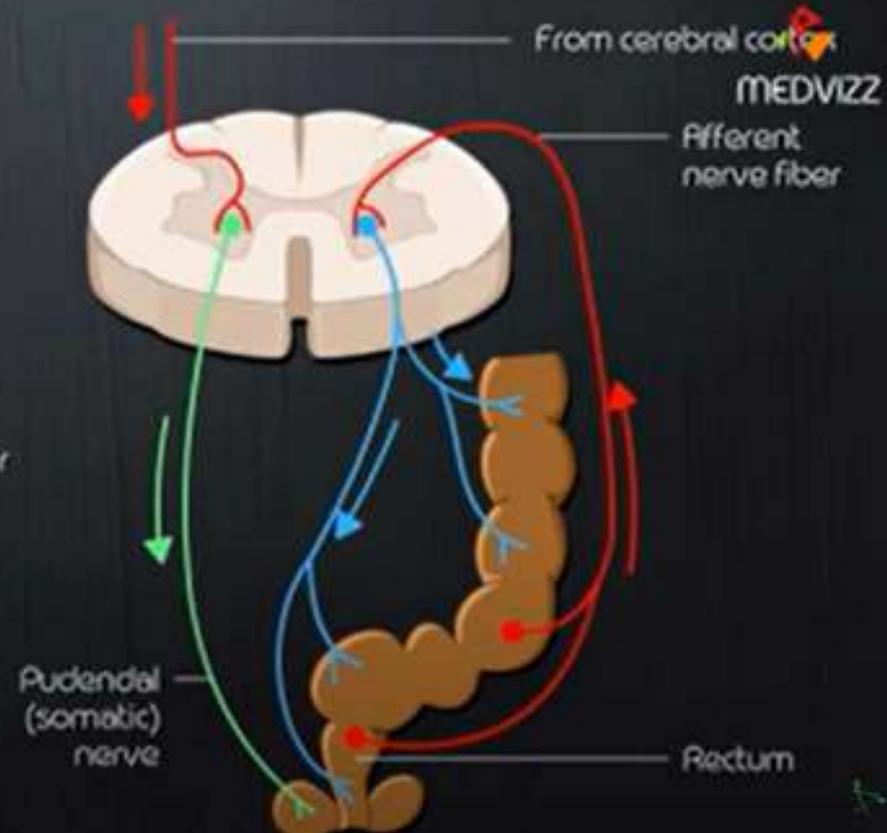
- A spinal cord reflex arc can mediate contraction of the EAS
- sensory information is additionally relayed to cortex
- Cortical input is critical to both voluntary inhibition or initiation of defaecation
- patients with spinal cord injury who lack cortical input require stimulation via manual digitation to initiate defaecation

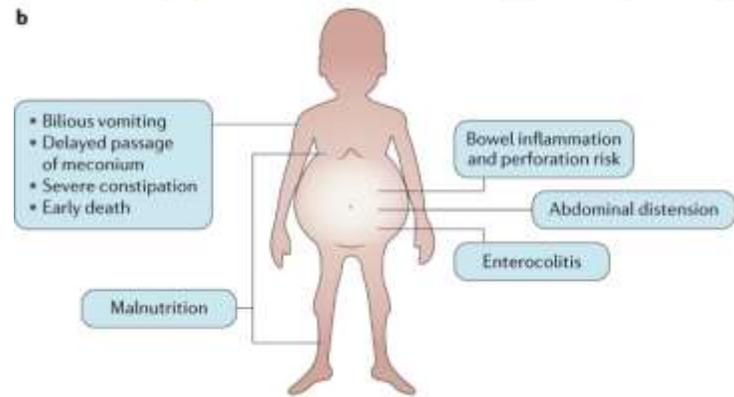
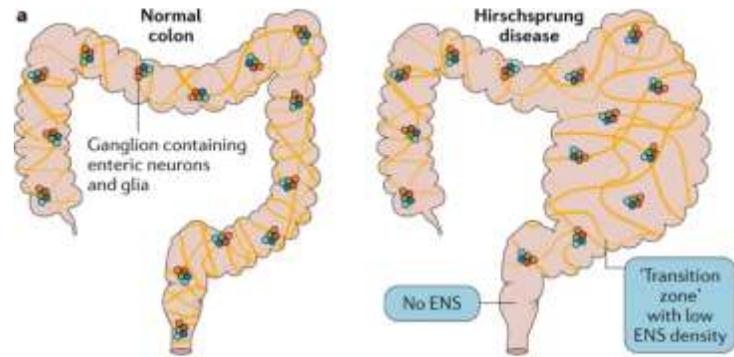


