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Women's Health: An Introduction to Treating Bowel Disorders

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www.pelvicfloorbiofeedback.com

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- **Presenter Disclosure:** Financial: Tiffany Lee has received an honorarium for presenting this course. Non-financial: Tiffany Lee has no relevant non-financial relationships to disclose.
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Learning Outcomes

After this course, participants will be able to:

- Describe how bowel disorders can impact one's self-care and quality of life.
- Describe methods for treating bowel disorders and applications to occupational therapy practice.
- List resources for further study, training, and certification in this area of practice.

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CONTINUED

Treating Bowel Disorders

- Bowel anatomy and physiology
- Medical Assessments and Diagnostic Tests
- Fecal Incontinence, Constipation, and Dyssynergia
- Behavioral interventions for bowel disorders

4

Anorectal Anatomy

- Anal Canal
  - anal skin margin to pelvic diaphragm
  - 3-4 cm long
  - two sphincter muscles
- Internal Anal Sphincter
  - near the rectum
  - partial contraction-smooth muscle
- External Anal Sphincter
  - distal to and overlaps internal
  - striated muscle both voluntary and involuntary control
    - subcutaneous, superficial, deep
    - deep layer fuses with puborectalis

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Anorectal Anatomy continued

- External Anal Sphincter (continued)
  - usually in a state of involuntary partial contraction
  - gas, diarrhea, solid stool discrimination
  - pudendal nerve
- Puborectalis Muscle
  - pubic bone and loops around the anorectal junction
  - part of levator ani muscle-medial
  - involuntary partial contraction
  - maintains anorectal angle
  - voluntary action
  - usually contracts along with the external anal sphincter

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CONTINUED

Anorectal Anatomy

- Other pelvic diaphragm (levator ani) muscles
  - pubococcygeus
  - iliococcygeus
  - ishiococcygeus
  - all support pelvic viscera
- Anal Canal Nerves
  - upper half-sympathetic and parasympathetic
  - lower half-pudendal nerve (inferior rectal nerves)

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CONTINUED

Anorectal Anatomy

- Rectum
  - 15 cm
  - longitudinal muscle fibers
  - SNS and PNS
  - sensory fiber ANS, low to pain, high to distention, stretch

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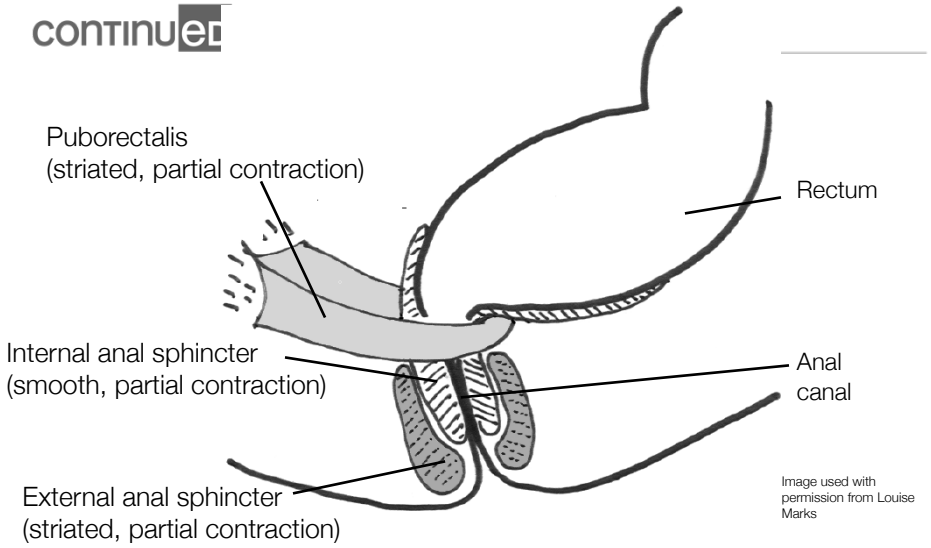

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Puborectalis and Sphincters at Rest

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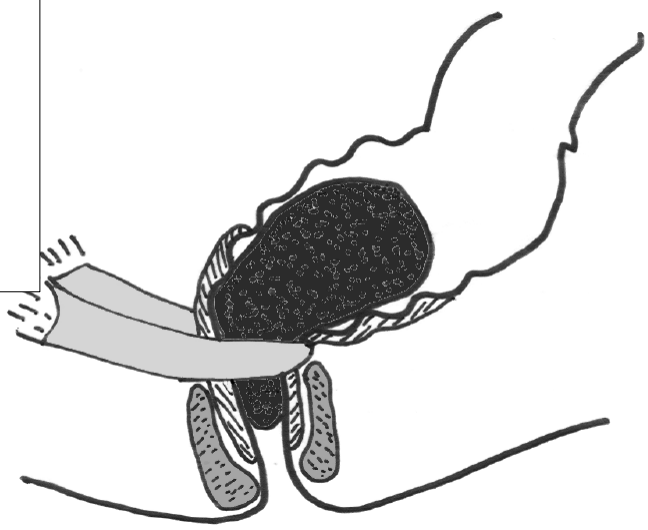
- Rectum contraction
- IAS relaxation
- EAS relaxation
- Stool enters anal canal



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Defecation Reflex

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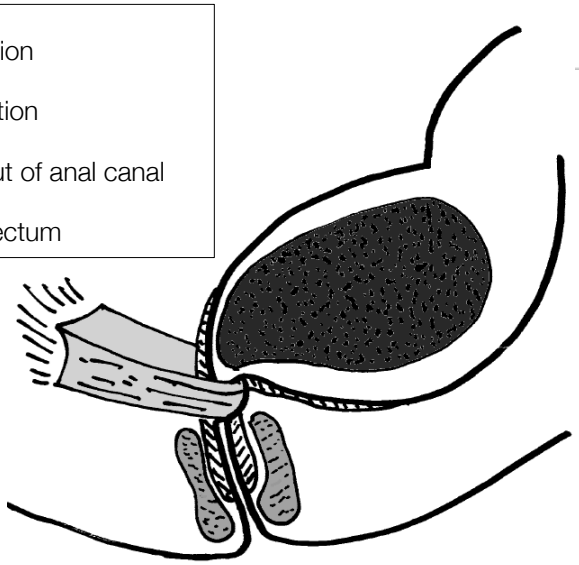
- Puborectalis contraction
- External anal contraction
- Movement of stool out of anal canal
- Accommodation of rectum



