

# Getting to the Bottom of it: Conquering Benign Anorectal Disorders

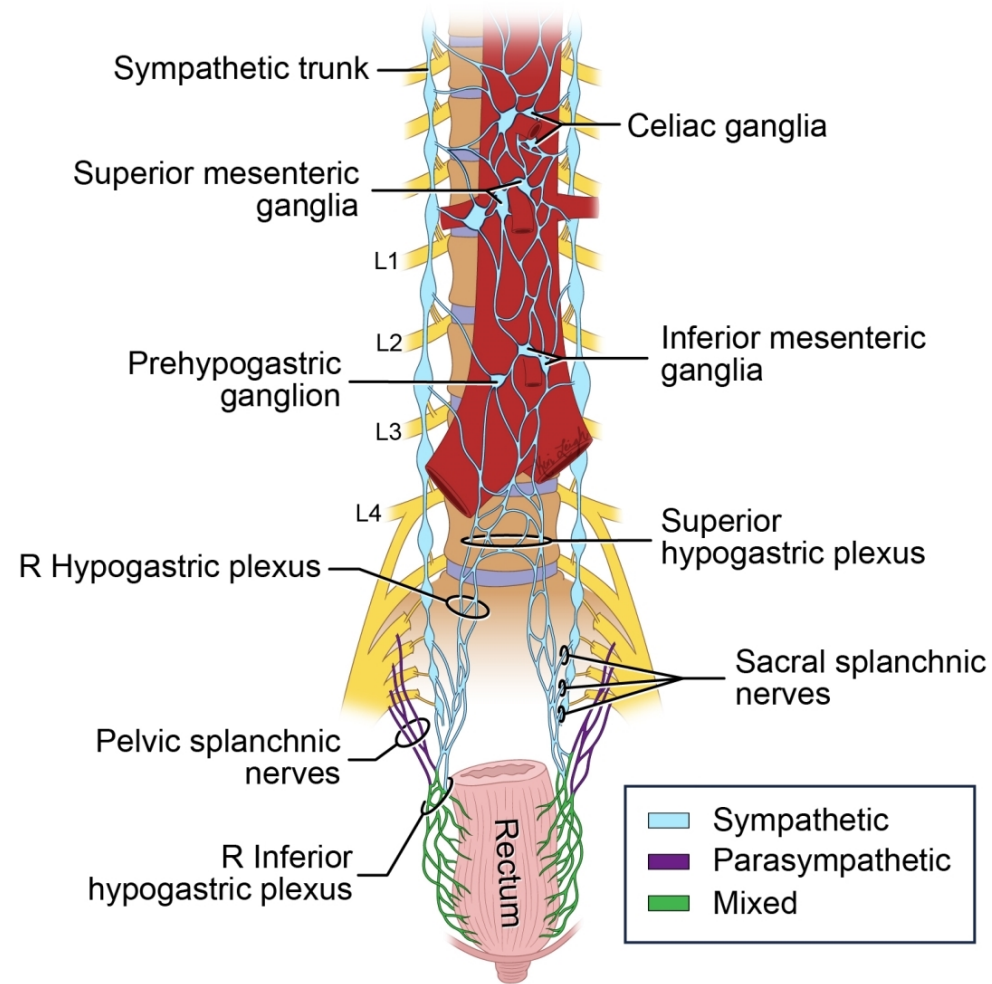


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Director, Neurogastroenterology/Motility  
Director, Digestive Health Clinical Research Center  
Medical College of Georgia  
Augusta University, Augusta, GA***

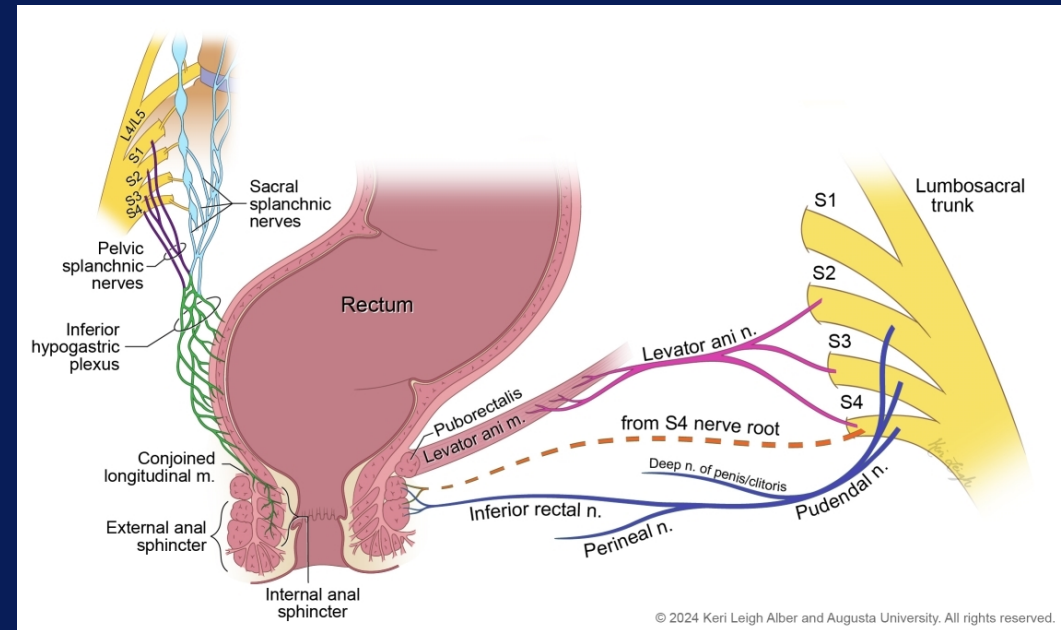
# OBJECTIVES

- **Pathophysiology of Anorectal disorders**
- **Evaluation of Anorectal disorders**
  - Digital Rectal Exam
  - Anorectal Manometry + BET+ Others
  - Translumbosacral anorectal magnetic stimulation (TAMS)
- **Discuss Treatment**
  - Dyssynergic Defecation
  - Fecal Incontinence
  - Anal Fissure
  - Hemorrhoids

# Neuroanatomy of the Anorectum



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- Sympathetic innervation arises from the superior hypogastric plexus, hypogastric plexus and splanchnic nerves (T1-L2).
- Parasympathetic from pelvic splanchnic nerves (S1-S4).
- Mixed autonomic from inferior hypogastric plexus.
- Somatic from pudendal nerves.
- Intercommunicating nerves.

# **Case Study**

## **41-yr-old school teacher**

- **Increasing constipation- 3 years**
  - **Now, B.M once every 1-2 weeks, hard, pellet-like stool only after phosphosoda enema + suppository and laxatives**
  - **Uses digital maneuvers, and describes excessive straining, incomplete evacuation and occasional bleeding**
  - **Tried OTC laxatives, linaclootide, PEG-no relief**
- **O/E: lower abdominal fullness**
- **What next?**



# Evaluation of Anorectal Function

- History
- DRE
- Stool diary



*Constipation APP*

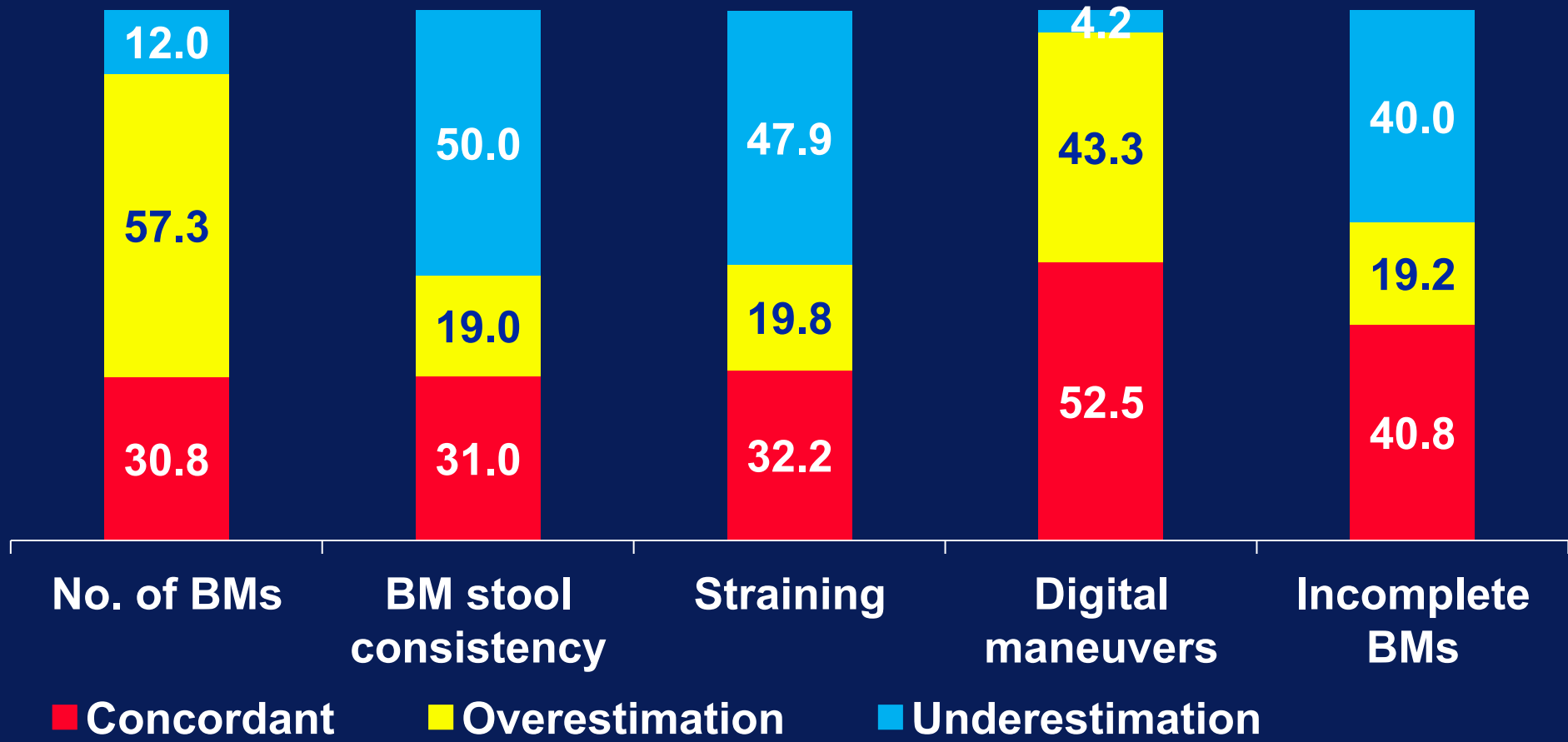


*Fecal Incont. APP*

- Anorectal high resolution manometry
- Anal Endosonography
- Rectal Compliance Test
- Pudendal Nerve Terminal Latency
- Balloon expulsion test
- Defecography

- Anal High Definition Manometry
- Translumbosacral Anorectal Magnetic Stimulation (TAMS)

# How accurate is constipation history? Recall vs Prospective Stool diary



# Constipation APP vs Paper Diary



*Constipation APP*

	Test-retest/Reliability (n=16)				Validity (n=16), APP vs Paper			
	First week	Second week	ICC	P	APP	Paper	ICC	P
<b>No. of BMs</b>	6.9 ± 1.0	5.2 ± 0.8	0.8	<0.0001	12.1 ± 1.7	12.8 ± 1.9	0.9	<0.0001
<b>No. of SBMs</b>	4.4 ± 1.3	3.4 ± 0.9	0.9	<0.0001	7.8 ± 2.1	10.3 ± 2.0	0.9	<0.0001
<b>No. of CSBMs</b>	1.9 ± 0.9	1.6 ± 0.7	0.9	<0.0001	3.5 ± 1.5	4.3 ± 1.6	0.9	<0.0001
<b>Time on toilet (min)</b>	9.4 ± 1.9	9.0 ± 2.0	0.9	<0.0001	9.1 ± 1.9	7.8 ± 1.8	0.9	<0.0001
<b>No. of Type 1-2 stools</b>	1.4 ± 0.8	0.9 ± 0.3	0.07	0.445	2.3 ± 0.8	2.6 ± 1.0	0.9	<0.0001
<b>No. of Type 3-5 stools</b>	3.2 ± 0.8	2.4 ± 0.7	0.2	0.345	5.6 ± 1.1	7.8 ± 2.1	0.8	0.0001
<b>Digital Use (n)</b>	2	2	0.6	0.043	3	3	1.0	1.000
<b>No. of Gas</b>	3.4 ± 0.8	2.4 ± 0.5	0.7	0.011	5.8 ± 1.2	8.4 ± 1.9	0.7	0.003
<b>No of Bloating</b>	5.1 ± 0.6	3.9 ± 0.6	0.8	0.003	9.1 ± 1.1	9.4 ± 1.8	0.8	0.004

*Who wants a Rectal exam?*



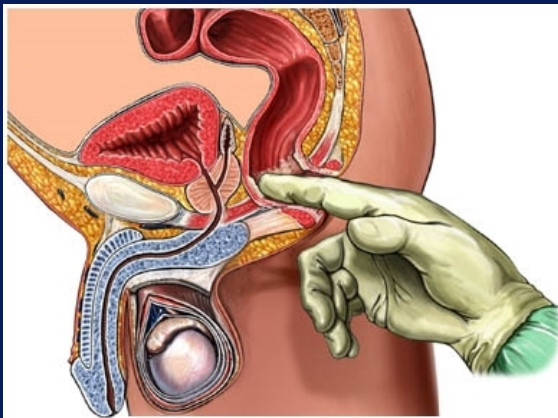
ao SS et al, Am J Gastroenterol 2018

**Rao SS et al, Am J Gastroenterol 2018**



# 3-step DRE-PROTOCOL

- 1) Inspection
- 2) Perianal sensation & anocutaneous reflex:
  - normal, impaired, absent
- 3) Digital maneuvers: mass, tenderness, stool
  - Squeeze x 2: normal, weak, increased
  - Bearing down x 2
    - push effort, sphincter relaxation, perineal descent