DEFECATION

II. Pathway for defecation reflex

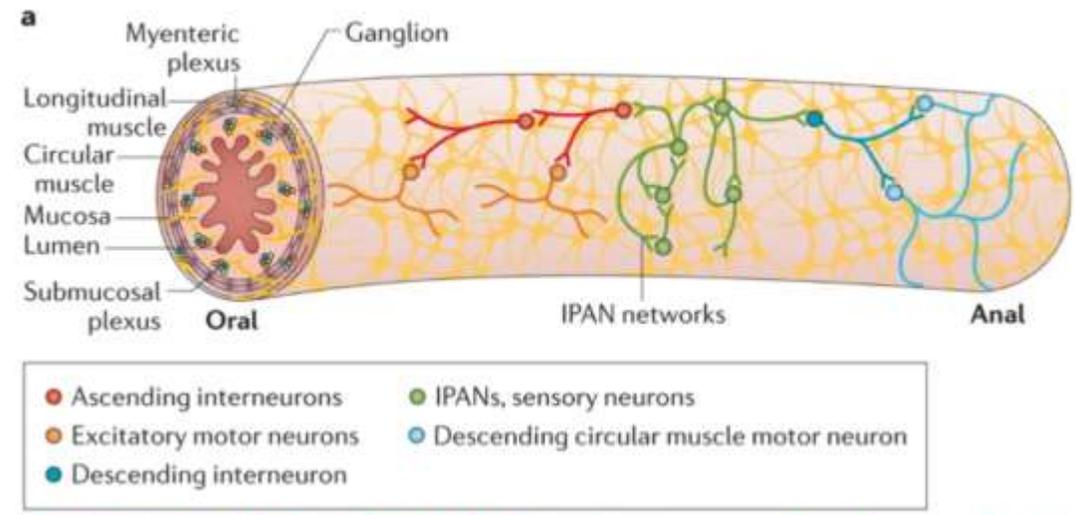
- Entry of feces by mass movement
- Rectum is distended
- Sensory nerve endings are stimulated
- Impulses are transmitted via afferent fibers of pelvic nerve to defecation center
- Center sends motor impulses to the descending colon, sigmoid, & rectum via efferent nerve fibers of pelvic nerve





