



# **Intractable constipation in children : A challenging problem**

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**Toward Good Health and  
Well-being of Children**



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# Disclosure

**No conflict of interest**

# **Objectives : To discuss**

- 1. How to approach childhood intractable constipation**
- 2. The diagnosis and management of intractable constipation, caused by defecation disorder as well as slow colonic transit**

# Intractable constipation : Definition

- **Constipation not responding to optimal conventional treatment for at least 3 months.**

*ESPGHAN and NASPGHAN. JPGN 2014;58:258-74.*

# **A case study : A 12-years old girl**


- **A 6-years history of constipation**
- **Defecated every 1-2 weeks, hard stools, spending >30 mins in the toilet, sometimes needing digital evacuation, with abdominal pain and loss of appetite**
- **Failure of treatment with milk of magnesia, senokot, bisacodyl, and tegaserod**
- **Very anxious about constipation**
- **Past history and physical examination were unremarkable**
- **Normal initial investigation**



**How should we do  
for this patient ?**



# Chronic treatment-resisted constipation : How to approach

- To evaluate** 
1. Proper laxative dosage
  2. Compliance
  3. Child abuse/sexual abuse
  4. Occult organic diseases

Internal anal sphincter  
achalasia

**Spinal defects**

**Dyssynergic defecation and slow colonic transit are the most common abnormalities underlying intractable constipation.**



# Colonic transit study in children with intractable constipation

	Normal	Slow transit	Outlet obstruction
<b>Radionuclear (N=101)</b> <i>(Cook BJ, et al. J Ped Surg 2005)</i>	25	50	26
<b>Radiopaque markers (N=28)</b> <i>(Gutierrez C, et al JPGN 2002)</i>	50	13	37 <sup>a</sup>

<sup>a</sup>64% showed dyssynergic defecation by anorectal manometry (ARM)

# **Intractable constipation (based on colonic transit study)**

- 1. Slow colonic transit**
- 2. Outlet obstruction (dyssynergic defecation)**
- 3. Normal**

# Dyssynergic defecation in children

## Theories to explain :

- Children may condition themselves to contract the EAS and close the anus in response to the urge to defecate.
- Could be due to painful bowel movements, trials to postpone defecation, faulty learning.

**Abnormal defecation dynamics are considered to be a behavior, rather than a pathophysiological disorders.**

# What defects could lead to slow colonic transit constipation ?

## Primary alteration of colonic motility

- Low substance P (tachykinin) – smooth muscle contraction
- Abnormalities in nitric oxide synthase and VIP – smooth muscle relaxation
- Loss of interstitial cell of Cajal – intestinal pacemakers