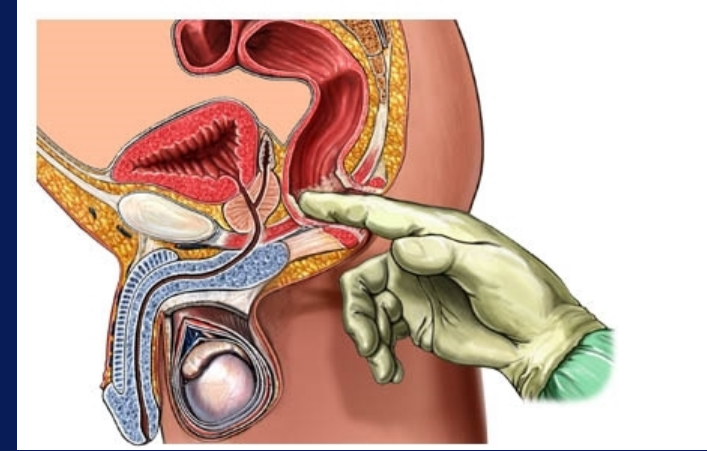


*Clinically dyssynergia if ... any 2;*

- inability to
  - contract abdominal muscles
  - relax anal sphincter
- paradoxical contraction of anal sphincter
- absence of perineal descent

# Yield of rectal exam in dyssynergia, n=209

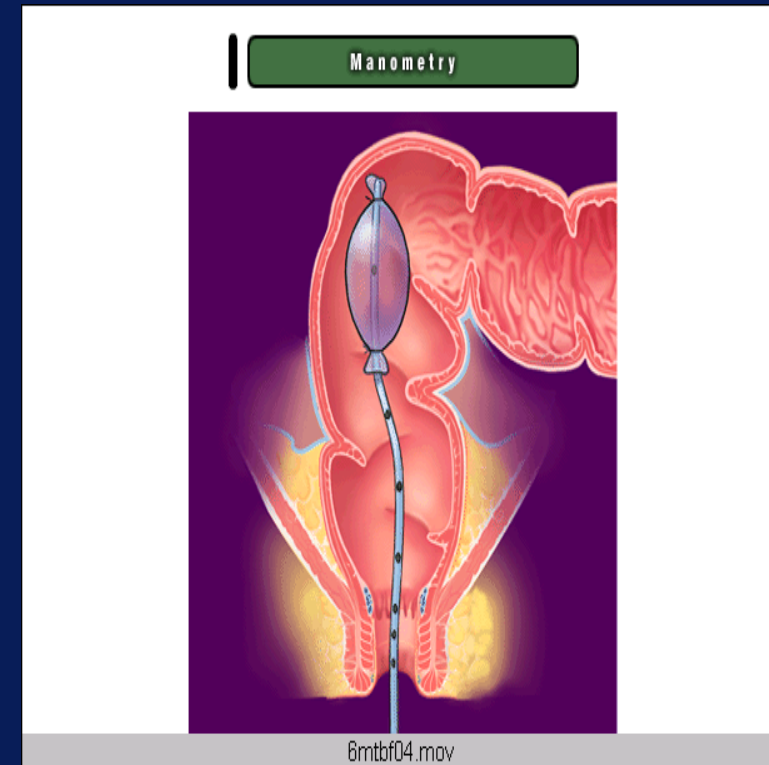
- All patients had
  - DRE
  - Anorectal manometry
  - Balloon Expulsion Test
- Data Analyzed independently



Parameter	Sensitivity (%)	Specificity (%)
Dyssynergia from DRE	75%	87%
Balloon expulsion test	49%	90%

# ANORECTAL MANOMETRY

- **Assessment of:**
  - **Pressure, Sensory and Reflex activity of the anus and rectum**
  - **Dynamics of defecation and continence.**





# Anorectal Manometry Probes

**Air-Charged  
disposable probe**



**High resolution probe**



**3D High-definition probe**



**Unisensor probe**



## Rao ARM Protocol

- Resting Pressure (5 min)
- Squeeze (30 s)
- 1 minute rest
- Squeeze (30 s)
- 1 minute rest
- Push/bear down (30 s)
- 1 minute rest
- Push/bear down (30 s)
- 1 minute rest
- Cough
- 30 s rest
- Cough
- 15 s rest
- Rectal sensation/Compliance/RAIR using intermittent rectal balloon distension technique
- Push on commode with 60 cc balloon (30 s)
- Balloon expulsion test ( 5 min)

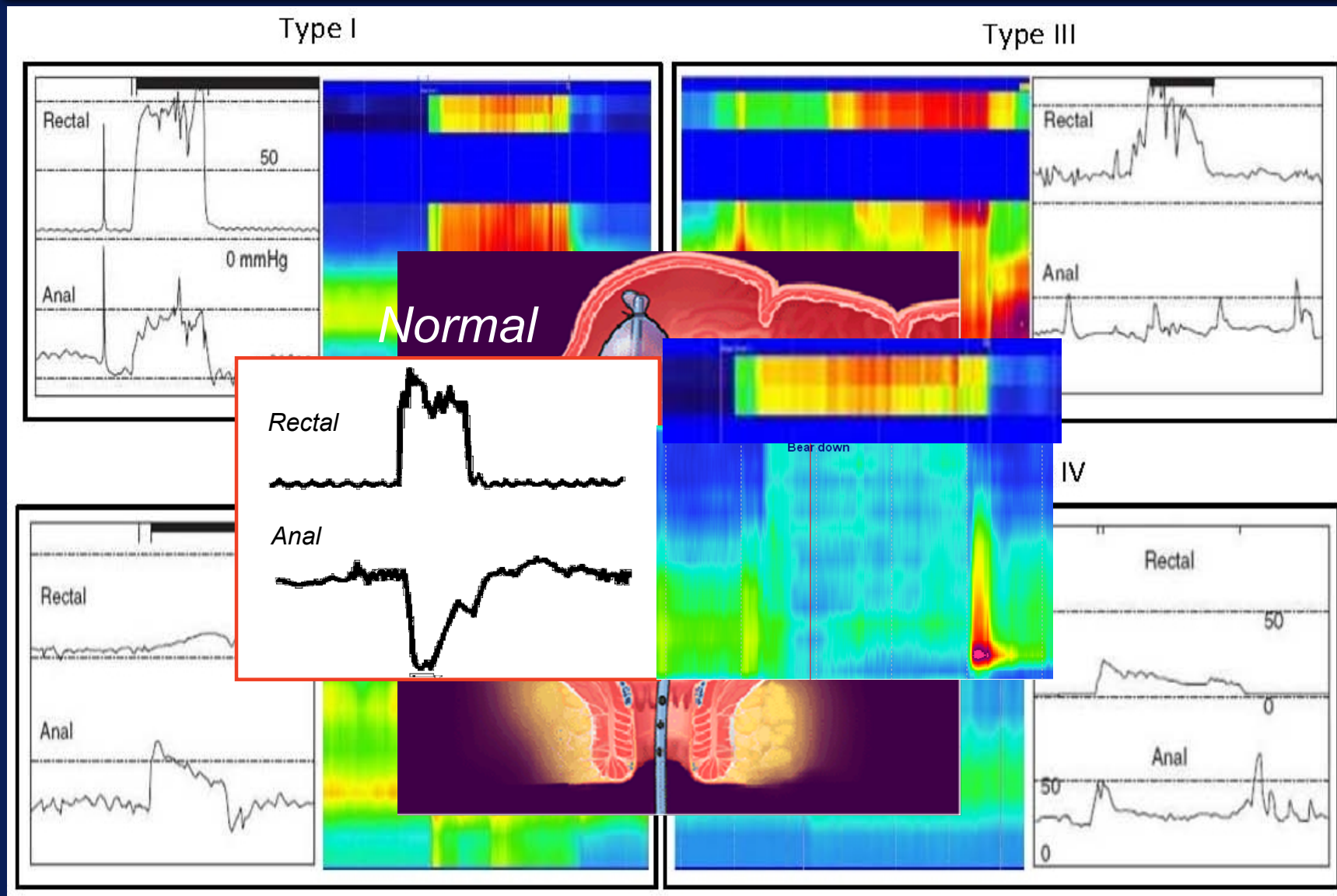
## IAPWG Protocol

- Stabilization period(3 min)
- Rest (60 s)
- Short squeeze (5 s) x 3
- Recovery interval (30 s) after each squeeze (x 3)
- Long squeeze (30 s)
- Recovery Interval (60 s)
- Cough x 3 (5 s)
- Recovery Interval (30 sec after each cough x 3)
- Push (15 s) x 3
- Recovery Interval (30 s) after each push x 3
- Rectal sensory testing ( 2 min)
- RAIR (60 s)

*Frye J, Rao SSC. Am J Gastroenterol. 2024; 119:1449-1455  
Carrington E, Bharucha A, Rao SSC et al Nature Rev Gastroenterol  
Hepatol 2018*

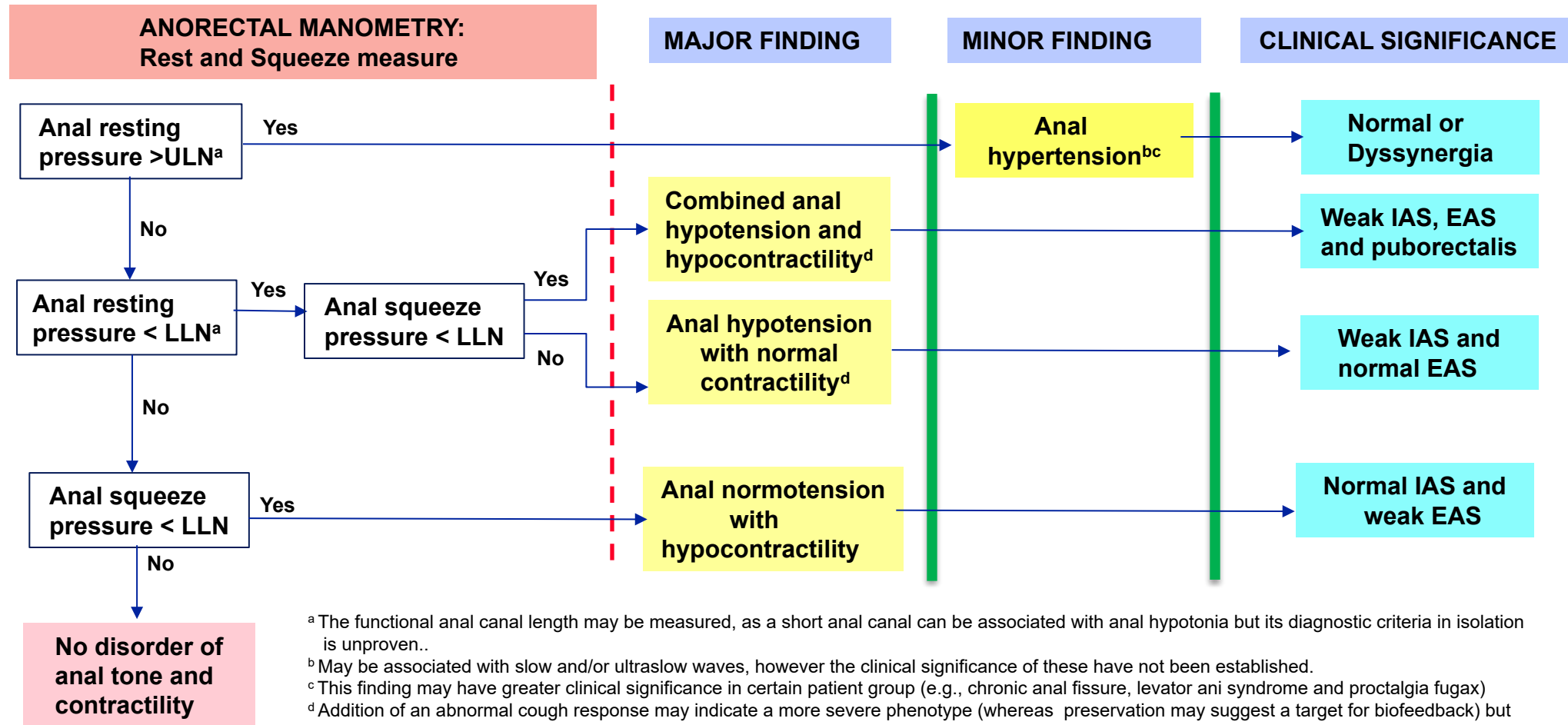


# Types of Dyssynergic Defecation



# London Classification

## LONDON CLASSIFICATION PART II: DISORDERS OF ANAL TONE AND CONTRACTILITY



modified

Carrington E, Heinrich H, Knowles C, Rao SS et al. *Neurogastroenterol Motil.* 2019.

LLN: Lower limit of normal  
ULN: Upper limit of normal

# Diagnostic Criteria-Dyssynergic Defecation

1. The patient must satisfy diagnostic criteria for **functional constipation-Rome III**
2. During repeated attempts to defecate must demonstrate **Dyssynergic pattern** of defecation
  - Manometry
  - EMG
3. Patient must demonstrate **one other abnormal** test:
  - a. Abnormal balloon expulsion Test (> 1 minute)
  - b. Prolonged Colonic Transit Time (radioopaque markers or wireless motility capsule or Scintigraphy)
  - c. Abnormal Defecograpy ( $\geq 50\%$  barium retention)

*Bharucha et al, Gastroenterology 2006; 130: 1514*

*Rao SSC. Gastroenterol Clin N Am 36 (2007) 687-711*

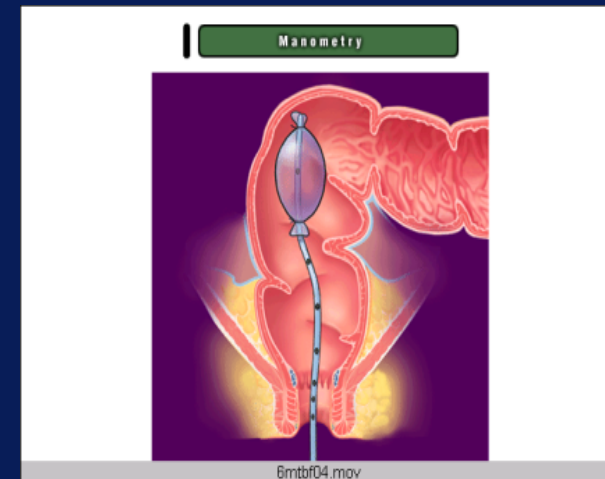
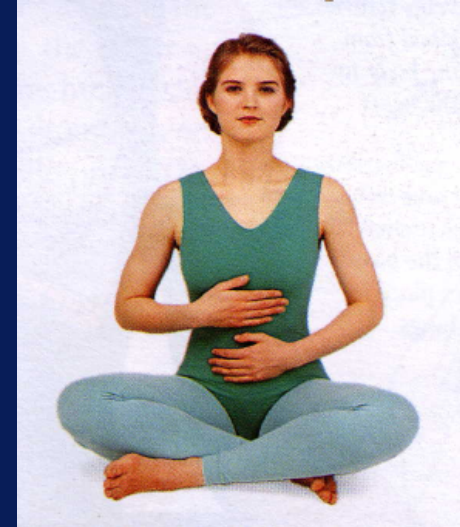
# How to Treat Dyssynergic Defecation ?