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Inhibition of Defecation

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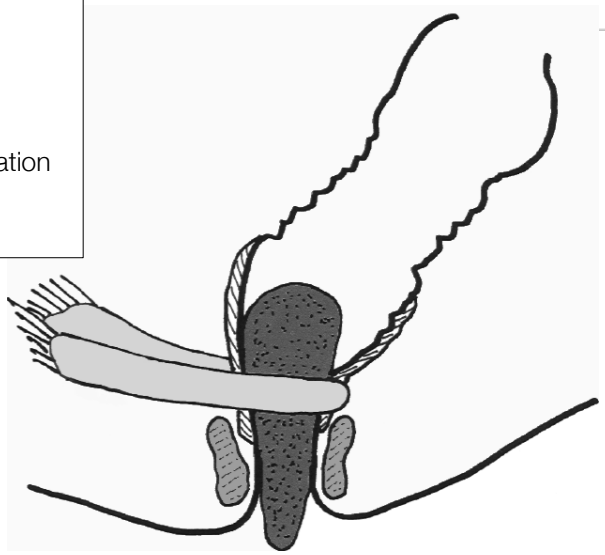
- Rectum contracts
- IAS relaxation
- Puborectalis relaxation
- EAS relaxation



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Defecation

Q1

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CONTINUED

Mechanism of Defecation

- Coordination of both voluntary and involuntary responses
- Peristaltic activity large intestines
- Rectal walls stretch (rectal distention)
- Nerves in rectal wall detect rectal distention and initiate the defecation reflex

Defecation Reflex-3 simultaneous actions

- rectal wall contracts
- internal anal sphincter relaxes
- external anal sphincter relaxes

CONTINUED

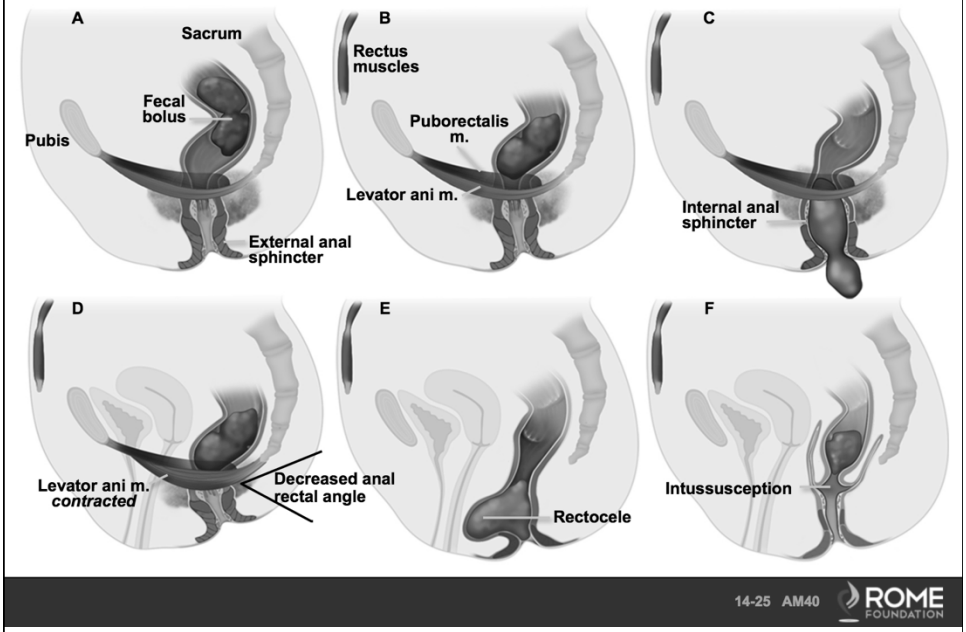
Anorectal Anatomy and Physiology

Inhibition of Defecation Reflex

- Rectal distention is perceived
- Message to external anal sphincter and puborectalis muscles to contract
- EAS and puborectalis override the reflex
- Rectal accommodation

Voluntary Defecation

- Valsalva maneuver (bear down)
- Voluntary relaxation of EAS and puborectalis



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Factors Maintaining Continence

- Normal transit time with normal consistency (time for food to travel through GI tract)
- Normal capacity to store
- Normal voluntary control
- Normal reflexive action of anal sphincter complex
- Contraction of EAS and puborectalis muscle
- Sensory awareness of stool in rectum

Q2

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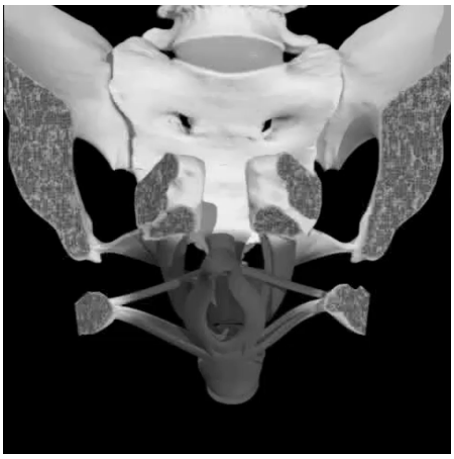
Pelvic Floor Contraction



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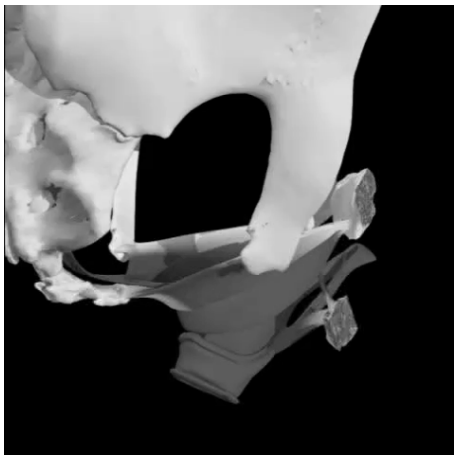
Pelvic Floor Contraction-Side



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Transit Time

- Slow transit time > more water gets reabsorbed by body, and the stool becomes harder
- To increase transit time = increase fiber which triggers peristalsis