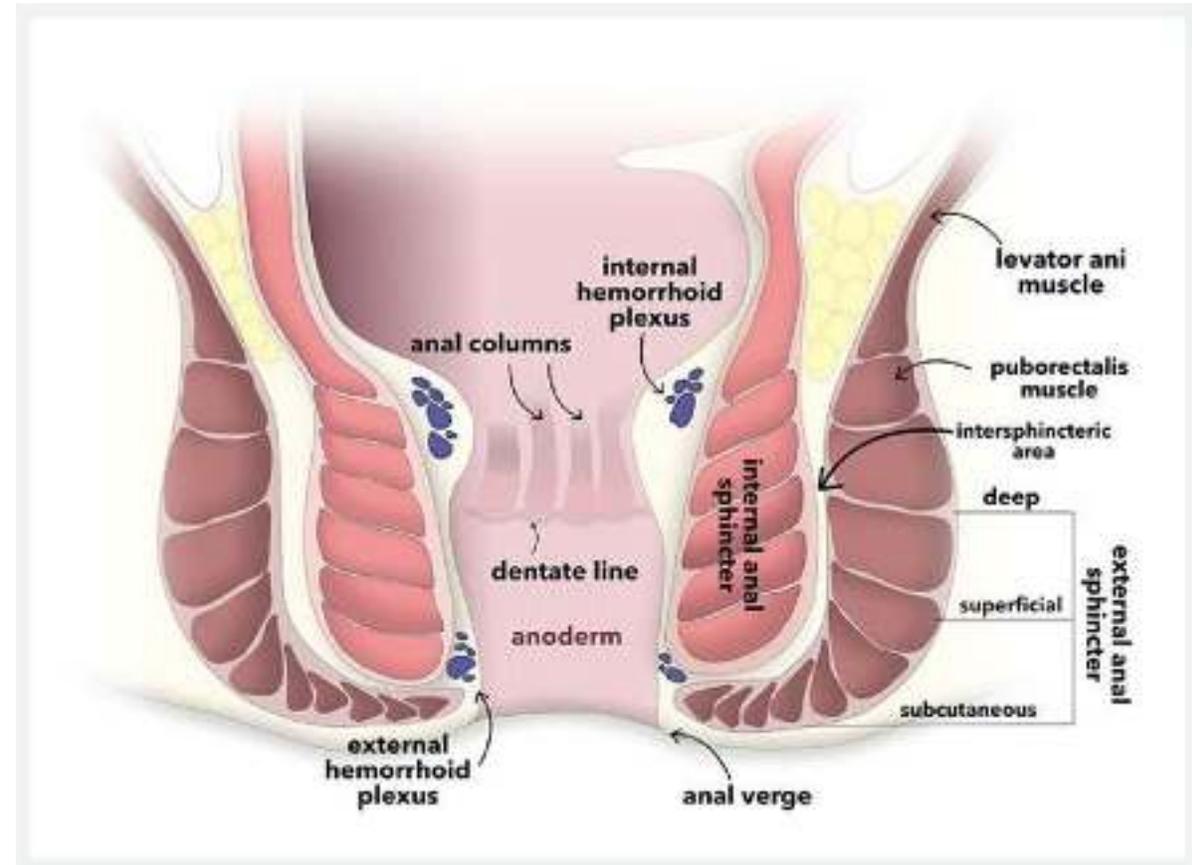
- Distension of the rectum beyond a threshold initiates the rectoanal inhibitory reflex (RAIR)
- intramural reflex mediated by the myenteric plexus and is characteristically absent in Hirschsprung disease
- preservation of the RAIR in patients following spinal cord injury

Figure 1: The enteric nervous system.