- **General Measures**
  - Diet, exercise, fluids & habit training
  - Laxatives/Prokinetics
- **Specific Treatment**
  - Botox injection
  - Biofeedback therapy
  - Cognitive Behavioral Therapy
  - Surgery
    - Myectomy- 30% improvement
    - Colostomy

# Biofeedback-Dyssynergia

## » *Goals of Therapy :*

- *A) Teach Diaphragmatic breathing exercise*
- *B) Teach anal sphincter & pelvic floor relaxation*
- *C) Improve Rectal Sensation*
- *D) Eliminate Sensory Delay*
- *E) Improve Recto-anal Coordination*

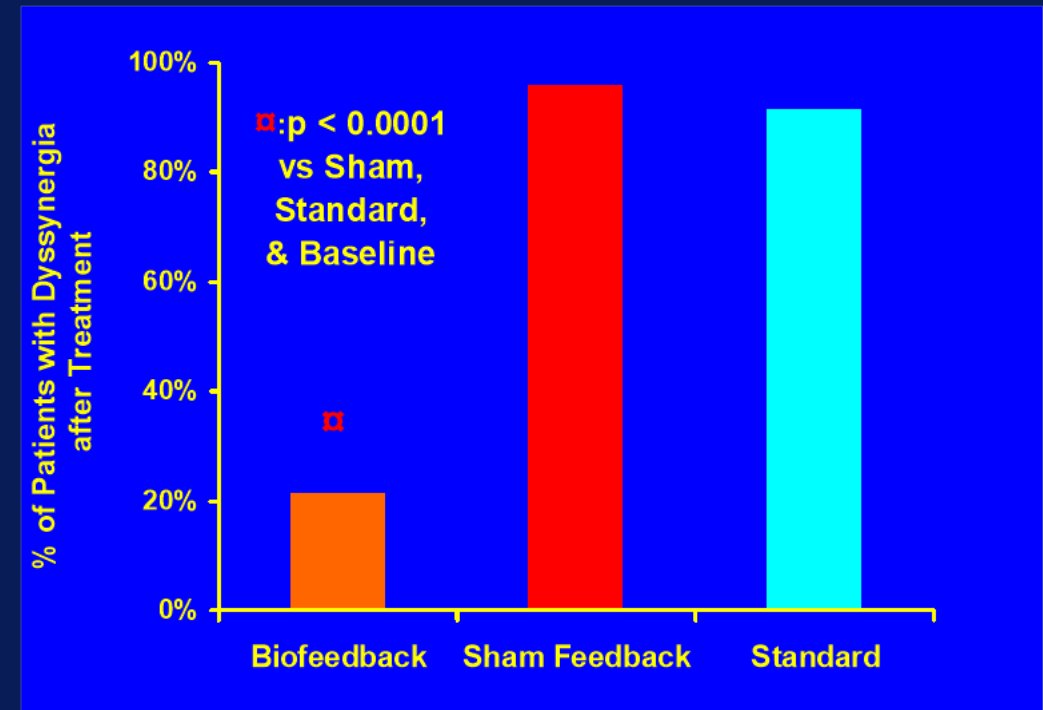
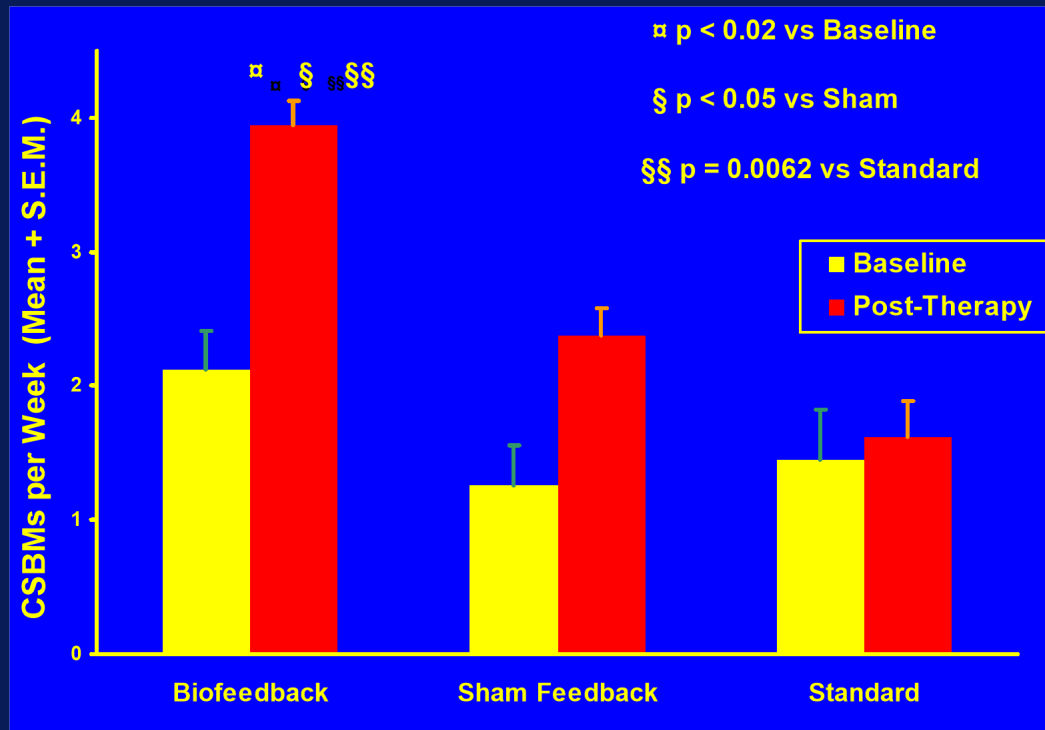




# Biofeedback Therapy-RCTs

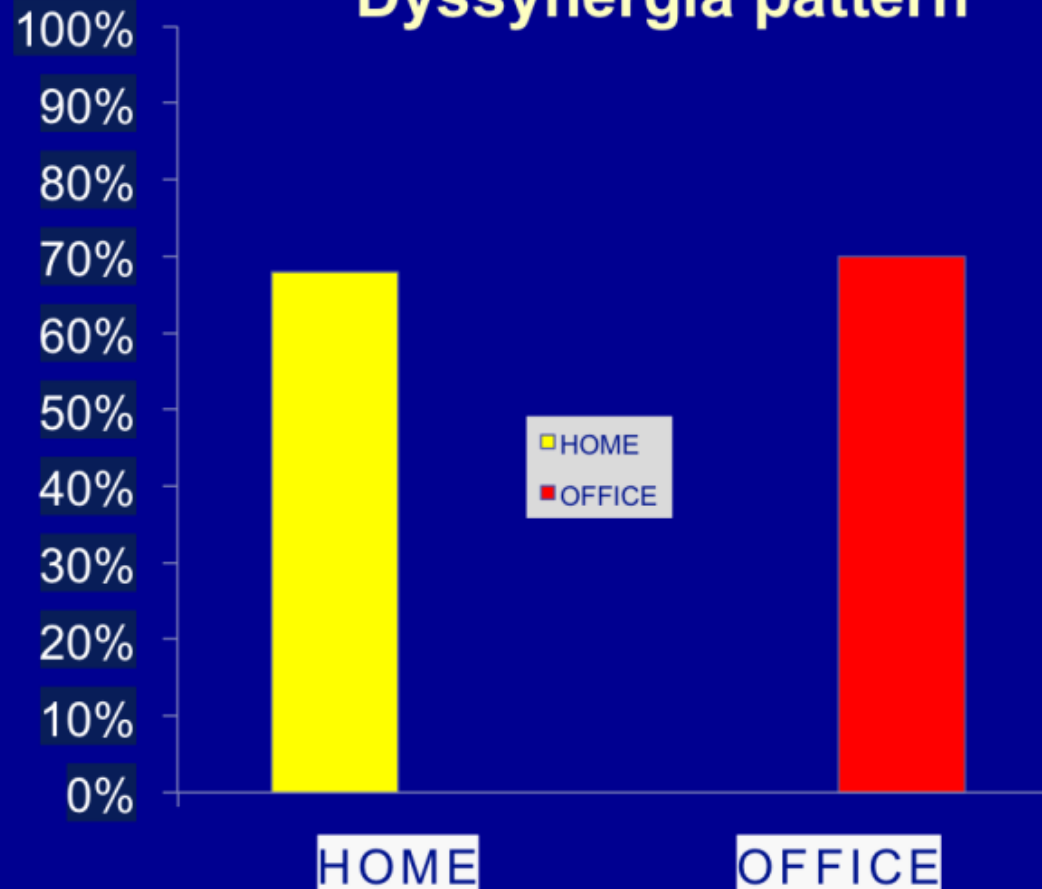
- Biofeedback Vs PEG 14.6 g for Dyssynergia
  - *Chiarioni et al, Gastroenterology 2006; 130: 657-64*
- Biofeedback vs Diazepam for Dyssynergia
  - *Heymen et al, Dis Col Rectum 2007*
- Biofeedback vs Sham Therapy vs Standard Therapy
  - *Rao et al CGH 2007*
- Biofeedback vs Standard Therapy-One Year outcome
  - *Rao et al Am J Gastroenterol 2010*
- *Home vs Office Biofeedback Therapy-Efficacy & Cost Effectiveness*
  - *Rao et al, Go et al, DDW 2011*