Disorders Involving the Anus and Rectum

- Fecal incontinence
- Anal or rectal pain
- Dyschezia (difficulty expelling fecal material from the rectum)
- Pelvic floor dyssynergia (inappropriate contraction of the anal sphincter muscle when straining to have a bowel movement)

Patient Intake for Behavioral interventions

- Physical exam
- Comprehensive history
- Diagnostic tests
- Biofeedback assisted behavioral interventions

Comprehensive History

- Onset and duration of bowel symptoms
- Frequency of episodes (3x a day to 3x a week is normal)- Men usually 2-3x a day vs women once every 2-3 days due to physiologic function
- Change in bowel habits
- Stool consistency
- Straining
- Neurological symptoms
- Blood or mucus in stool

History continued

- Diarrhea
- Difficult vaginal delivery
- History of pelvic or anal surgeries
- Abdominal cramping
- Pelvic or anal pain
- Present medications
- Type and number of protective pads
- Effects of various foods
- Are there urgent calls to stool

Medical Assessment and Diagnostic Investigations for Anorectal Disorders

Anorectal Manometry

- Anorectal Manometry is a diagnostic procedure designed to examine the muscle function of the anorectal area. The procedure consists of placing a (pencil thick) flexible tube into the rectum that holds multiple sensors to detect and record pressure activity in the rectum and anal canal.

 Q3 25

Anal Manometry measures:

- Strength and control of the anal sphincter muscles
- Sensation of stooling in the rectum
- Reflexes that govern bowel
- Movements of the rectal and anal muscles
- Coordination with defecatory straining.

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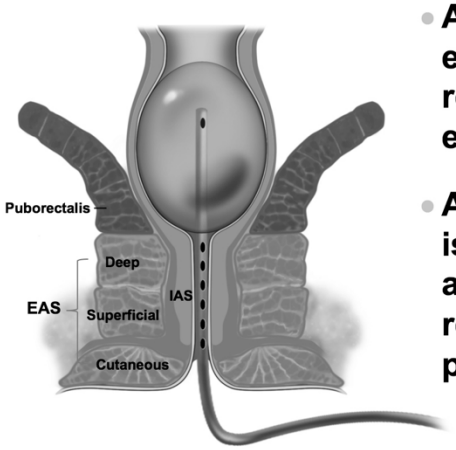
Anorectal Manometry



- **Assesses the internal and external anal sphincters, rectal sensations, and expulsion patterns**
- **A pressure-sensitive catheter is inserted into the anorectum to measure resting and squeeze pressures of the anal canal**

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CONTINUED

Anorectal manometry

Anorectal manometry is useful in the diagnosis of the following conditions:

- Constipation, particularly difficulty with stool evacuation (dyssynergic defecation)
- Stool leakage or fecal incontinence
- Anorectal function before or after bowel surgery

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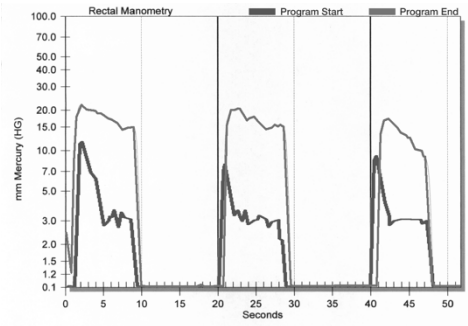
Fecal Incontinence
-Muscle strength & endurance-



Session Timing:
Work/Rest Work Seconds: 10 Rest Seconds: 10 Number of Trials: 3

Overall Session Values:

	Channel B Avg	Min	Max	StD	W-R Rise	%S	Tot %S
WORK	1.43	0.17	3.92	0.58	+0.95		
REST	0.48	0.00	1.36	0.20		0.00	0.00

	Channel C Avg	Min	Max	StD	W-R Rise	%S	Tot %S
WORK	12.6	0.10	22.2	6.15	+12.5		
REST	0.14	0.00	0.93	0.07		0.00	0.00

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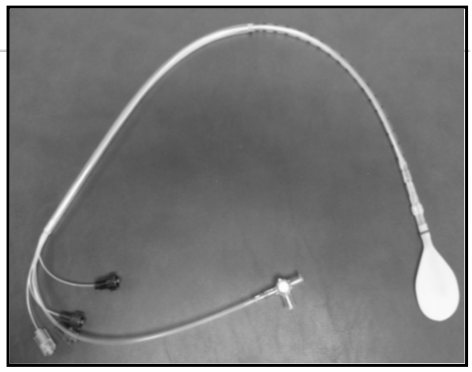
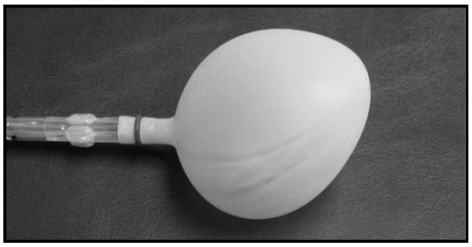
Rectal Sensation

- Balloon Expulsion Test
- Measurements:
  - First sensation
  - First urge to defecate
  - Maximum tolerable volume
  - Rectoanal inhibitory reflex (RAIR)





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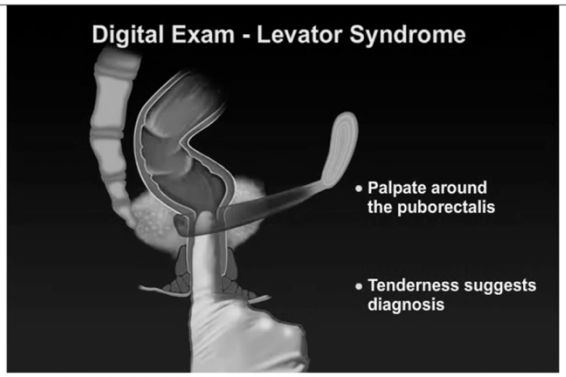
Digital Rectal Exam

- For the estimation of the tonicity of the anal sphincter, which may be useful in case of fecal incontinence or neurologic diseases
- To test EAS strength and EAS/IAS resting tone