*Lyford GL, et al. Gut 2002.*

*King SK, et al. Neurogastroenterol Motil 2010.*

## Secondary to massive chronic fecal retention

*Southwell BR, et al. J Paediatr Child Health 2005.*

*Mugie SM, et al. Nat Rev Gastroenterol Hepatol 2011.*

# Colonic and anorectal functional testing

## Defecatory function

**Balloon expulsion test**

**EMG**

**Anorectal manometry**

**Defecography**

## Colonic function

**Colonic transit**

**Radiopaque markers**

**Scintigraphy**

**Colonic manometry**

**Wireless motility capsule**

# Diagnostic procedures in disordered defecation

## 1. Balloon expulsion test

A 4-cm-long balloon, filled with 50 mL of warm water is placed in the rectum

Positive - Fails to expel a rectal balloon by 1-3 mins

Sensitivity 50%, false positive 0-16%

78% agreement with ARM

*Rao SSC. Gastroenterol Clin N Am 2008;37:569-86.*

*Rao SCC, et al. Am J Gastroenterol 2005;100:1605-15.*

*Wald A. JAMA 2016;315:185-91.*

## 2. EMG – Recording myoelectrical activity of the ext. anal sphincter

## 3. Anorectal manometry (ARM)

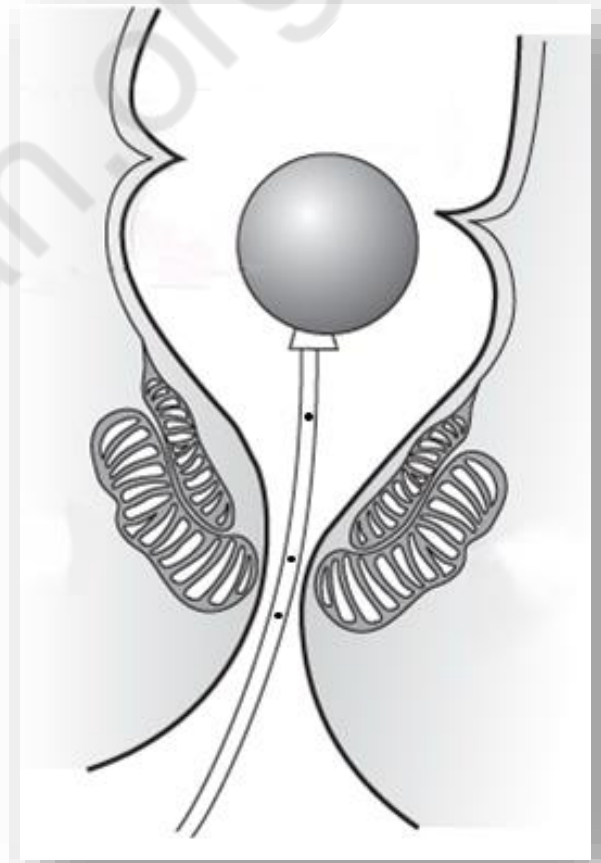
Providing a comprehensive assessment of anorectal pressure activity, RSR, rectal sensation

False positive 22-26%

*Rao SSC. et al. Am J Gastroenterol 1999;94:773-83.*

*Rao SCC, et al. Am J Gastroenterol 2006;101:2790-6.*

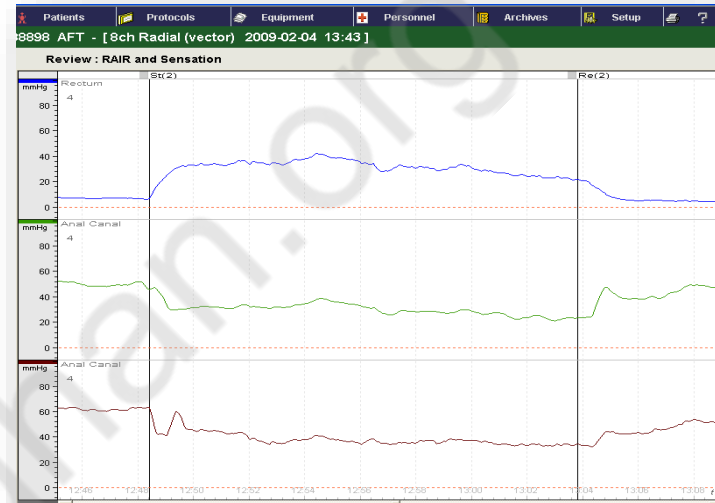
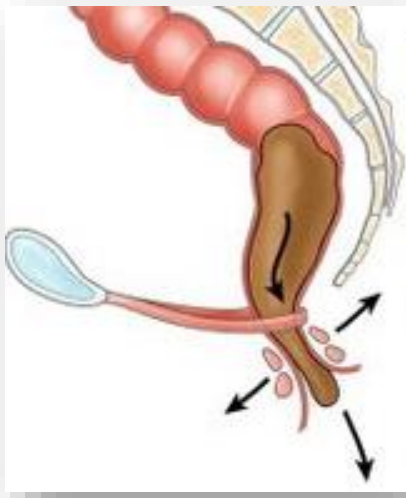
# Anorectal manometry