# Effects of Biofeedback Therapy on CSBM & Dyssynergia- ITT Analysis

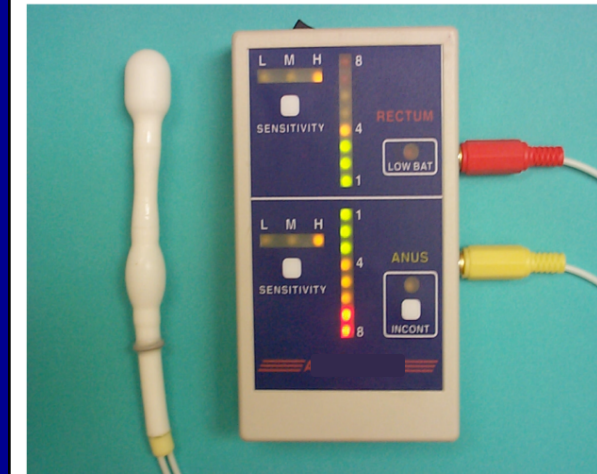


# Home vs Office Biofeedback- Responder Analysis, How Effective?

RESPONDER=  $\geq 1$  CSBM/wk + Normalization of Dyssynergia pattern



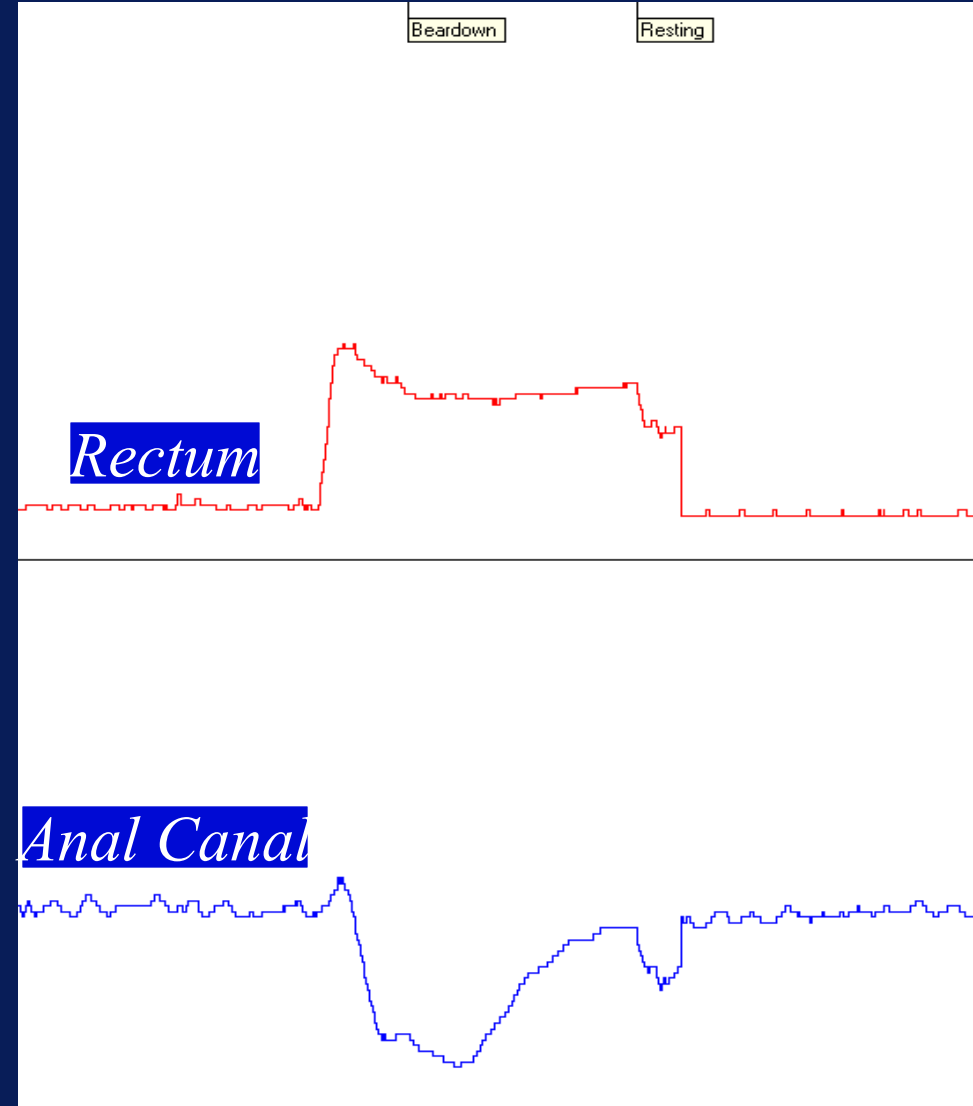
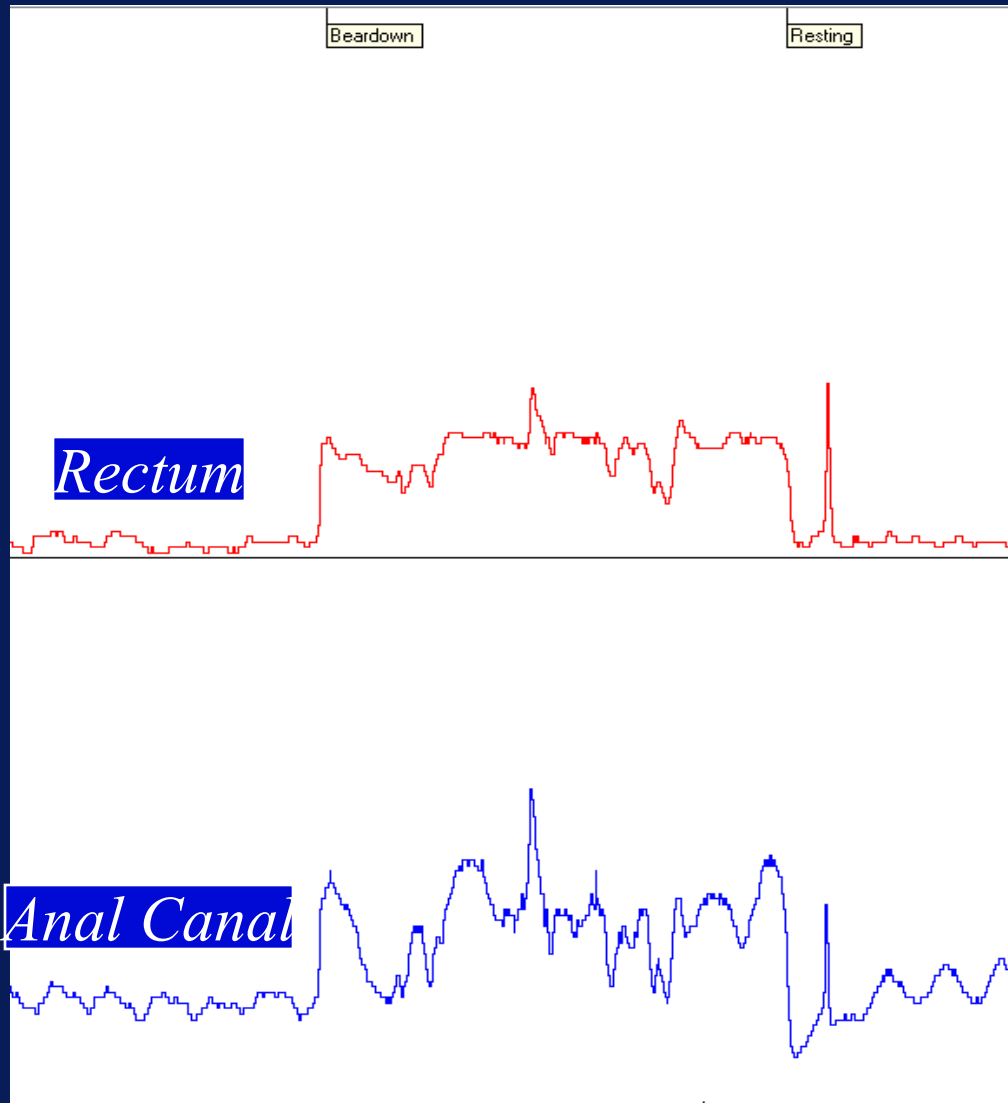
home trainer & probe



# *Dyssynergia-Effects of Biofeedback*

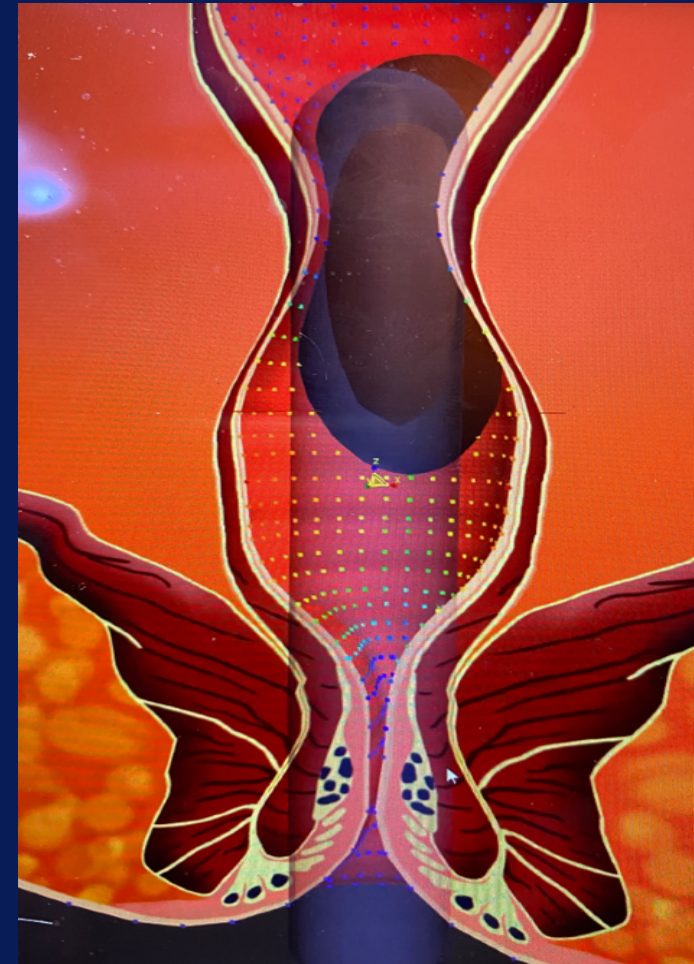
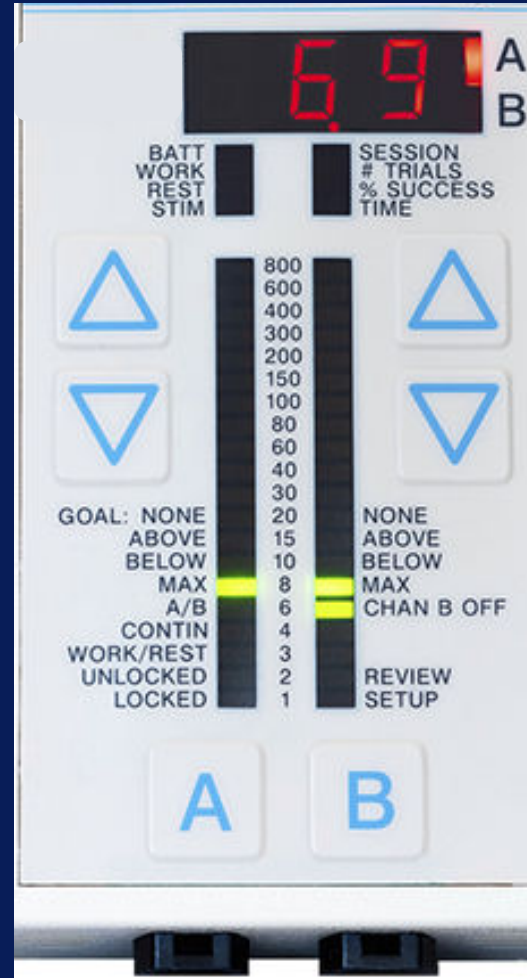
## *BEFORE*

## *AFTER*



*Courtesy of Rao SS*

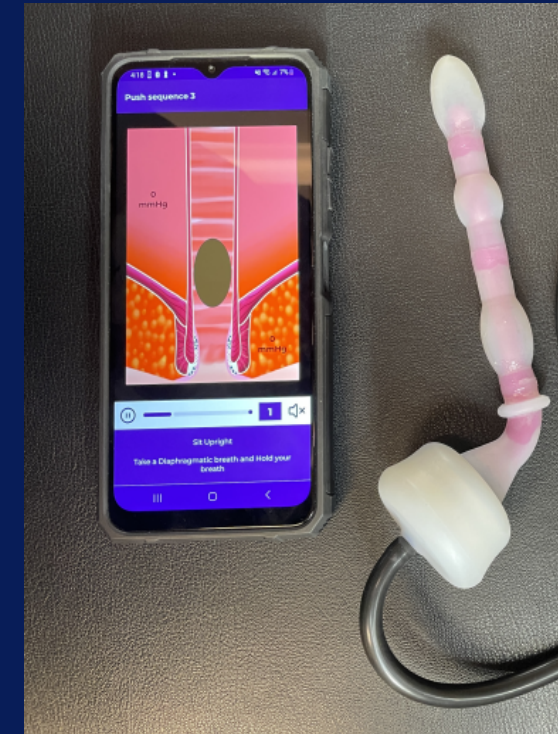
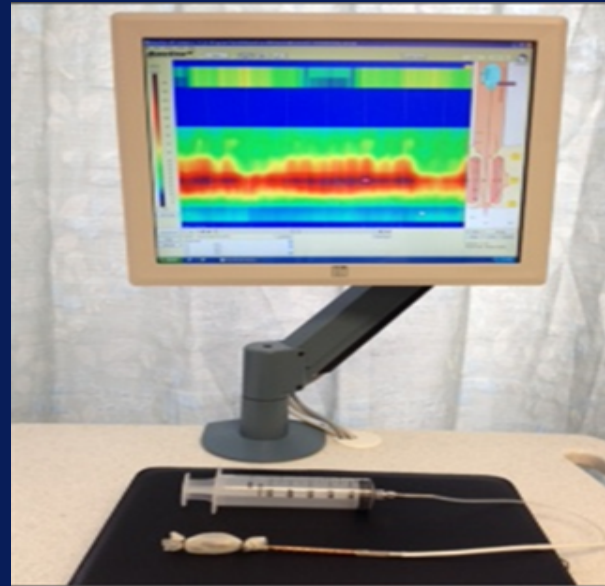
# Biofeedback System: Visual Display Challenges





# Home vs Standard Office BT

- Dyssynergic defecation ( Rome IV)
  - Constipation symptoms (2/6 symptoms ) for >6 months
  - Dyssynergic pattern (Rao Types I-IV)
  - Abnormal Balloon (50 ml) Expulsion time = > 1minute
- DD patients (Rome IV) were randomized to home using home or office BT.



# Results

*RESPONDER= >1 CSBM/wk vs Baseline + Normalization of Dyssynergia Pattern*

Fig 4. Responder Rates

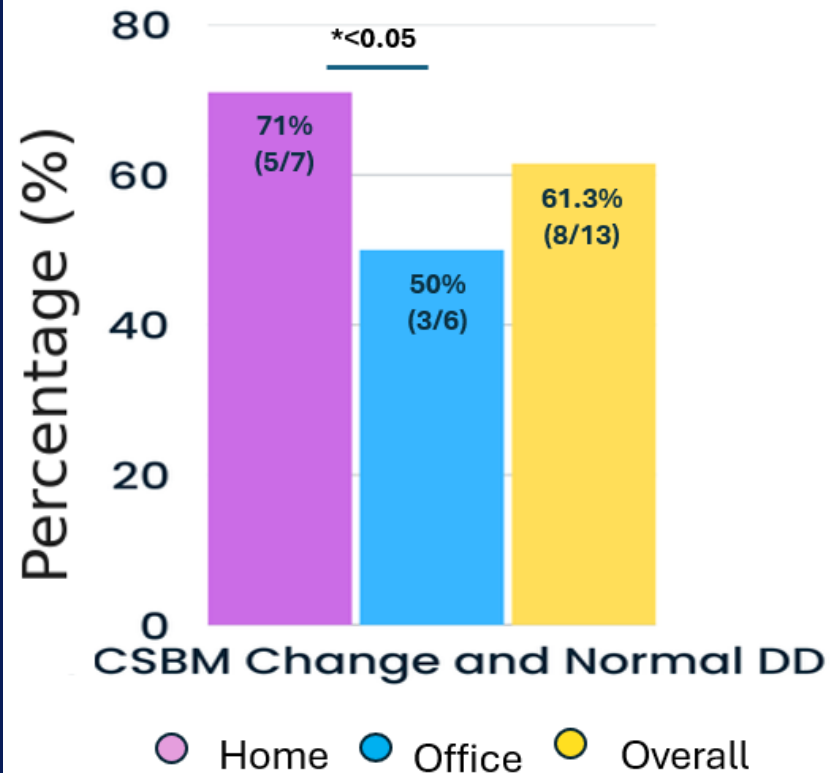
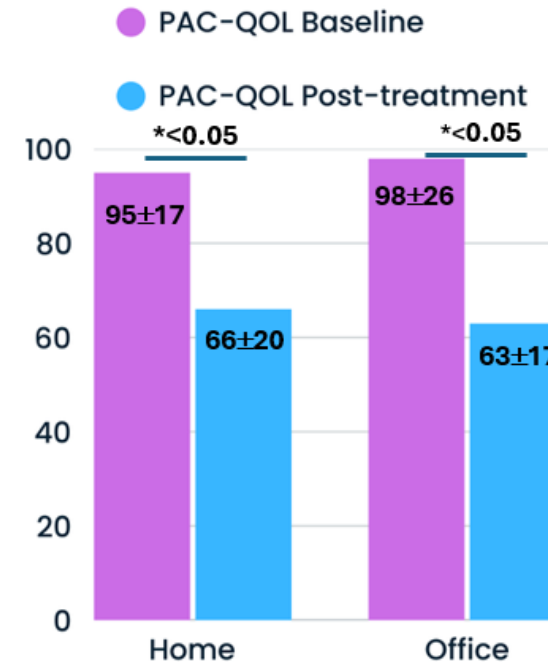