Anorectal Exam

Chronic Proctalgia Syndrome



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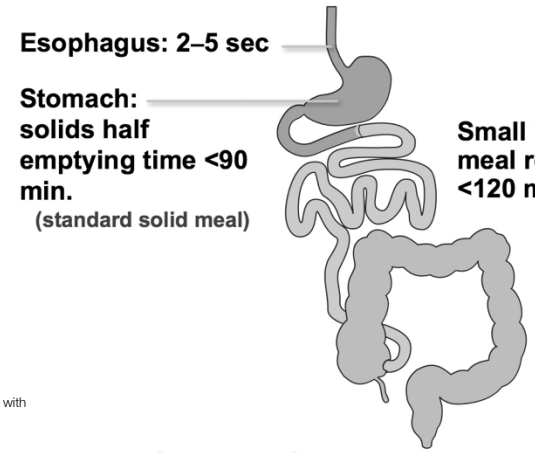
Transit Time Studies

- Colonic marker study to measure colonic transit
  - 24 markers ingested
  - X-rayed 3-5 days later
  - > 20% of rings present after 5 days -delayed colonic transit

Regional Differences in Transit Along the GI Tract



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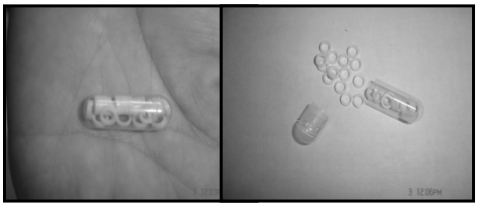
Colonic Transit / Motility (Sitz Marker)

- Ingestion of capsule (containing radiopaque markers), interval flat films taken over 5 days (e.g capsule taken Sunday - films on Monday, Wednesday, Friday)



- Pattern of colonic inertia: ≥ 80% of markers diffusely scattered throughout colon on 5th day, predominant retention in proximal colon

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- Pattern of colonic inertia: ≥ 20% of markers predominantly retained in rectosigmoid

Day 1 Day 3 Day 5

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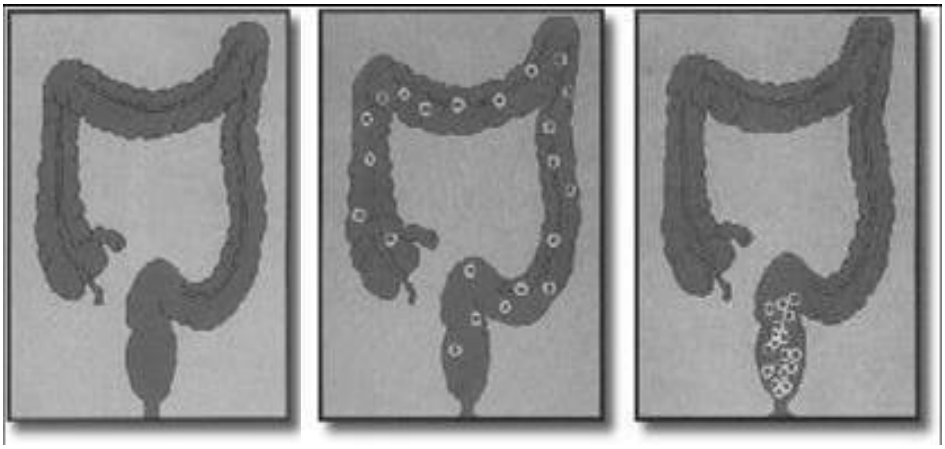
Patterns of Colonic Motility



Normal (80% Evacuated) Colonic Inertia Outlet Obstruction

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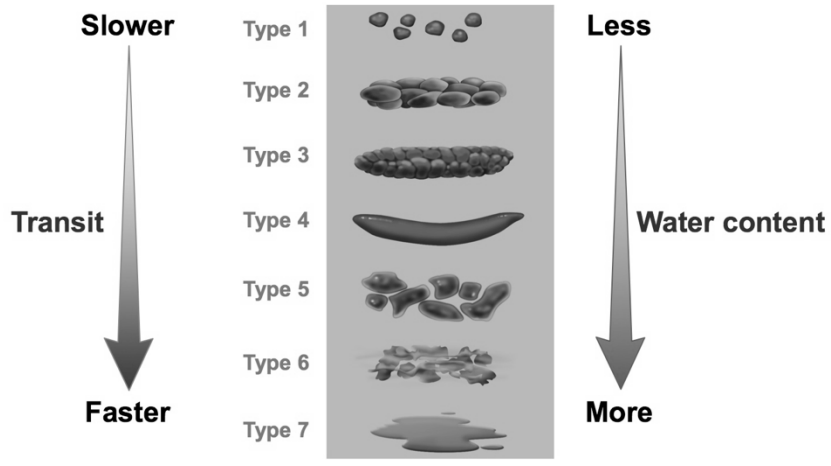
Stool Form Depends on Water Content and Correlates With Transit Time



Lewis SJ, Heaton KW. Scand J Gastroenterol 1997; 32:920
Heaton KW, O'Donnell LJ. J Clin Gastroenterol 1994; 19:28

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CONTINUED

Fecal Incontinence (Accidental Bowel Leakage)- Common Causes

- Surgical repair procedures
  - Fistulas: track of inflammation that bores a hole through tissue
  - Fissures: tear or open crack like sore in the anus
  - Hemorrhoids-often from straining
- Neurological causes
  - upper or lower motor neurons
  - diabetic mixed motor and sensory
- Sphincter trauma
  - fecal impaction
    - common geriatric problem
    - youth, mega rectum or congenital anorectal malformation
- Idiopathic constipation

Fecal Incontinence-Common Causes

- Obstetric trauma
  - most common
  - sphincter damage- difficult delivery
  - delayed pudendal nerve latencies
  - Sultan et al 128 woman 1/3-had EAS damage
- Pudendal nerve neuropathy
- Rectal Prolapse
- Hirschsprung's disease
  - children
  - anorectal malformation

Fecal Incontinence (FI)
Medical and Post-surgical Conditions

- Impaired rectal sensation
- Inadequate EAS contraction
- Poor resting tone of IAS
- Diminished rectal capacity
- Incomplete relaxation or paradoxical contraction with defecation
- Severe constipation (overflow)

Impaired Rectal Sensation

- Damage to afferent nerve fibers
- Damage to sensory areas of brain
- Chronic rectal dilation-constipation
- Lack of appropriate response to normal “sampling”
  - IAS relaxation-anoderm in anal canal
  - Options: pass gas, toilet, EAS contraction
- No closure of distal anal canal with increase in proximal anal canal pressure