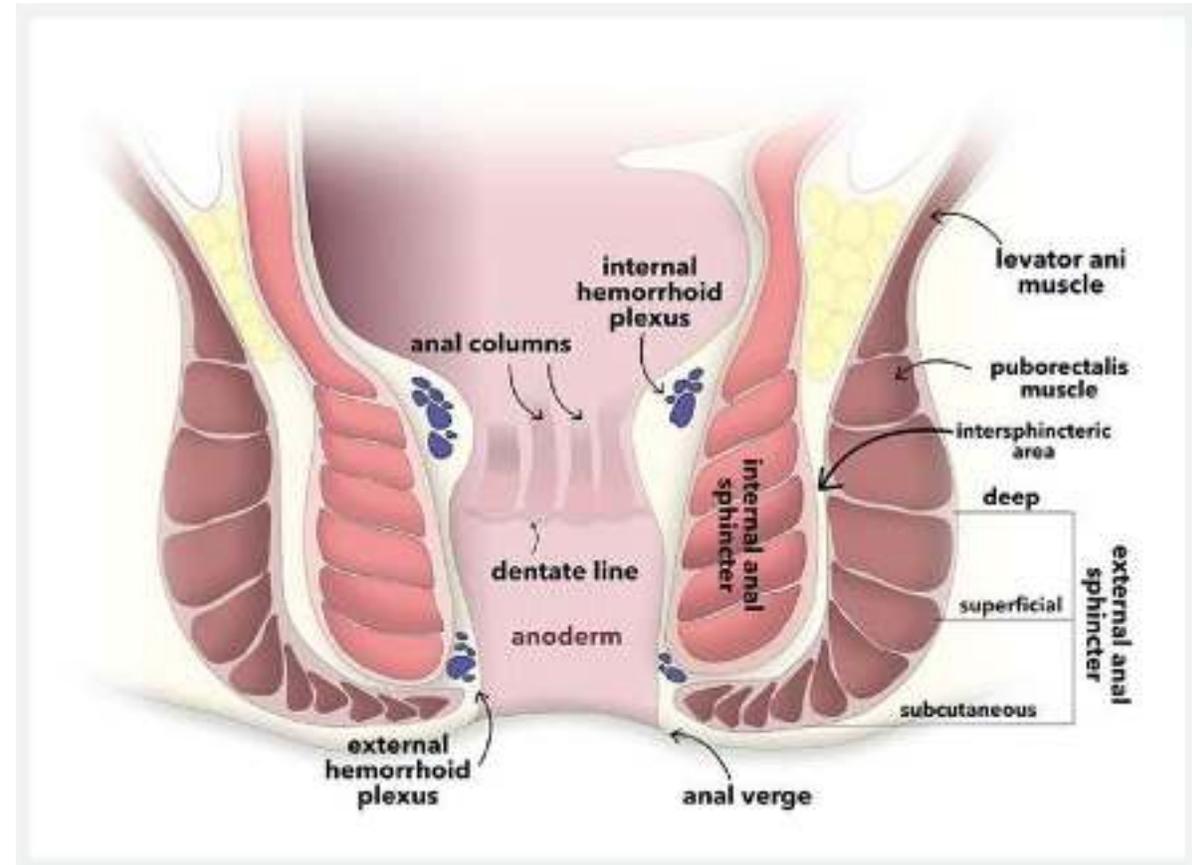
internal anal sphincter (IAS)

- Smooth muscle
- Not under voluntary control
- Relaxes via release of nitric oxide
- Resting tone is responsible for the majority (70–85%) of anal canal resting pressure