Fig 5. Effects on QOL



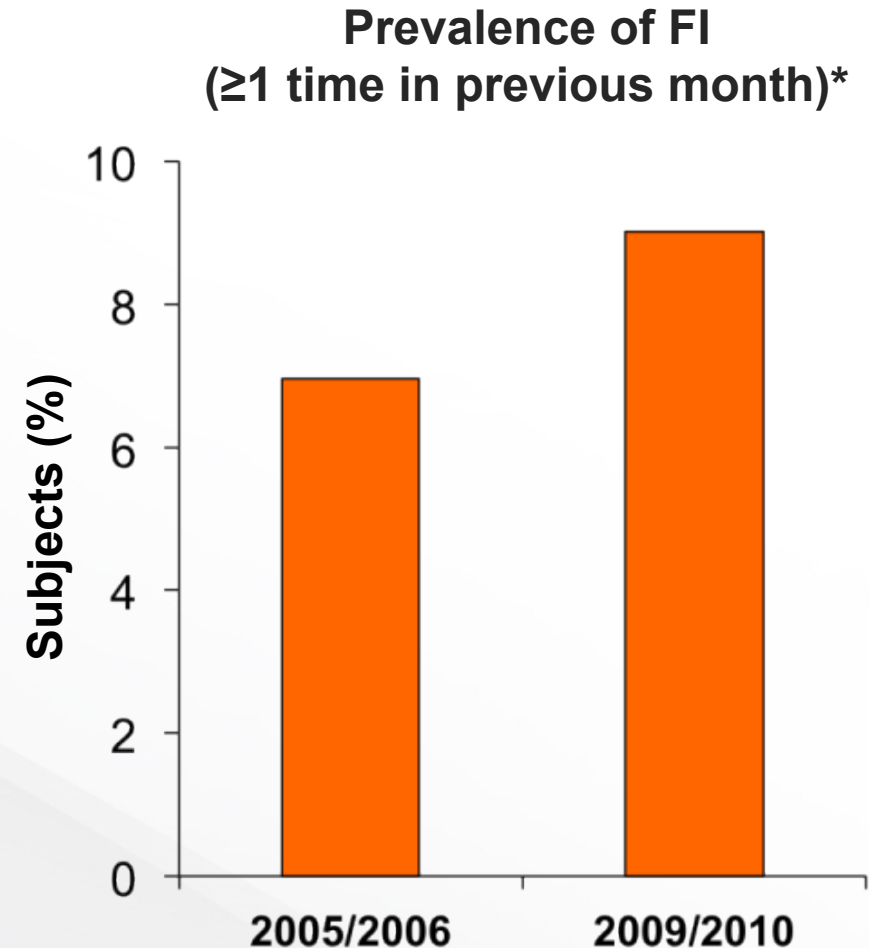
# CASE STUDY

**AH: 47 yrs, Gravida 3, Para 2**

- 2005 - Fecal Incontinence - 2 months after delivery.
- 2012 - 2nd Delivery, symptoms have worsened.
- B.M. - 2/day; 4-8 incontinence episodes/wk-10yrs
- Senses stool coming out but cannot stop it.
- Flatus incontinence
- No urinary incontinence, back injury or diabetes.
- Hypothyroid
- Tried Psyllium, loperamide 4mg/tid-No relief

# Prevalence of Fecal Incontinence: Fast Facts

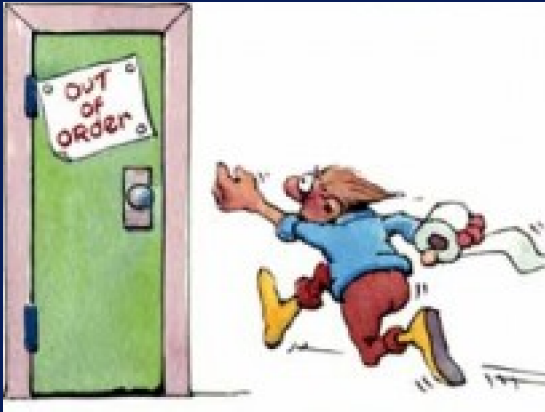
Overall prevalence of fecal incontinence:	9.0%
Prevalence of fecal incontinence occurring at least once weekly:	1.1%
Prevalence in men:	7.4%
Prevalence in women:	9.1%
Prevalence in individuals aged $\geq 70$ years:	17.5%



\*Data from NHANES 2005/2006 and 2009/2010 surveys. N=52,195.  
Ditah I et al. *Am J Gastroenterol*. 2012;107:S717. Abstract 1762.



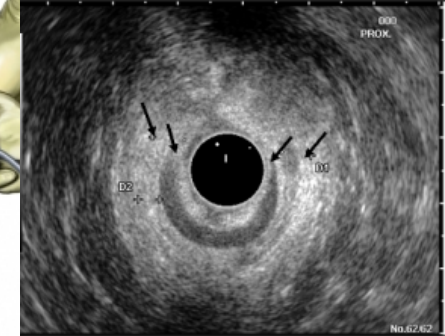
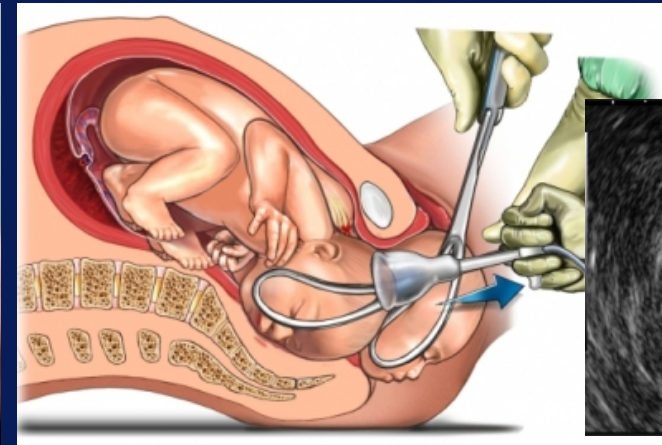
# Fecal incontinence- A Multifactorial Problem



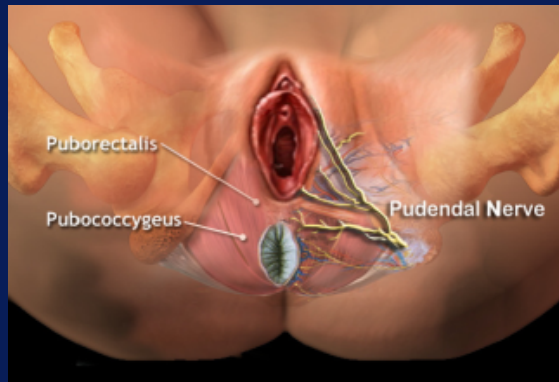
*Diarrhea/Urgency*  
*Bharucha et al Gastro 2010*



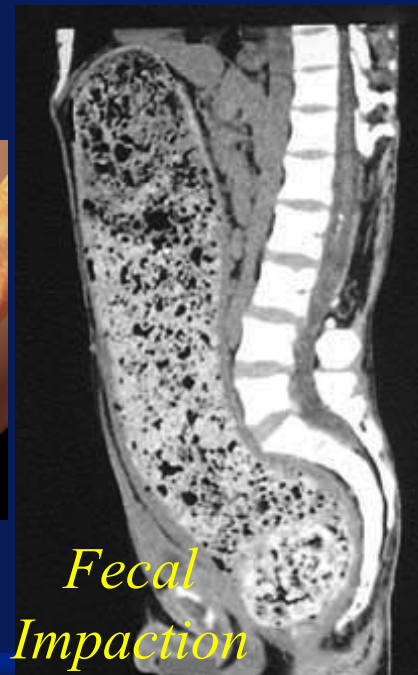
*Ageing*



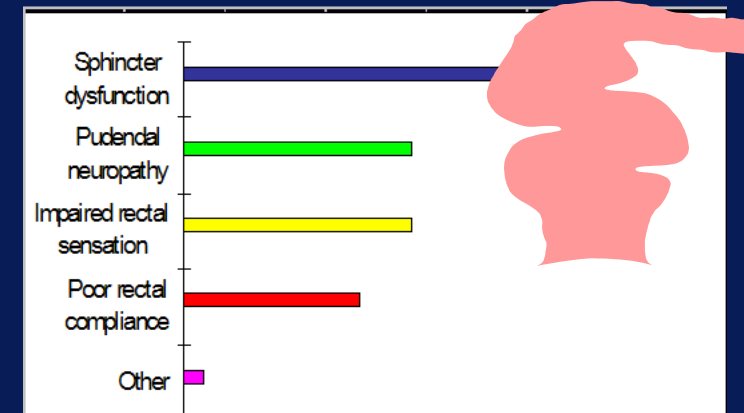
*S.C. Injury*



*Pudendal Neuropathy*



*Fecal Impaction*



*80% > one abnormality-*

*Rao et al Am J Gastro 1997;92:469-75*



# ***Fecal Incontinence-Clinical Subtypes***

## ■ ***Passive Incontinence***

- ***Involuntary discharge of feces or flatus without awareness***

## ■ ***Urge Incontinence***

- ***Discharge of rectal contents in spite of active attempts to retain***

## ■ ***Fecal Seepage***

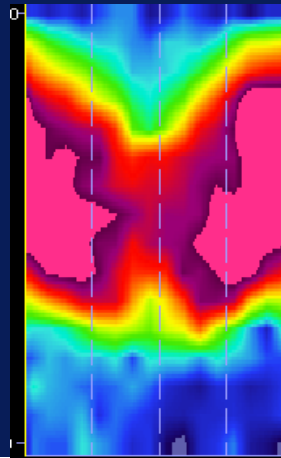
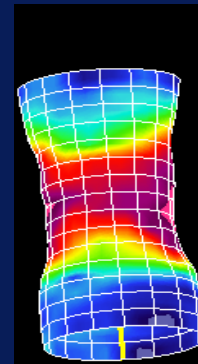
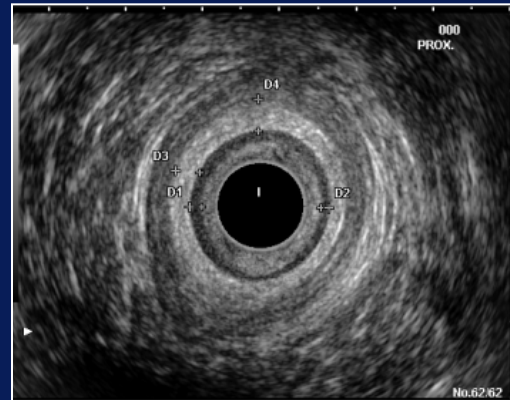
- ***Involuntary seepage with otherwise normal evacuation***

# Anal Sphincter Changes in Health & FI

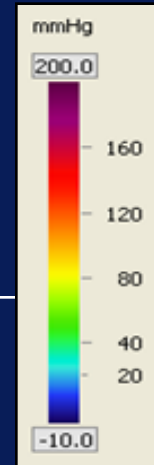
**AUS**

**HDM**

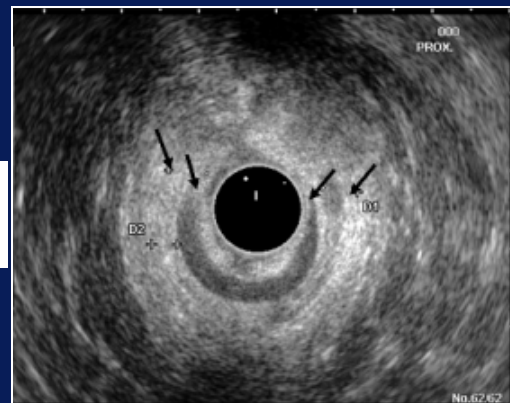
**Normal**



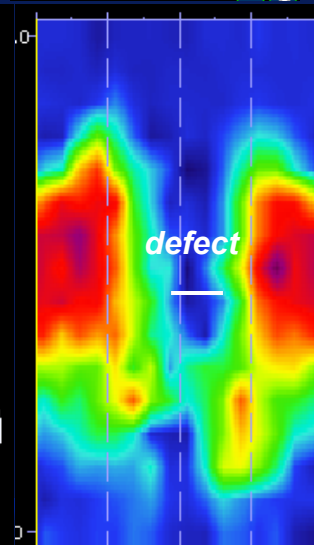
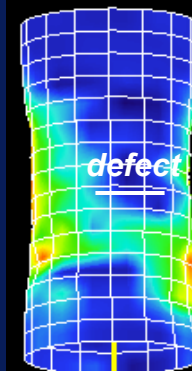
**Squeeze**