Paradoxical PFM Contraction

- Abnormal contraction with defecation attempt
- Outlet obstruction type constipation
- Straining with stool
- Need to assess with fecal incontinence (Rectocele or prolapse repair, hemorrhoidectomy)
- Incomplete emptying, post-defecation seepage

- Sensory impairment
  - Sensory training with manometry biofeedback
  - Strengthening assisted by EMG biofeedback to increase stretch reflex of PFM
  - Increase stool bulk with fiber-want daily stool
- Deficient EAS
  - Sphincter and puborectalis strengthening assisted by biofeedback
- Low IAS tone
  - Increase PFM tone and strength to compensate for IAS
  - Increase anal canal tone
- Address related constipation
- Avoid bowel irritants

MDCP

Fecal Incontinence (Moderate)

Treatment Options:

- **Conservative management should be tried first**
  - Education about the physiology of continence
  - Normalize stool consistency with fiber, or antidiarrheal drug
  - Improve strength of pelvic floor muscles by daily squeeze exercises
- **Biofeedback**
  - Squeeze pressure using instrument-based biofeedback
  - Duration of sustained squeeze
  - Ability to recognize weaker rectal distentions through sensory training
  - Teach deep breathing as a coping skill to counteract anticipatory anxiety and increase tolerance for rectal distention
- **Sacral nerve electrical stimulation (neuromodulation)**
- **Inject inert bulking agent (dextranomer) into the submucosal space to increase resting anal pressure**
- **Surgery, e.g. sphincteroplasty, mesh slings, or colectomy**

MDCP 221 ROME FOUNDATION

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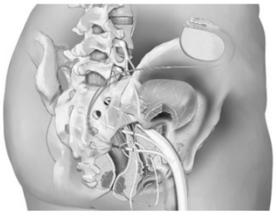
Sacral Nerve Stimulation

Sacral neuromodulator

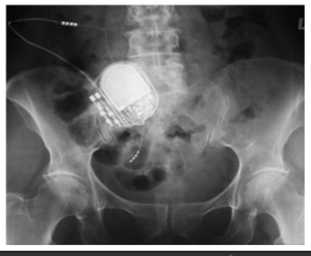
Temporary phase with external pulse generator and controller connected to a unipolar lead



Implant and lead in situ

Success (1-2 week test phase)

Permanent stimulator with quadripolar tined lead and implantable pulse generator



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Relevant Dietary Factors

- Bulky stool stimulates GI peristaltic activity-decreased transit time
- Individual responses to foods
- Offer dietary information as suggestions to try
- Elimination diet approach

Foods That Can Thicken Stool-Fiber

- Bananas
- Toast
- Potatoes
- Yogurt
- Cheese
- Creamy Peanut Butter
- Apples
- Bread
- Tapioca
- Pasta
- Applesauce
- Rice

Foods That Can Loosen Stool or Stimulate Bowel Movements

- Warm foods
- Warm drinks
- Fried foods
- Prune juice
- String beans
- Chocolate
- Raw fruits
- Grape juice
- Raw vegetables

Q5 49

Foods That Can Produce Gas

- Apple juice
- Broccoli
- Beans
- Soda
- Wine
- Cabbage
- Vinegar
- Seltzer
- Onions
- Beer

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Foods That Can Produce Odor

- Alcohol
- Asparagus
- Garlic
- Cabbage
- Fish
- Vitamins / Medications
- Beans
- Onions

Foods That Can Cause Bowel Irritability

- Milk and milk products
- Tomatoes and tomato based food
- Fried foods
- Greasy foods
- Artificial sweeteners
- Caffeinated fluids (tea, coffee, soda)
- Chocolate
- Eggs
- Salads
- Citrus fruit/juice
- Alcohol

High Fiber Foods

Blackberries	Raspberries
Beans	Baked potato
Prunes	Whole grains
Corn	Dried apricot
Oatmeal	Bran Cereals
Nuts	Bananas
Pears	Raisins
Celery	Popcorn
Cabbage	Spinach
Apples	Dried Figs
Carrots	Lentils

Fiber

- How much?
  - General recommendation 25-30 grams per day
  - American diet 13 grams per day, African 60 grams
  - Possibly more with constipation
- How to increase fiber?
  - Bran containing cereals (4-5 grams per serving)
  - Increase fruit and vegetable
  - Cooked beans of all types (4-5 grams per 1/2 serving

Q6

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Bowel Recipe

- 1 cup of unsweetened applesauce
- 1 cup coarse *un*processed wheat bran (Miller's brand) or oat bran
- ¾ cup prune or cranberry juice

Begin with 2 TBLs everyday with a glass of water. Increase to 2 TBLs 2x a day if needed.

Diet Modification

- Bowel Habit Regulation
- Goal: Regular and predictable
  - Adequate Fiber (25-30 grams a day)
  - Avoid straining
  - Fluids and Exercise
  - Regular time
  - Heed the Urge
  - Avoid constipation
  - Bowel Recipe

Home Exercise Program for FI

- Tailor prescription to patient to maximize compliance and eventual success
- 5 sets of 20 contractions, 100 per day (shape up to at least 10 second holds)
- Do sets in variety of positions (start with reclined, add on sitting and standing)
- Train to contract external sphincter and puborectalis with any sensation of fullness
- Maintain relaxed abdominal muscles (obliques and rectus)

Home Exercise for FI continued

- Kegel exercises increases sensitivity to rectal fullness as well as strengthening
- Individualized exercise program
- Home trainer
- Bowel diary for symptom tracking, exercise compliance, dietary factors

Biofeedback

- Used to improve or compensate for:
- PFM/EAS weakness, incoordination, poor endurance, poor rectal support
- Paradoxical contraction (failure to relax)
- Ability to use abdominals correctly to increase abdominal pressure for strain-free evacuation
- Sensory deficits