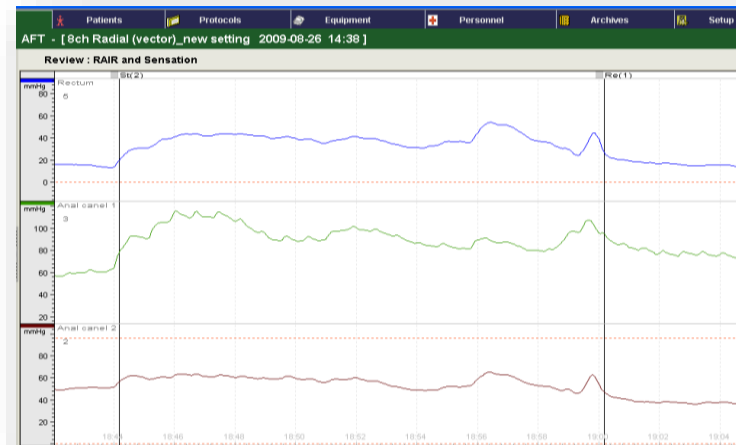
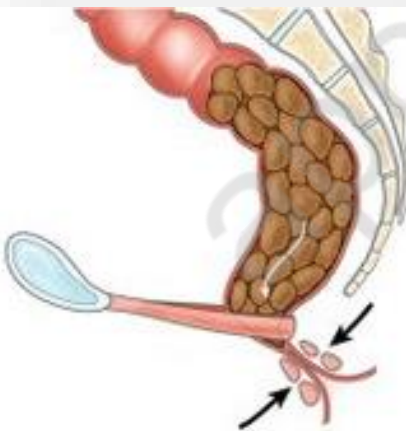


# Pattern of defecation dynamics

## Normal defecation



## Abnormal defecation



# Colonic transit study

## Radiopaque marker technique

### Single capsule (Sitz Mark)

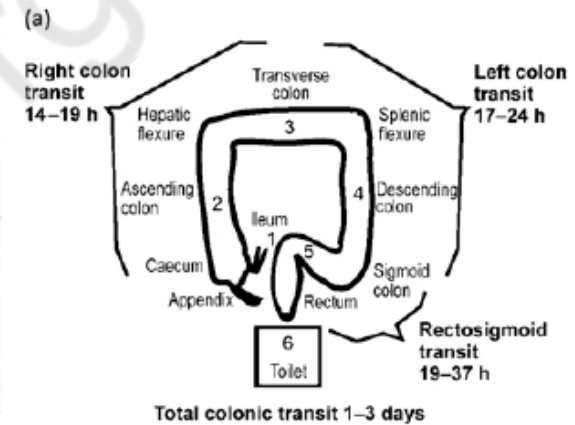
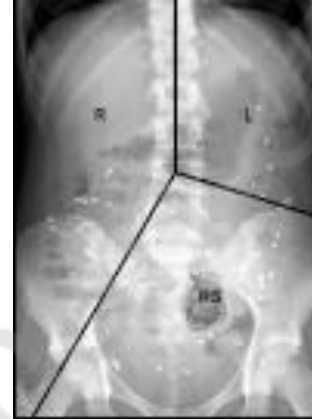