**Incontinent**

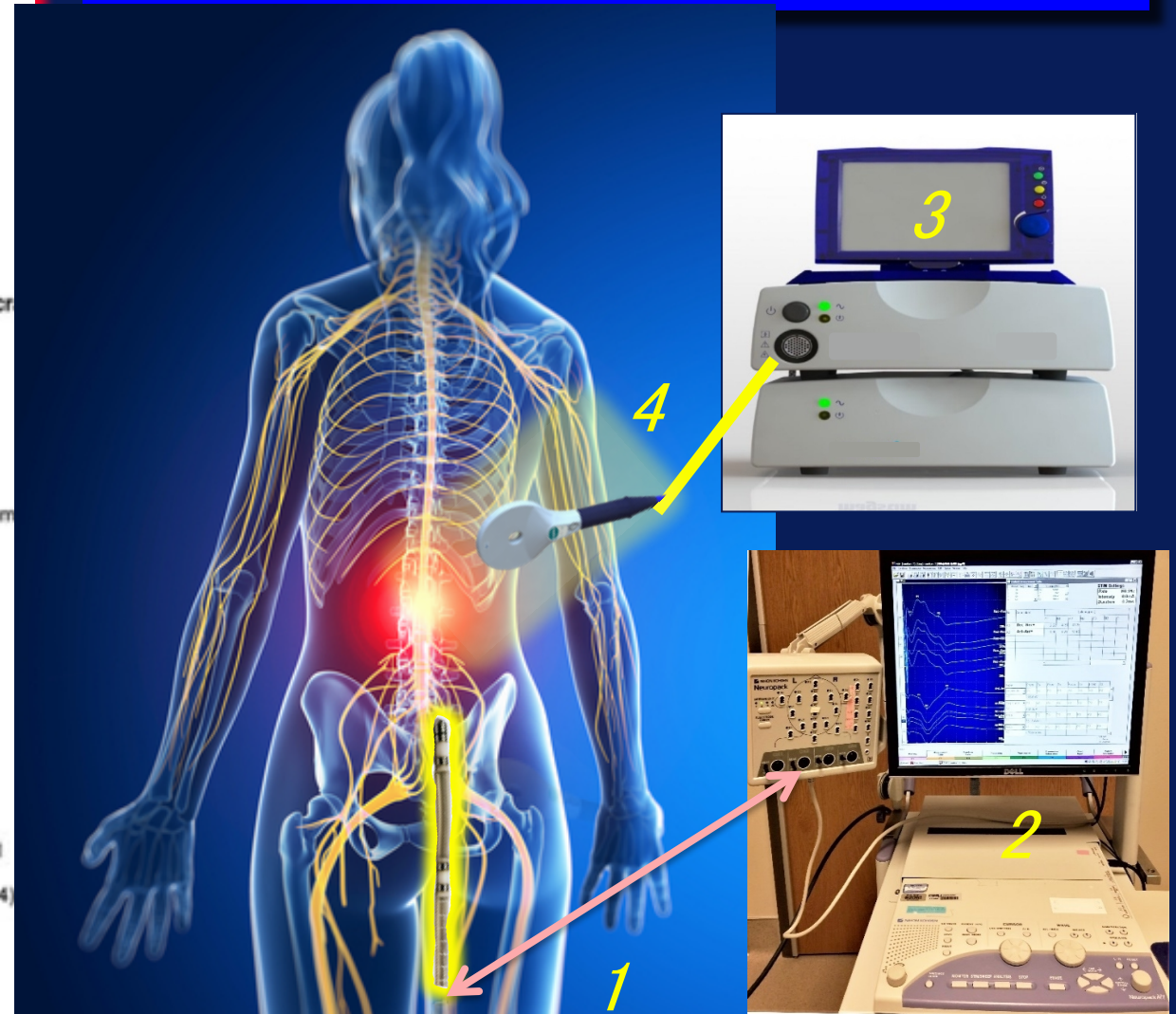
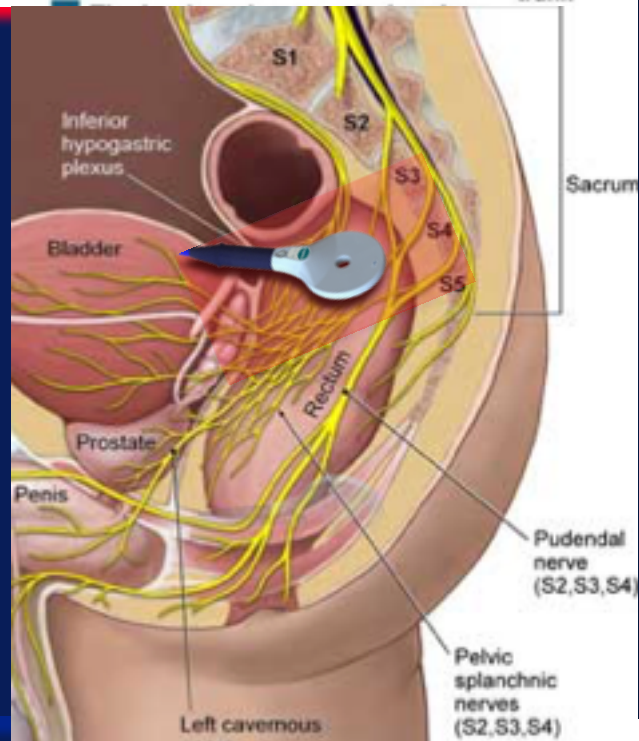
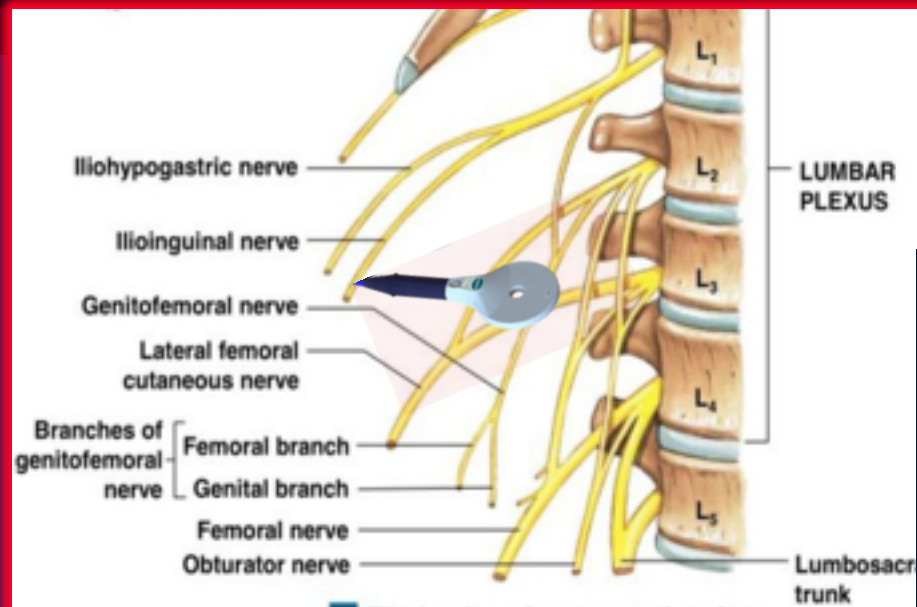


**Squeeze**

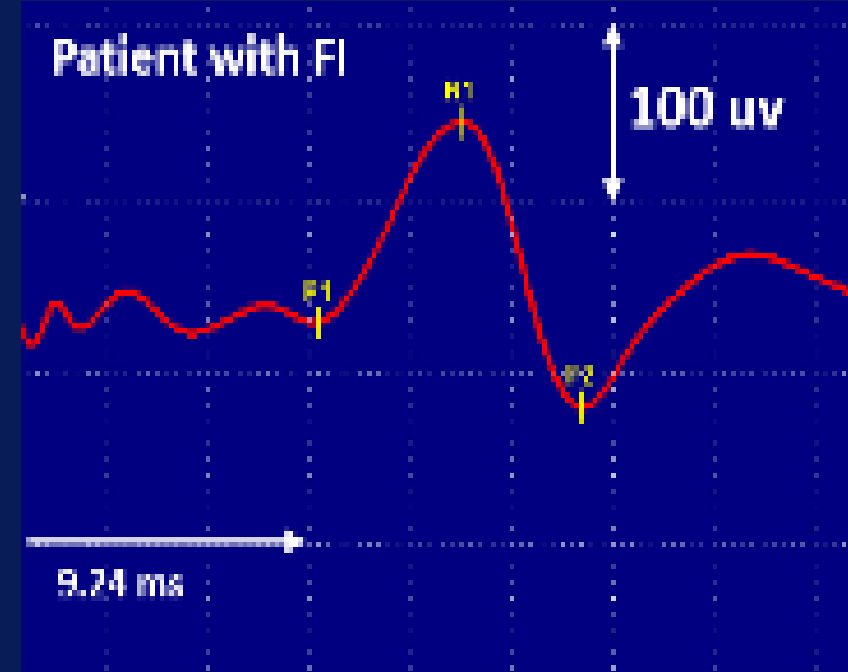
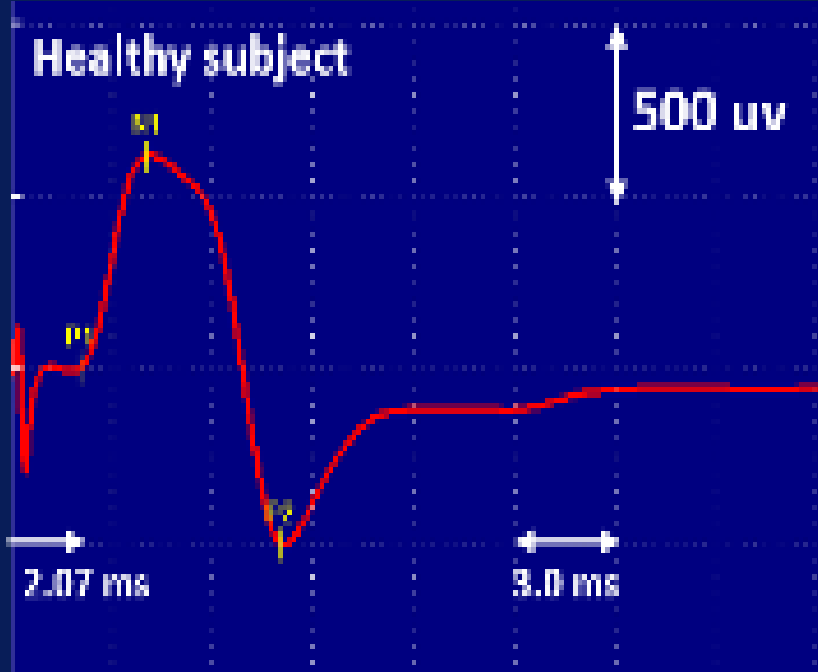


**Squeeze**

# Translumbosacral Anorectal Magnetic Stimulation (TAMS) Test



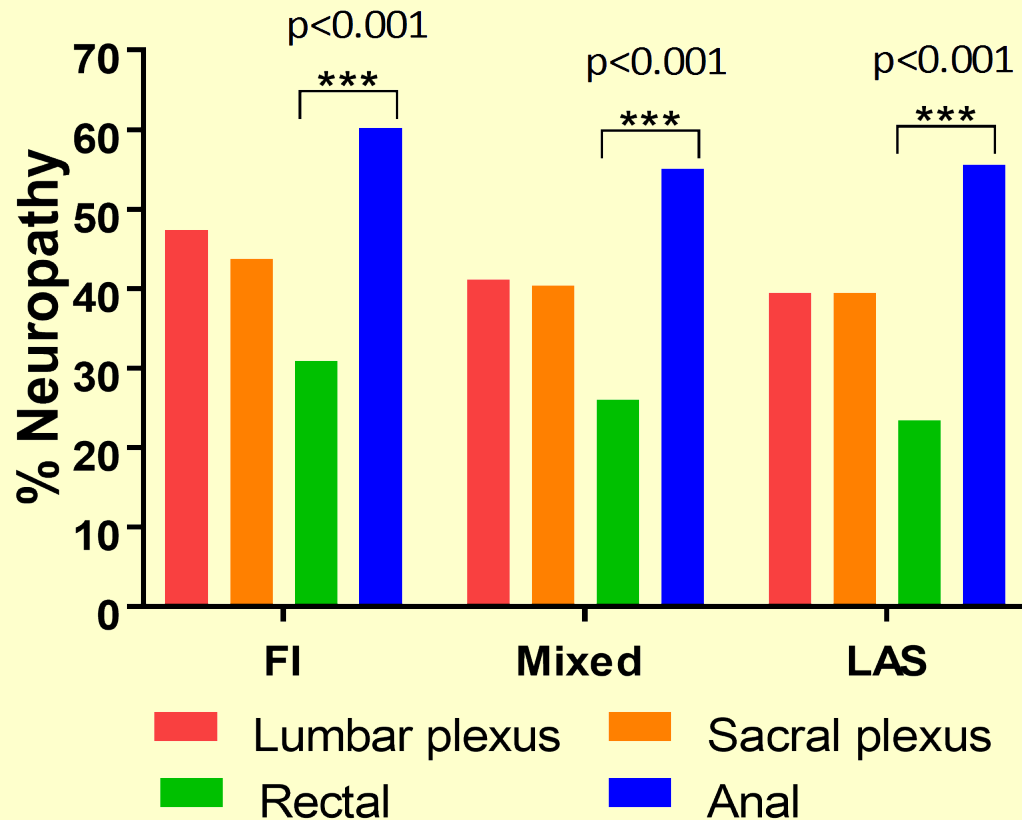
# TAMS Test



*Sacro-anal Motor Evoked Potentials (MEPs)*

# Clinical Utility of TAMS

**FI=152, Mixed=68, LAS= 31**



- FI= Fecal Incontinence
- Mixed= FI and Constipation
- LAS= Levator Ani Syndrome



## Case Study – Anorectal Physiology Data

	Patient	Normal range (Females)
Resting Pr mm Hg	35	65 (53-75)
Squeeze Pr mm Hg	72	117 (100-134 )
Squeeze Duration (sec)	16	25 (21-29)
Threshold 1st sensation (cc)	100	20(16-24)-3.9)
Lt TLMEP ms	7.1	<4.9
Rt TLMEP ms	5.8	<5.0
Lt TS MEP ms	6.9	<4.9
Rt TS MEP ms	8.8	<5.0

# **Cochrane Review of Medical Therapy-2013**

- 16 trials (11 cross over), n=558
- 11 Trials of F.Incontinence + Diarrhea
- 7 tested antidiarrheals, 6 enhance anal sphincter function (Phenylephrine, valproic acid), 2 tested Lactulose, 1 zinc aluminum
- Small studies, short F.up, meta-analysis not possible
- Risk of bias unclear