Source: Jeannette Tries, OT

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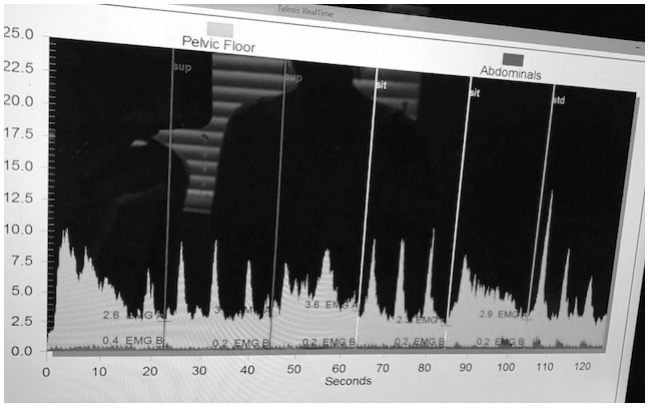
Assessment: Sustained Contractions and Quick Flicks in 3 Positions



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Biofeedback Goals for Treatment

- Improve selective PFM contraction
- Decrease long-latency to relax after contraction
- Decrease baseline activity
- Decrease paradoxical EAS activity with evacuation maneuvers
- Instruct in bowel management (diet, fluids, gastro colic reflex)
- Establish a HEP

Source: Jeannette Tries, OT

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Patient Characteristics and Biofeedback

- > 5 years old
- Motivated
- Sufficient intelligence and memory to understand training
- Defecation reflex response with rectal distention (manometry)
- Some sensation of rectal distention (manometry evaluation)
- BFB overall effectiveness 70-80%

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Childhood Fecal Incontinence

- Over the age 4 with leakage
- Encopresis
- Overflow incontinence
  - shyness at school, sluggish colon, decongestants, painful fissures
- Pain-vicious cycle
- Paradoxical diarrhea-relaxed IAS and EAS, impaired sensation
- Megacolon and megarectum
- The Poo in You – You Tube video
- It's No Accident (book by Steve Hodges)

Causes and Rx

- Imperforate anus
  - Rare anorectal anomaly
  - No opening to outside
  - Lack of proper neuronal connections
  - Damage during surgical repairs
- Toilet fears
- Severe toilet training
- Treatment
  - Behavioral habit training or re-training
  - Biofeedback

CONTINUED

Biofeedback Treatment

- Biofeedback has been used to train the musculature of the pelvic floor through specific exercises, which, in cases of pelvic dysfunction (synonyms: anismus, paradoxical contraction of the puborectalis muscle or spastic pelvic floor syndrome), aids the relaxation of this musculature during evacuatory efforts. This approach is recommended for children over 6 years of age and adults. Biofeedback therapy with the aim of training patients to relax the pelvic floor during defecation is appropriately recommended for the treatment of patients with symptoms of pelvic dysfunction.

Diagnosis and treatment of constipation: a clinical update based on the Rome IV criteria

CW Sobrado, IC Neto, RA Pinto, LF Sobrado… - Journal of Coloproctology, 2018

Rome IV Diagnostic Criteria for Functional Constipation

Must include two or more of the following occurring at least once per week for a minimum of 1 month with insufficient criteria for a diagnosis of IBS:

1. **Two or fewer defecations in the toilet per week in a child of a developmental age of at least 4 years**
2. **At least one 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 can obstruct the toilet**

After appropriate evaluation, the symptoms cannot be fully explained by another medical condition.

DiLorenzo C, et al. Disorders of Brain-Gut Interaction, 4th ed. Rome Foundation, 2016; pp. 1297-1372

ROME FOUNDATION

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CONTINUED

Constipation

- Most common digestive problem in the U.S.
- Constipation can lead to:
  - fecal impaction
  - fecal incontinence
  - dilation and even perforation of the rectum
- Normal frequency of bowel movements
  - three per week to three per day
- Some constipated individuals have dyschezia (pain)
- Causes can include:
  - drugs and medications
  - disorders and diseases (stress and depression)

Bowel Management Principles

- Daily regular time utilizing the gastrocolic reflex
- Utilize method to reliably empty rectum (reflex, glycerin suppository, enemas, etc.)
- Start training after rectum empty
- Try abdominal massage 10-20 min. after insertion of suppository
- Pay attention to posture on toilet

Constipation
Some Causes and Dynamics

- Elevated mean sensory threshold
  - Nerve damage
  - Megarectum, megacolon
  - Rectocele
- Increased pelvic floor descent
  - Muscle weakness, lax ligaments, poor funneling of stool
- Anismus-paradoxical contraction of EAS and puborectalis with defecation
  - Pain - current or past
  - Sexual abuse history

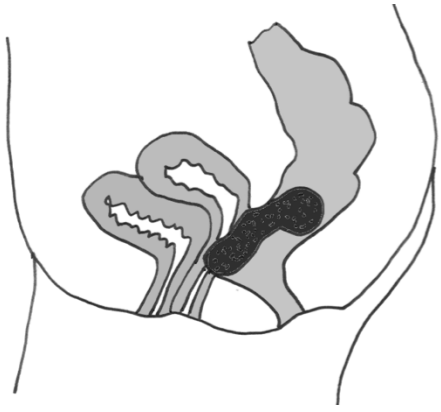
Constipation
Some Causes and Dynamics

- Colonic motility
  - Slow transit time
  - Diet-low bulk
  - low amplitude contractions (most often)
  - morning, after awakening, pre-defecation high amplitude contractions occur
- Poor habits
  - Delaying call to stool
  - Lack of exercise

Disorders/Diseases Contributing to Constipation

- Diabetes
- Hypothyroidism
- Painful anorectal disorders
  - fissure
  - hemorrhoid
  - abscess
- Depression
- IBS
- Megarectum and megacolon
- Rectocele

Rectocele



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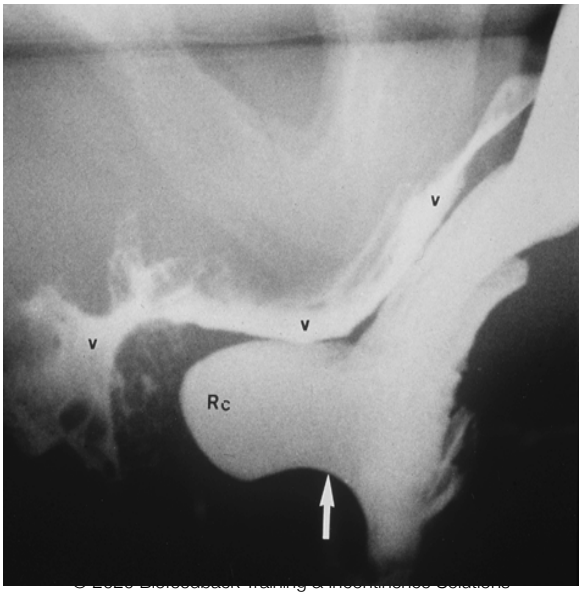
Rectocele