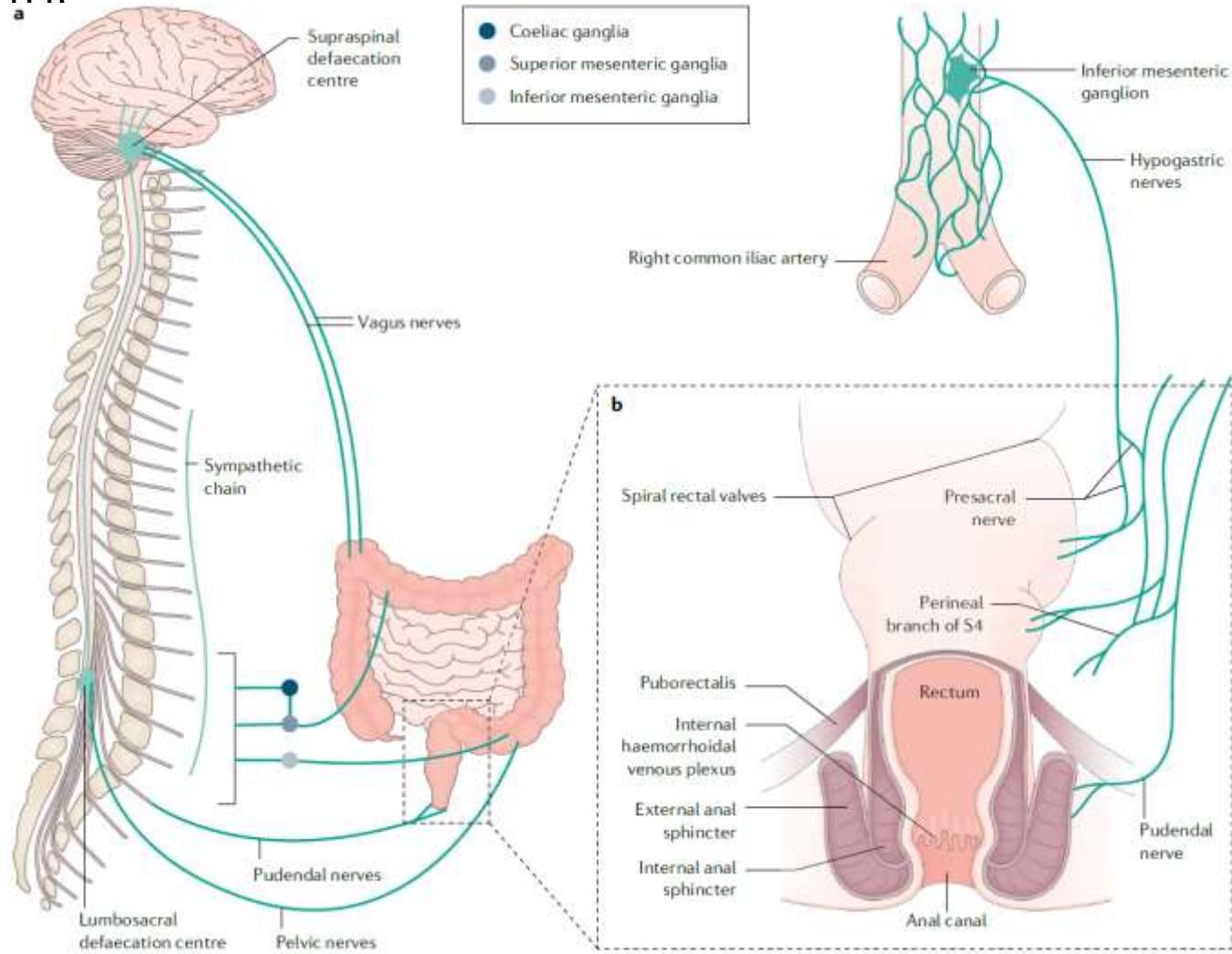


external anal sphincter (IAS)

- skeletal muscle
- under spinal and cortical control
- Generates maximal squeeze pressure and the acute voluntary control of continence
- Some of control also supported by musculature of pelvic floor