## **Conclusions:**

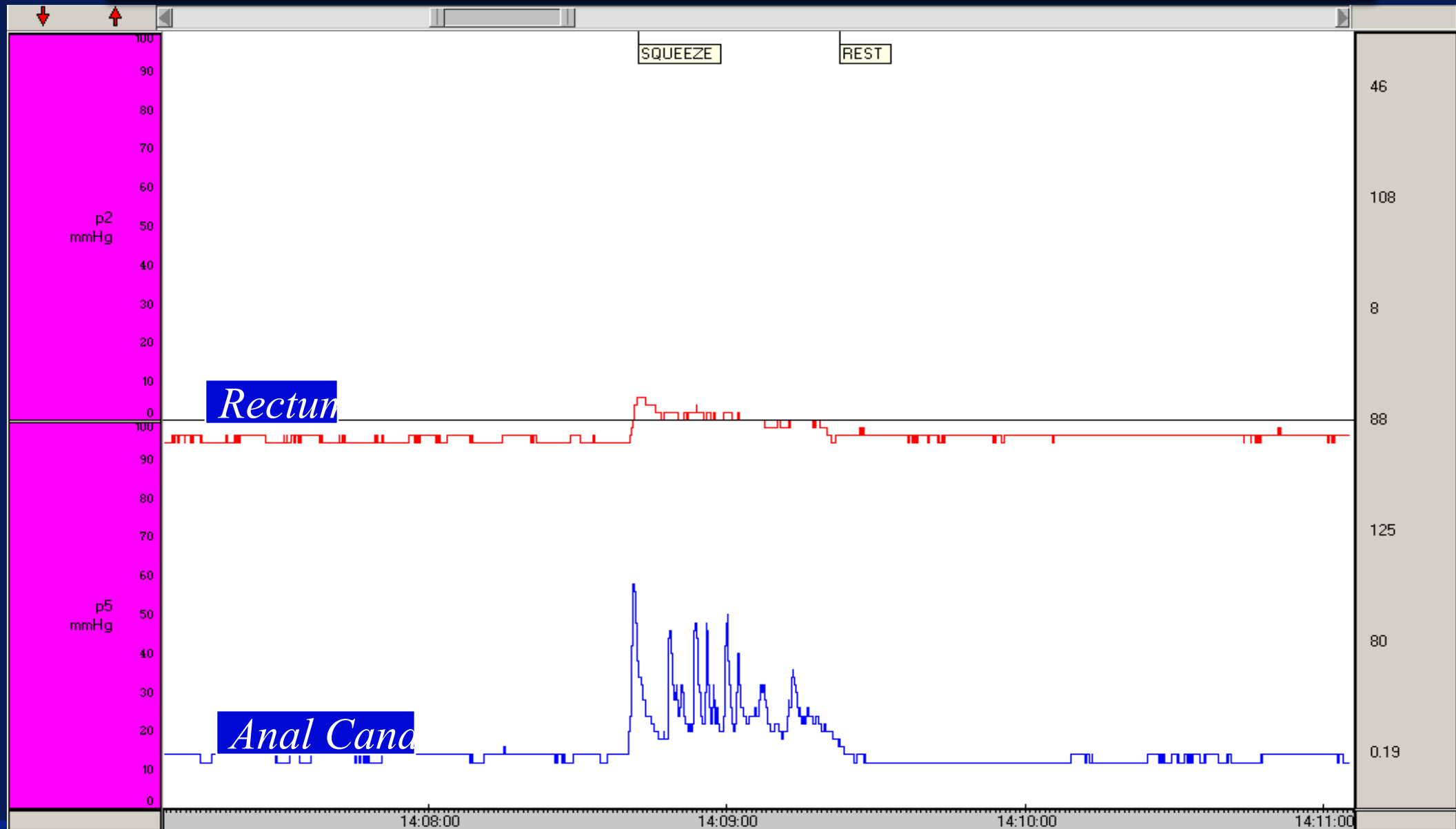
- Focus of most therapy was diarrhea not incontinence
- Little evidence to guide clinicians, Larger well designed trials are required

# Goals of Neuromuscular Training for Fecal Incontinence

## ■ Biofeedback Therapy

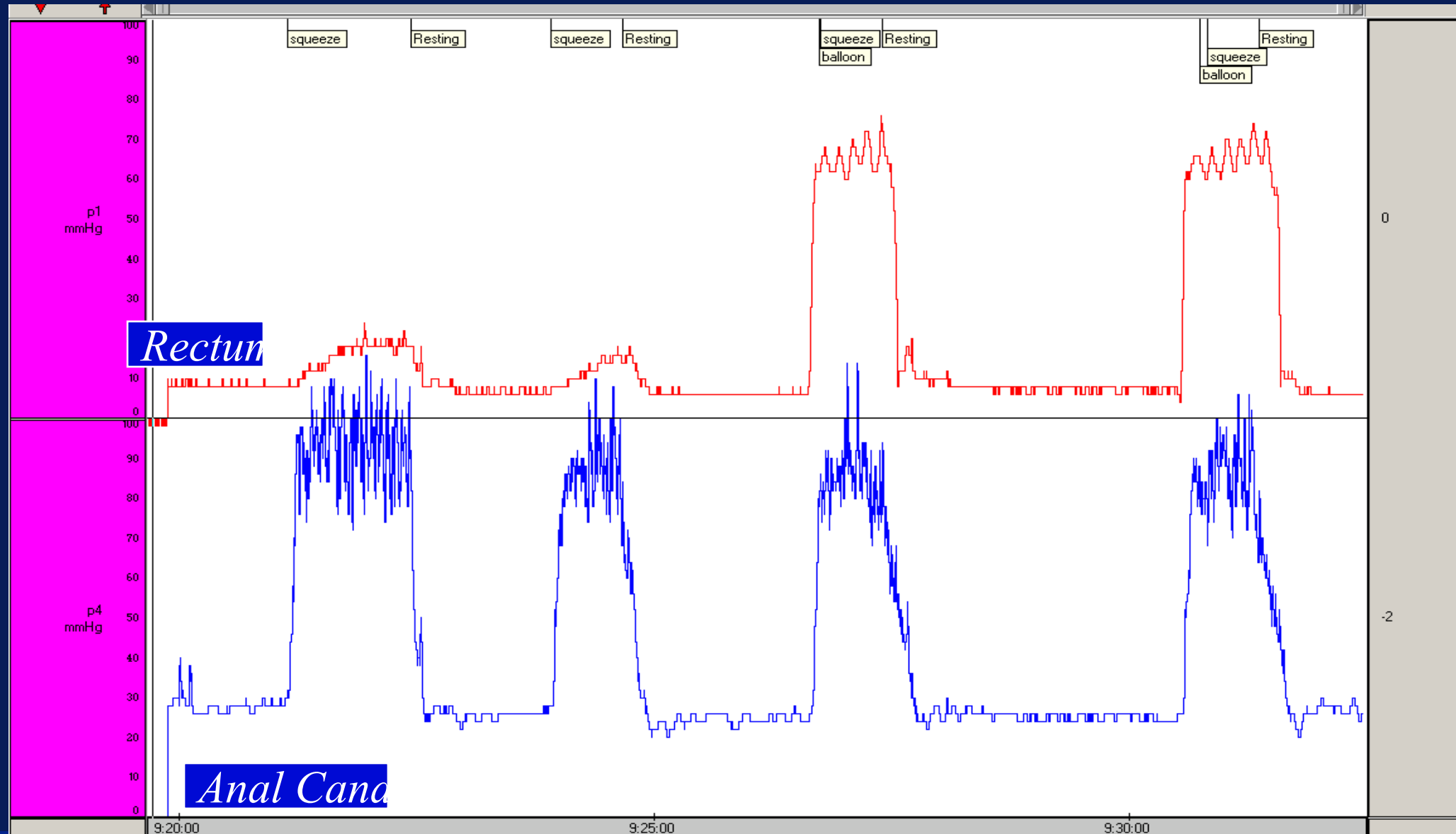
- Strengthen anal sphincter/Puborectalis muscle
  - Endurance + Strength
- Improve rectal sensation/sensory delay
- Rectoanal coordination training
  - Isolation of anal muscles
  - Control of Accessory Muscles
- Training to correct dyssynergia & evacuation

# Biofeedback-Incontinence- Before Therapy



Courtesy of Rao SS

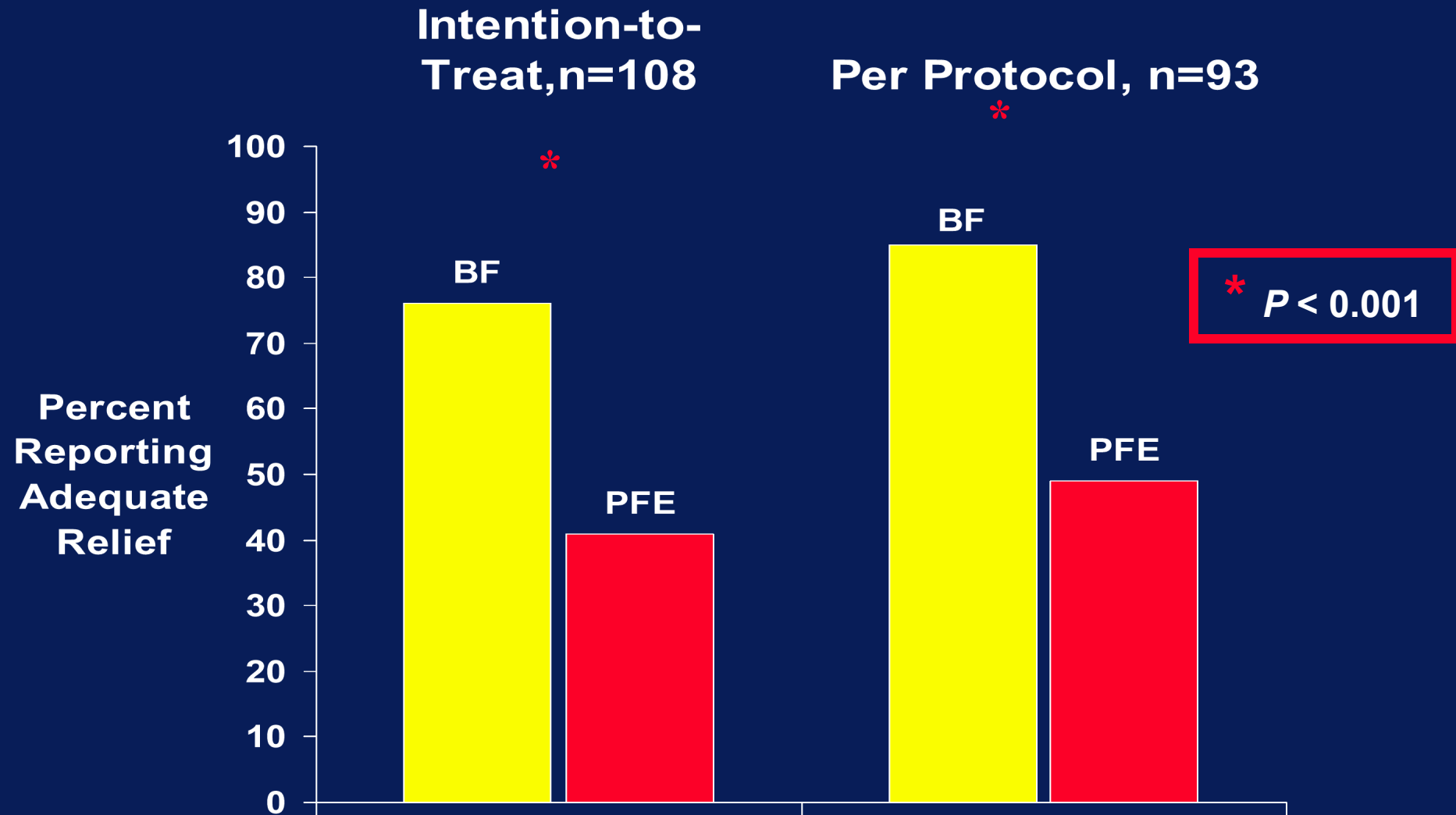
# Biofeedback-Incontinence- After Therapy



Courtesy of Rao SS



# Biofeedback vs Non-digital assisted squeezes- Incontinence: Primary Outcome



# NIDDK- FIT Trial (2018-24)

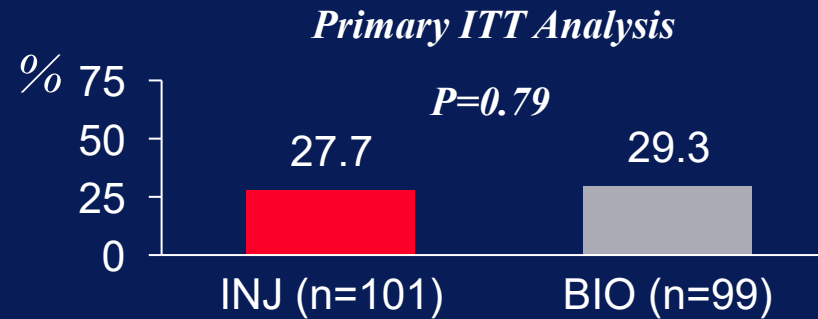
## Mayo, Augusta,, U.Mich, UAB, UNC

200 FI Patients  
were Randomized  
to  
Biofeedback or  
Dextranomer  
Injection

### Biofeedback vs Dextranomer

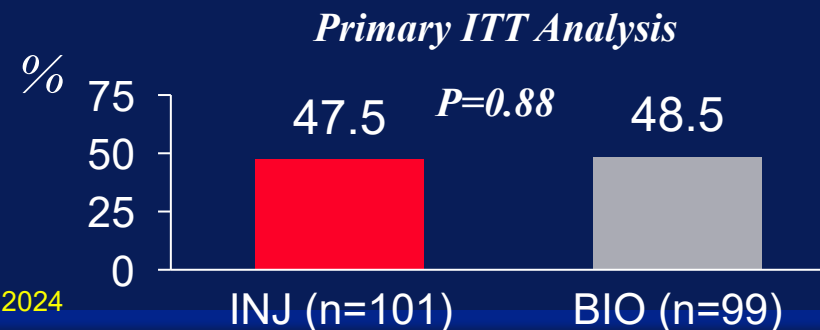
#### **Primary Efficacy Outcome: 75%**

*Treatment Responder ( $\geq 75\%$  reduction from baseline in number of average weekly FI episodes)*



#### **Secondary Efficacy Outcome: 50%**

*( $\geq 50\%$  reduction from baseline in number of average weekly FI episodes)*