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Behavioral Treatments for Constipation

- Habit training
- Relaxation exercises
- Synergy training (abdominals)
- Home trainer
- Diet and exercise
- Toileting postures

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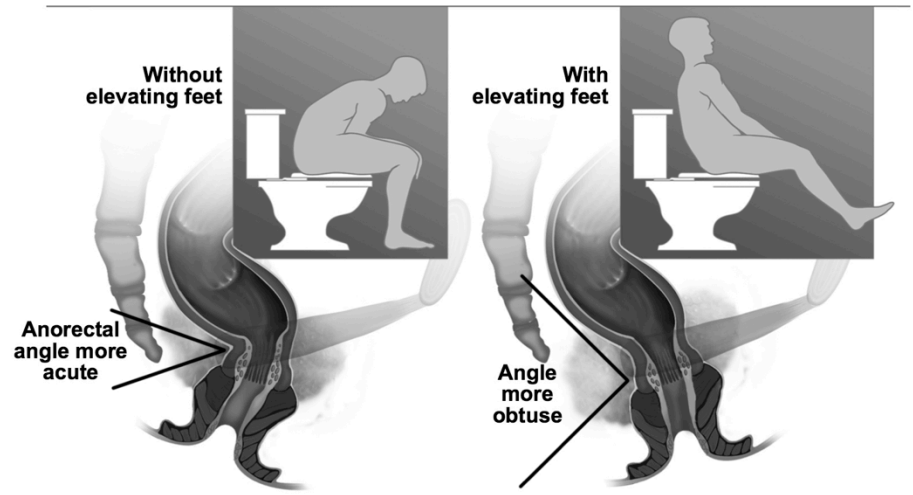
Habit Training

- Enema or laxative to clean bowels
- Attempt bowel movement at regular time each day (after breakfast is best).
- If no bowel movement occurs for two days (48 hours), take an enema or laxative again with MD approval

Constipation Rx continued

- Toileting behaviors
  - quick response to call to stool
  - maximize defecation reflex after meals
    - Gastrocolic reflex
  - toileting postures
  - allow sufficient time for defecation
- Dietary
  - adequate fluid intake (64 oz.)
  - adequate fiber intake (35 grams optimal)
- Regular Exercise

Squatting and Elevating Feet Can Facilitate Defecation



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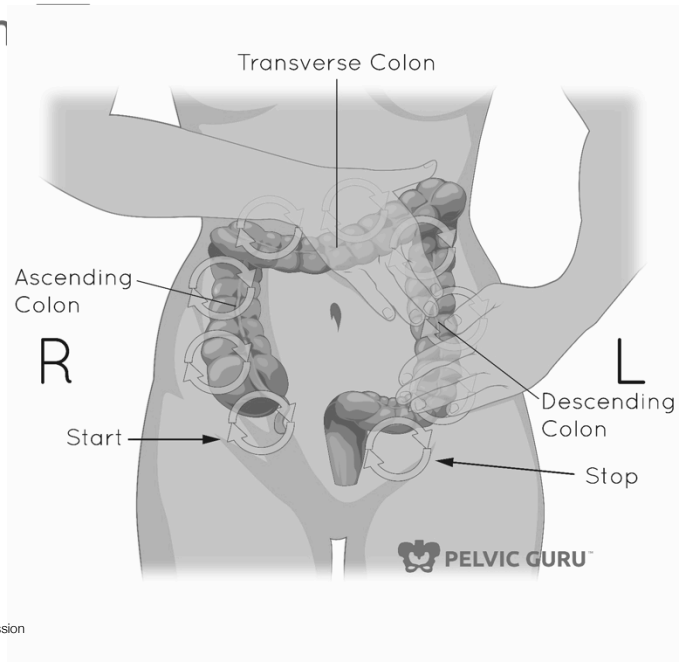

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Dyssynergia

- Rome Diagnostic Criteria: At least three months of chronic or recurrent symptoms
  - Straining on at least 25% bowel movements
  - A feeling of incomplete evacuation following at least 25% of bowel movements; or
  - Digital facilitation of defecation (vaginal splinting, pressing in or around the anus) at least 25% of the time; and
  - Mechanical causes have been excluded (rectocele)

Q10 79

Pelvic Floor Dyssynergia

- Evidence that pelvic floor muscles fail to relax or actually contracts during attempts to have bowel movements:
  - Electromyography
  - Manometry (pressure measurement)
  - Defecography (x-ray study)
- No evidence of organic cause or disease process

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Dyssynergia Treatment

- Habit training (20 minutes after breakfast)
- Down training PFM hypertonis with BFB
- PFM strengthening for better funneling of stool

Down-Training

- Toilet Track
- 8 minutes
- Found on I-tunes Music
- Meditations for Pelvic Health by Nari Clemons
- 9 tracks for $9.99

Behavioral Treatments for Constipation related to Pelvic Floor Dyssynergia

- Biofeedback Synergy Training: neuromuscular reeducation assisted by rectal and abdominal EMG biofeedback
- Neuromuscular relaxation training assisted by multi-modal biofeedback
- Habit training – don't strain or rush
- Toileting skills and postures

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- The following slides are for you to read on your own on biofeedback research in treating bowel disorders!