Colonic inertia



Dyssynergic defecation

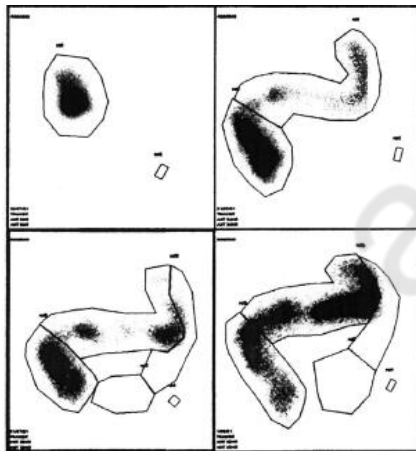
### Multiple capsules



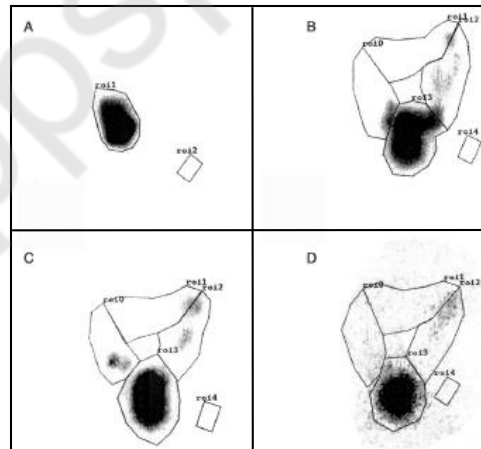
Eun Ran Kim, et al.  
*J Neurogastroenterol Motil*  
2012.

Southwell BR, et al. *J Paediatr Child Health* 2005.

## Radionuclear technique



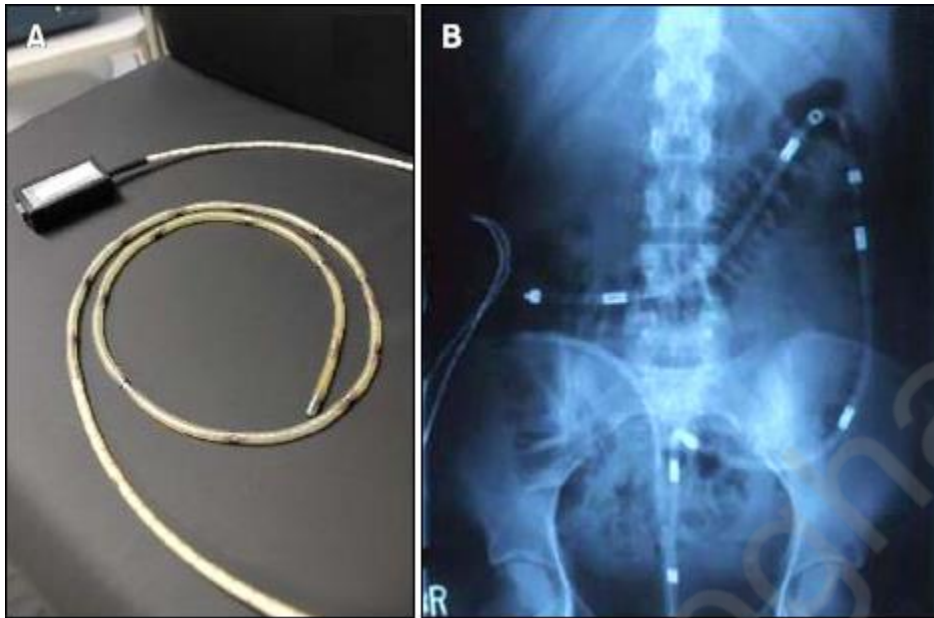
Colonic inertia



Dyssynergic defecation

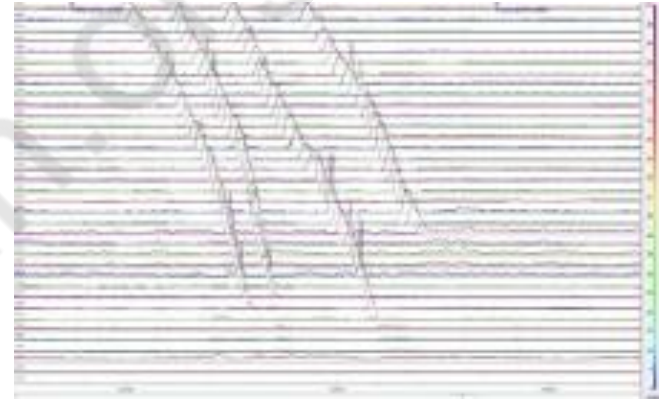
Cook BJ, et al. *J Pediatr Surg* 2005;40:  
478-83.