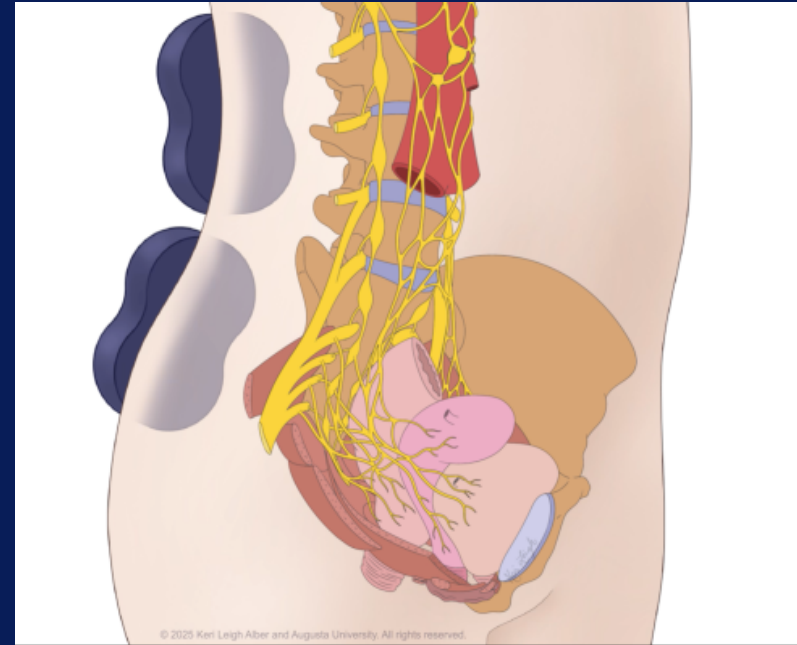


# Surgical Treatment of Incontinence

- Dextranomer Injection
- Sphincteroplasty
- Rectal Augmentation
- SECCA procedure
- Sacral nerve stimulation
- Maloney-ACE procedure
- Colostomy



# Translumbosacral Neuromodulation Therapy (TNT): Randomized Trial

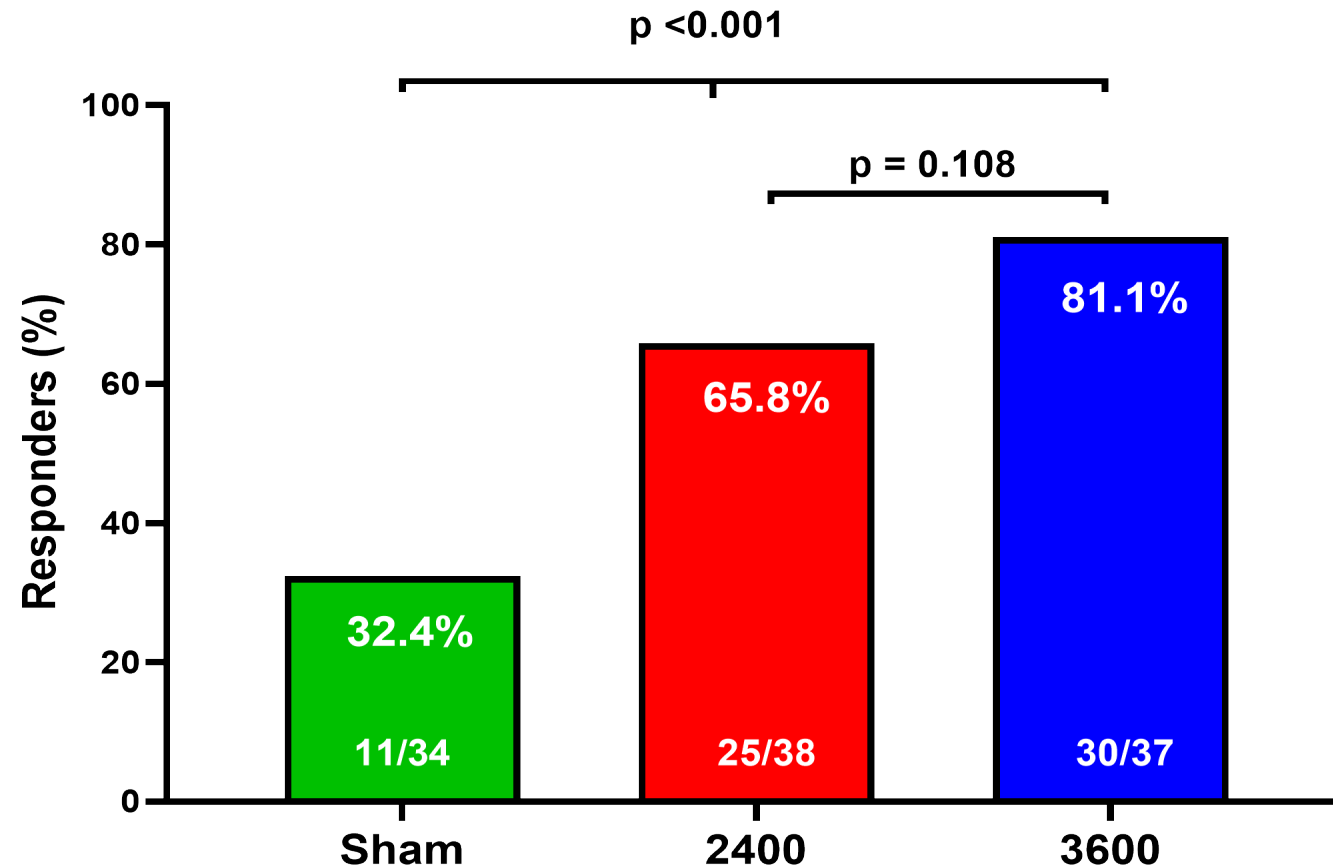


Frequency	Stimulations	Train
1 Hz	2400	2
1 Hz	3600	2
1 Hz	Sham	2

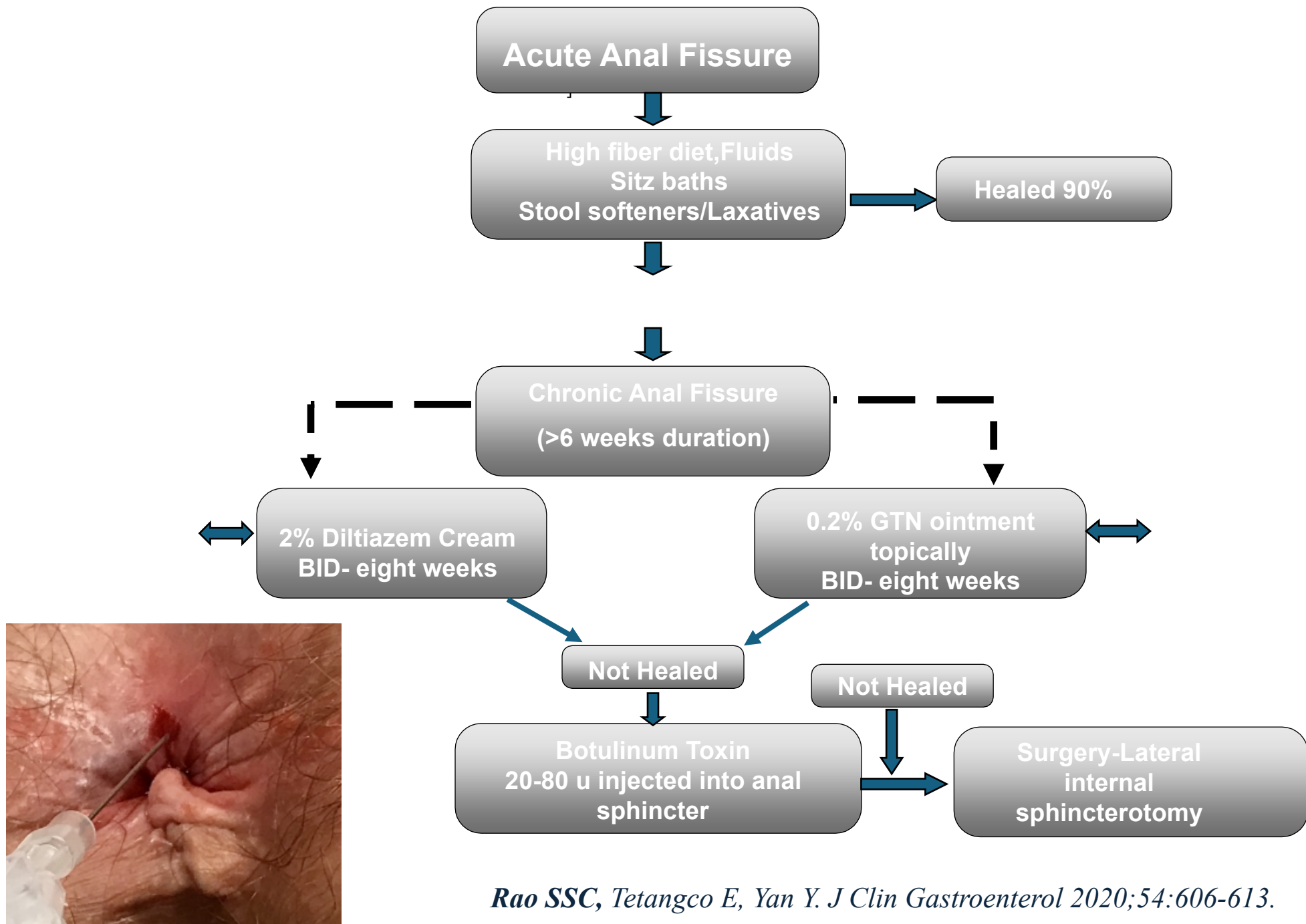
# TNT: Primary Efficacy Outcome

## ITT analysis, n=109

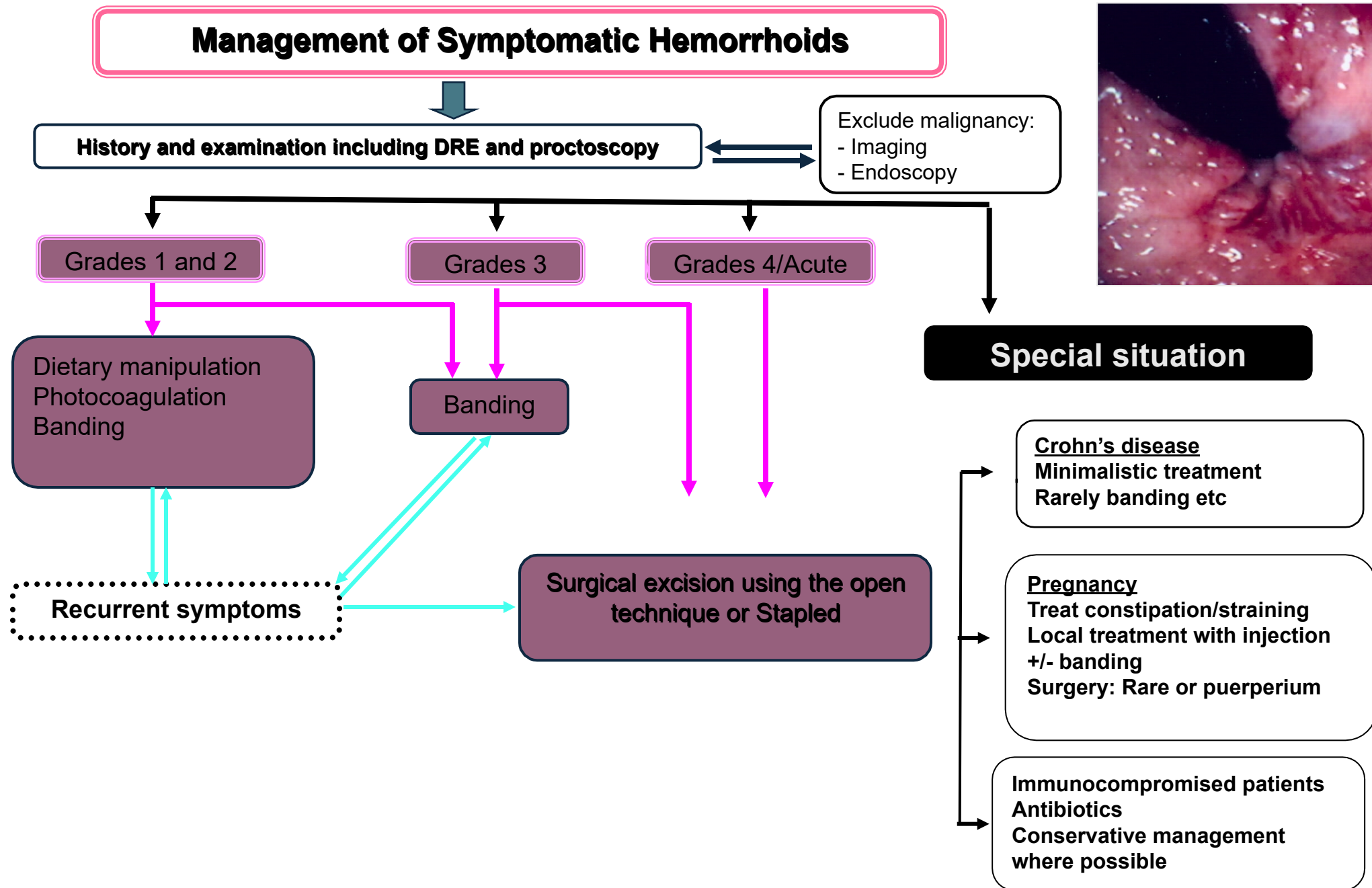
50% reduction in FI episodes compared to baseline







*Rao SSC, Tetangco E, Yan Y. J Clin Gastroenterol 2020;54:606-613.*



# Take Home Points



- Detailed History, Physical & DRE important
- Electronic Stool Diary APPs enable accurate History & Severity assessment
- Dyssynergic defecation
  - Is common but missed clinically
  - HRM and BET provide accurate diagnosis
  - Biofeedback is the preferred treatment; Home BT-future
- Fecal incontinence
  - Is multifactorial
  - ARM, Anal Ultrasound, MRI, TAMS test are complementary
  - Biofeedback First line and effective
  - Selected cases surgery or SNS or Dextranomer injection
  - Novel treatments: Home Biofeedback & TNT
- Anal Fissure: Conservative rx helps 80%
- Hemorrhoids: Banding