Literature Review
BFB and Functional Anorectal Disorders

- Palsson, Heymen, Whitehead, Applied Psychophysiology and Biofeedback, Sept. 2004
- Looked at studies from 1975-2003
  - Functional constipation, fecal incontinence, anorectal pain
  - Conclusions: BFB provides significantly higher probability of successful outcomes with functional constipation and fecal incontinence than standard medical care
  - Should be offered routinely - safe, relatively inexpensive, well accepted by patients
  - More studies needed to assess which BFB interventions are more effective

Biofeedback Research

- Always check latest research on scholar.google.com
- More research being done on electrode placement and PF treatment with and without biofeedback

Electrode/Sensor Placement

- Recent literature supports use of surface EMG peri-anal electrodes
- Electrodes placed at 4:00 and 9:00 positions around anus
- Surface electrodes offer same recording of (RMS mean) average magnitude of change and RMS peak as intravaginal sensor. RMS=root, mean, square
- Surface electrodes allow alternate sensor placement for those who do not want vaginal sensor

"Electromyographic assessment of women's pelvic floor: What is the best place for a superficial sensor?" Neurology and Urodynamics: 2017;9999:1-7. Moretti, E.,Galvao de Moura Filho,A.,Correia de Almedia, J., Araujo, C., Lemos,C.

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BF-assisted PFM improves SUI rates

- Treatment compliance can be optimized with patients using biofeedback assisted PFM training.
- Patients who choose own type of sensor have higher compliance
- 53 women randomized into 3 groups: PRM HEP alone, PFM and BF-assisted exercises with intravaginal sensor and PFM and BF-assisted with peri-anal electrodes.
- Those who used biofeedback showed superior improvements over those with HEP alone.
- Both intravaginal sensor and surface electrodes showed equivalent results.

"Comparison of the efficacy of perineal and intravaginal biofeedback assisted pelvic floor muscle exercises in women with urodynamic stress urinary incontinence." Aysun Ozlu, MD, Necmettin Yildiz MD, Ozer Oztekin, MD, Neurology and Urodynamics, 2017, 9999: 1-10.

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Comparison of the efficacy of pelvic floor muscle exercises (PFME) with and without surface EMG biofeedback (BF)

- PFME and PFME + BF participants exhibited significant increases in muscle strength, pre-contraction while coughing , maximum voluntary contraction, duration of endurance contraction, and ICIQ-SF scores.
- The PFME and BF group showed significantly superior results over the PFME alone group.

Effect of electromyographic biofeedback as an add-on to pelvic floor muscle exercises on neuromuscular outcomes and quality of life in postmenopausal women with stress urinary incontinence: A randomized controlled trial". Adriane Bertotto, Renata Schwartzman, Silvana Uchoa, Maria Celeste Osorio Wender, Neurourology Urodynamics, November 2017, 2142-2147.

Quality of Life Outcomes

- Outcomes from this case using perineal sEMG biofeedback in conjunction with PFM training demonstrated clinically meaningful improvements in incontinence-related QOL, in addition to improvements in motor function in a woman with mixed UI and nocturia.
- This case suggests that use of perineal electrodes can provide meaningful improvements in patient outcome without use of intravaginal sensor.
- Opens the door for more treatment options with use of biofeedback for those unable to tolerate intravaginal sensor.

"Quality-of-Life Outcomes Following Surface Electromyography Biofeedback as an Adjunct to Pelvic Floor Muscle Training for Urinary Incontinence: A Case Report". Hill, A., Alappatu, M. Journal of Women's Health Physical Therapy: May 2017 - Volume 41 - Issue 2 - p 73–82

Pediatric Biofeedback

- Case study reports improved continence following intervention with biofeedback for pelvic floor muscle dysfunction in a five year old child.
- Surface EMG biofeedback perineal electrodes used during treatment sessions to provide visualization of muscle.

"Biofeedback-Assisted Muscle Training for Pelvic Floor Dysfunction to Address Pediatric Incontinence: A Case Report". Gibbs, K., Kenyon, L., Journal of Women's Health Physical Therapy, January 2018: 17-22.

MDCP

Functional Defecation Disorder (Dyssynergic Defecation) with Functional Constipation – (Moderate)

A 33-year-old female accountant is referred to the GI clinic with infrequent bowel movements, difficulty passing hard stools, straining, and a sensation of incomplete evacuation. Spontaneous bowel movements occur every three or four days, and she often takes a laxative to have a bowel movement. She reports symptoms of bloating without abdominal pain at least several days per week and these symptoms worsen before menses. She recalls decreased bowel movement frequency in childhood and symptoms worsened while in college. Her symptoms affect work productivity and social activities. She misses work a couple of times per month and has to limit her social outings. On exam, there is right-sided abdominal fullness and slightly increased anal sphincter tone with paradoxical pelvic floor contraction when bearing down. Anorectal manometry confirms this and balloon expulsion test is abnormal. Radio-opaque markers show retention of 80% of markers at five days, scattered throughout the colon, indicating slow colonic transit. Calcium and TSH are normal.

- **A. Categorical Diagnosis:** Functional defecation disorder and functional constipation,
- **B. Clinical Modifier:** Dyssynergic defecation, slow transit constipation
- **C. Impact on Daily Activities:** Moderate
- **D. Psychosocial Modifier:** None known
- **E. Physiological Features and Known Biomarkers:** Abnormal anorectal motility and balloon expulsion test showing dyssynergia, normal increase in rectal pressure (more than 45mm Hg when attempting to defecate, abnormal Sitzmark study with prolonged colonic transit

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MDCP

Functional Defecation Disorder (Dyssynergic Defecation) with Functional Constipation – (Moderate)

Treatment Options:

- **Referral for anorectal biofeedback**
  - Biofeedback is superior to laxatives for treatment of dyssynergic defecation
  - Delayed whole gut transit may occur secondary to disordered defecation and may resolve with effective biofeedback treatment. Therefore, first treat DD with biofeedback and reassess for slow transit if symptoms do not resolve.
- **Dietary consultation**
  - Assess whether bloating may be due to ingestion of poorly absorbed carbodydrates or other food items (e.g., FODMAP); if so, recommend dietary restrictions.
- **Pharmacologic treatment: laxatives (e.g., PEG), lubiprostone, linaclotide, prucalopride**
  - Use osmotic laxative, prosecretory drug, or 5HT4 prokinetic if biofeedback is not available or if symptoms do not resolve with biofeedback.

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Applied Psychophysiology and Biofeedback for IBS

- Paced respiration and basic relaxation training assisted by biofeedback (relaxation tapes)
- Rectal EMG biofeedback
  - sphincter strengthening/diarrhea predominant fecal incontinence
  - synergy training for anismus/constipation predominant
- EEG biofeedback training
- Heart rate variability training for autonomic balancing, heart rate variability (6 breaths a minute), biofeedback

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