# Colonic manometry



*Lee YY, et al. J Neurogastroenterol Motil 2014*

**High amplitude propagating contraction (HAPCs)**



*Radiguez L, et al. Neurogastroenterol Motil 2016*

## **Indication :**

- 1. To confirm colonic inertia**
- 2. Help in planning surgical interventions (ACE, diverting ileostomy, re-anastomosis of a diverted colon, colonic resection)**

# Treatment of intractable constipation in children

## **Dyssynergic defecation**

**Biofeedback therapy**

**Measures to decrease anal sphincter tone**

**Anal sphincter botulinum toxin injection**

**Anal dilatation**

**Anal sphincter myectomy**

## **Slow colonic transit**

**Colonic irrigation**

**Transanal irrigation**

**Antegrade colonic enema (ACE)**

**Ostomy**

**Colectomy**

**Electrical stimulation**

**Sacral nerve stimulation**

**Transcutaneous interferential therapy**

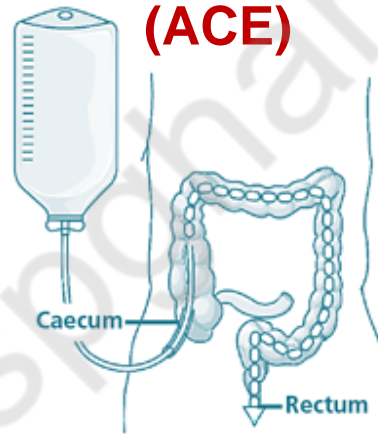
# Colonic irrigation

**Indication :** Slow transit constipation with severe fecal incontinence

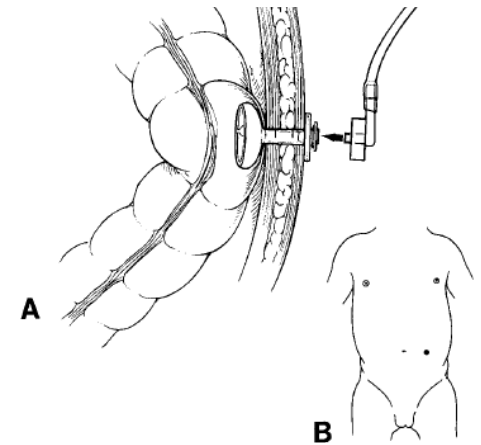
## Transanal irrigation



## Antegrade colonic enema (ACE)



## Lt. ACE (LACE)



## Long-term FU :

30-80% - improvement in colonic manometry post ACE

*Aspirot A, et al. J Ped Surg 2009.*

*Rodriguez L, et al. Neurogastroenterol Motil 2013.*

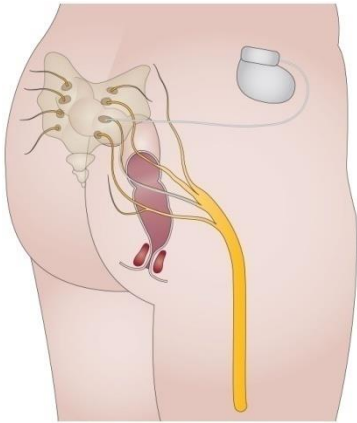
15-35% - discontinued ACE

*Jaffray B. J Ped Surg 2009. King SK, et al. J Ped Surg 2009. Rodriguez L, et al. Neurogastroenterol Motil 2013*