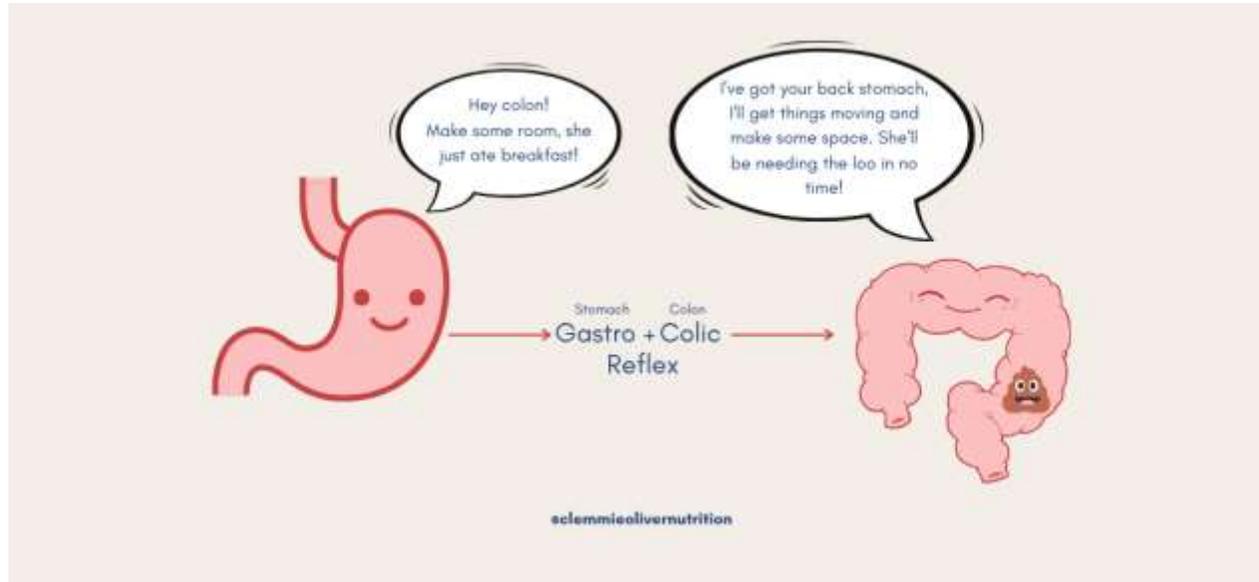
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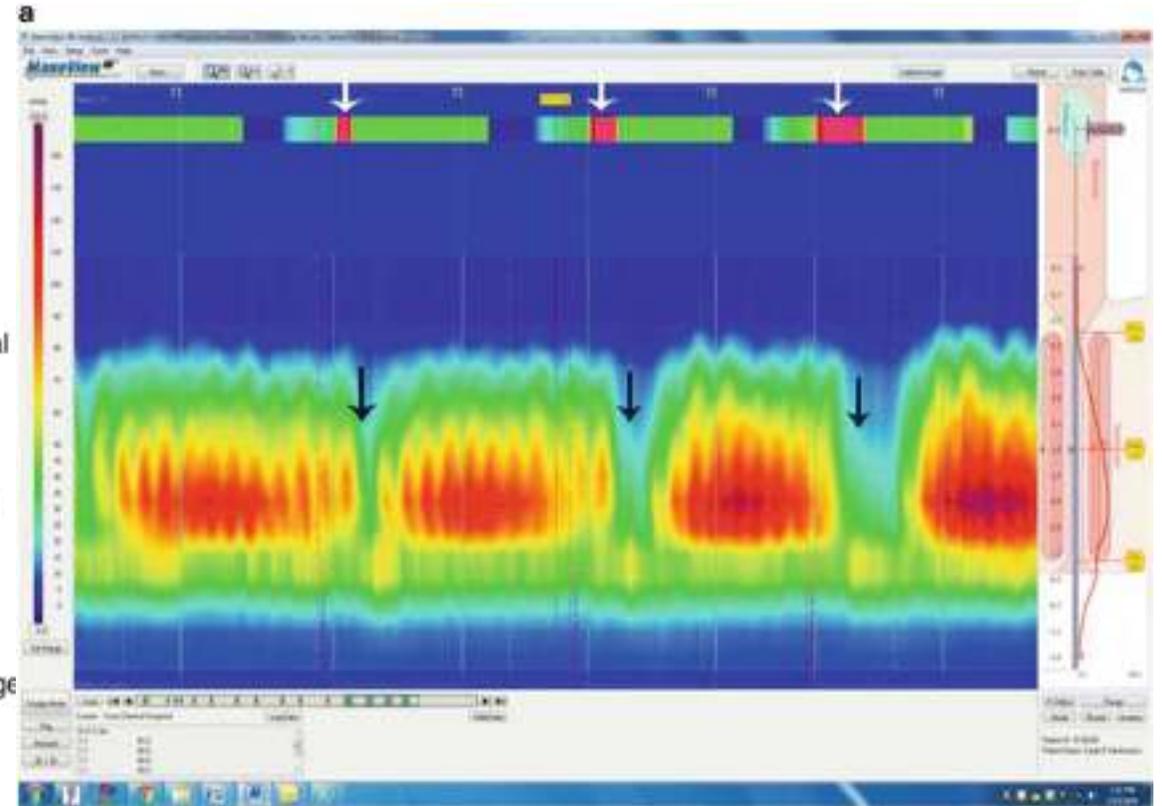
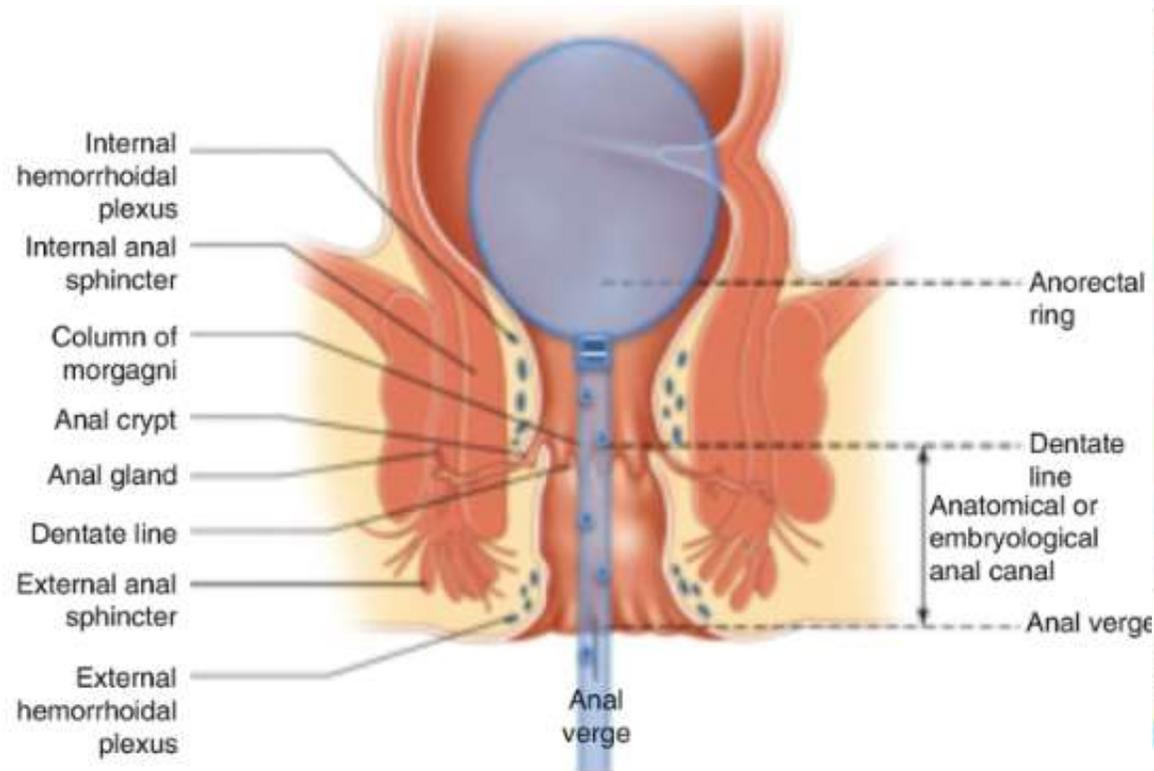
Source:

Gastrocolic reflex

- Frequency of propulsive HAPCs increases after a meal



Recto-anal inhibitory reflex (RAIR)



Fiber

- must resist fermentation to remain relatively intact throughout the length of the large bowel
- must significantly increase the percent water content of stool
- liquid stool is $\approx 90\%$ water content; soft stool is $\approx 77\%$ water; formed stool is $\approx 75\%$ water, and hard stool is $\leq 72\%$ water
- this 18-percentage point difference in water content represents a 240-fold increase in stool viscosity

Fiber

- effective fiber therapy will keep stools soft/formed, and significantly increase stool bulk
- ineffective fiber might add to the dry mass of stool, which would decrease the percentage of stool water content and result in harder stools

Other Definitions

- *“difficulty with defecation for at least 2 weeks, which causes significant distress to the patient”*
- **Intractable Constipation:** Constipation not responding to optimal conventional treatment for at least 3 months.
- **Fecal Impaction:** A hard mass in the lower abdomen ; or a dilated rectum filled with a large amount of stool ; or excessive stool on x-ray.
- **Infant dyschezia:** 10+ minutes of straining and crying before successful passage of soft stools, in the absence of other health problems

Title

- Dietary fiber
 - Soluble and insoluble
- Fluid intake
- Behavioral therapy