# Electrical stimulation

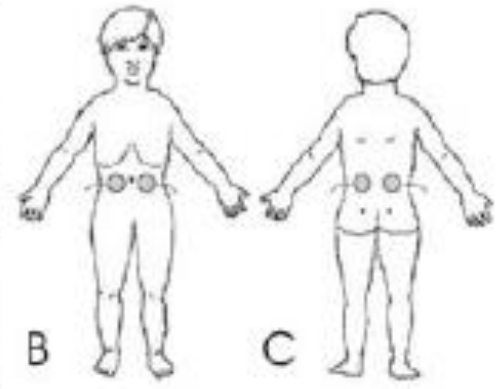
## Mechanism : Inhibition of sympathetic nerve

### Sacral N. stimulation



*Mitchell, PJ. et al. Nat. Rev. Gastroenterol Hepatol 2013.*

### Transcutaneous electrical stimulation (TES)

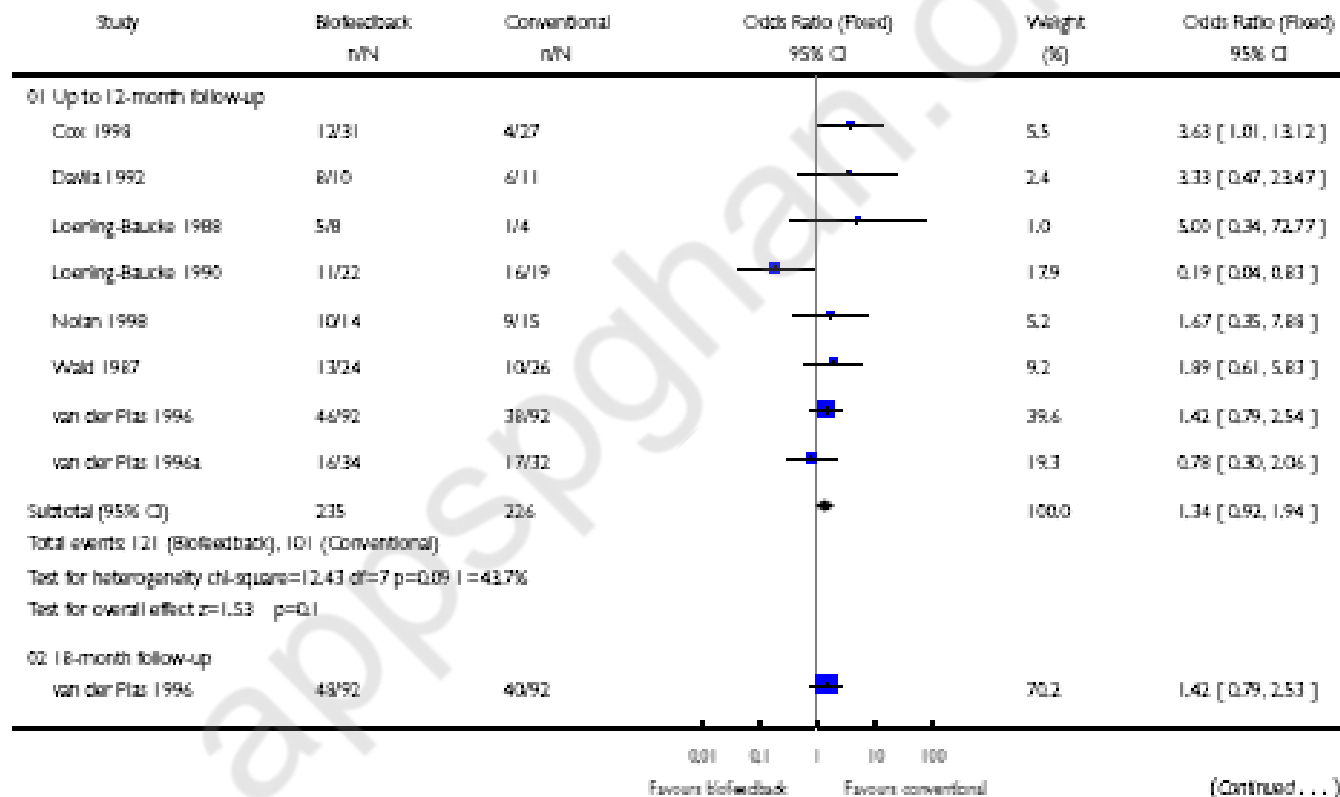


*Chase J , et al. J Gastroenterol Hepatol 2005.*

**How efficacious are these  
treatment ?**



# A Cochrane review in biofeedback treatment in pediatric functional constipation



# Current Surgical Management of Pediatric Idiopathic Constipation

**52 reports published during 1966-2014**

Procedure (no. of study)	Success (%)	Complications (%)
Botox injection (2 non - RCTs)	78-100	N/S
Myectomy (8 non - RCTs)	75-91	N/S
Anal dilatation vs. placebo (1)	86 vs. 74 <sup>a</sup>	N/S
Botox vs. myectomy (1)	85 <sup>a</sup>	N/S
ACE (25 non - RCTs)	33-100	5-100
Colectomy (10 non - RCTs)	22-100	6-60
Ostomy (5 non - RCTs)	83-95	10-25

N/S, not specified; <sup>a</sup> comparable

*Siminas S, et al. Ann Surg 2015;262:925-33.*

# Case study : progression



Barium enema



Colonic transit study

# Case study : progression

**Balloon expulsion test:**

**Failed 50 ml. water-filled balloon expulsion**

**Anorectal manometry:**



# **Diagnosis : Dyssynergic defecation**

**How do you treat this patient ?**

- A. Biofeedback**
- B. Botox injection of IAS**
- C. Anal dilatation**
- D. Anal sphincter myectomy**
- E. Antegrade colonic enema**

# Treatment

## Biofeedback Techniques

### Training

Diaphragmatic breathing exercise

Relaxing the anal sphincter through trial and error with the help of therapists and visual feedback

**Biofeedback device** : anorectal manometry

**No. of sessions** : usually 4-6 sessions; each session lasts 0.5 - 1 hr.

**Bisacodyl 2 tabs hs., MOM 30 ml hs.**

**2<sup>nd</sup> BF** - Relaxed the anal sphincter almost all attempts



**Clinical** – 2-3 bowel movements/wk.

**Rx** : MOM 30 ml hs., bisacodyl 1 tab hs.



## **After 2<sup>nd</sup> BF**

**2 wk**

**No abdominal pain**

**3 bowel movements/wk.**

**Rx : - Bisacodyl 1 tab in alternate day**

**MOM 30 ml hs.**

**- No more BF**

**6 wk**

**Passing stool within 5 mins everyday**

**MOM and bisacodyl were discontinued by herself**

**18 wk**

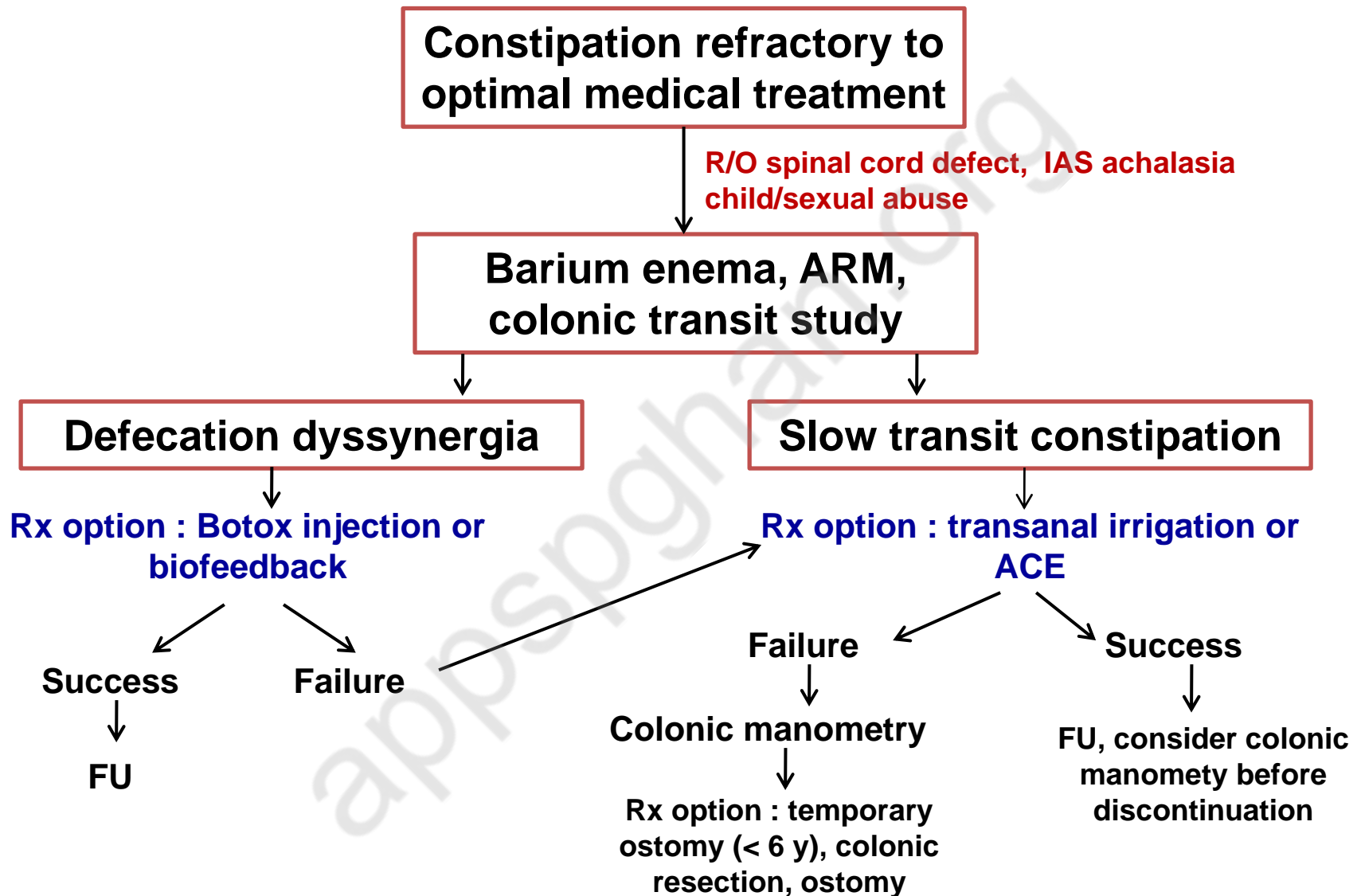
**Still improved**

**1 year (the last FU)**

**Having daily bowel movement**

**No abdominal pain**

# Management of intractable constipation : Summary





*Thank You*

appspgghan.org

**What happens to children with  
intractable constipation who  
receive ACE**

# ACE may improve colonic motility (CM)

	Baseline abnormal CM (n)	Normalization of CM after ACE (n; %)
<b>Aspirot A, et al. (N=7)</b> <i>J Ped Surg 2009</i>	6	5 (83)
<b>Rodriguez L, et al. (N=40)</b> <i>Neurogastroenterol Motil 2013</i>	34	13 (38)

# Is it possible to discontinue ACE ?

	Discontinued ACE (n; %)	Mean FU (yrs)
<b>Jaffray B (N = 80)</b> <i>J Ped Surg 2009</i>	<b>12 (15)</b>	<b>8.8</b>
<b>King SK, et al. (N = 42)</b> <i>J Ped Surg 2009</i>	<b>15 (35)</b>	<b>2.6</b>
<b>Rodriguez L, et al. (N = 40)</b> <i>Neurogastroenterol Motil 2013</i>	<b>11 (27)</b>	<b>4</b>