

Neurogenic Bowel Management

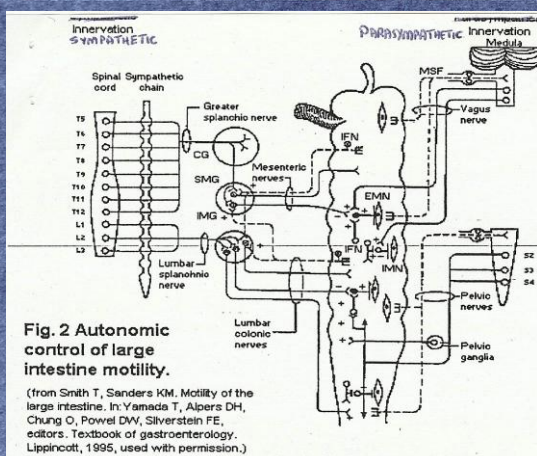
in adults with Spinal Cord Injury (S.C.I.)

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OVERVIEW

- Anatomy and Physiology
- Storage, propulsion and defecation
- Continence and defecation
- Pathophysiology of neurogenic bowel:
 - Spinal shock
 - Gastrocolic response
 - Effects of colorectal compliance and motility
 - Alterations in anal sphincter function



Sequence of events in normal Defecation

Involuntary activity:

- Giant migratory contractions advance stool through the colon to the rectum
- Stool distends the rectum and stretches the puborectalis muscle as the internal sphincter relaxes-the rectoanal inhibitory reflex. This triggers a conscious urge to defecate.
- External anal sphincter and puborectalis muscle contraction retains stool- the holding reflex.

Voluntary activity:

- Relaxation of the external anal sphincter and the puborectalis
- Contraction of the levator ani, external abdominals and diaphragm, combined with glottis closure, elevates intra-abdominal pressure and aids peristalsis in propelling stool out

Pathophysiology after SCI

Spinal shock:

- Transient loss of reflex function
- Depressed tone distal colon
- Terminated when reflexes return

Gastrocolic reflex:

- Feeding triggers peristalsis
- Returns with resolution of spinal shock

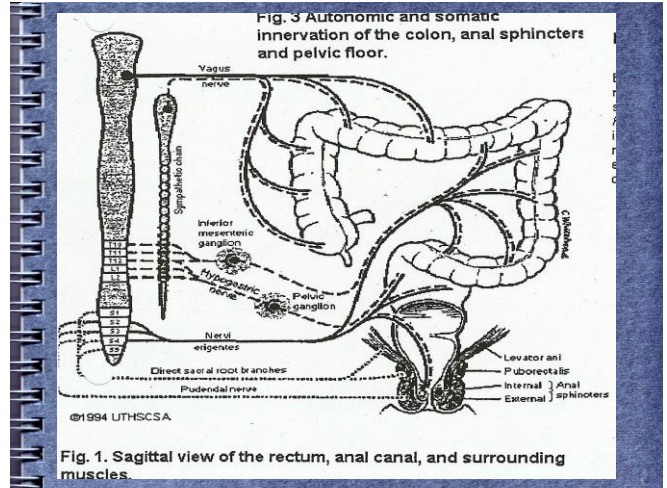
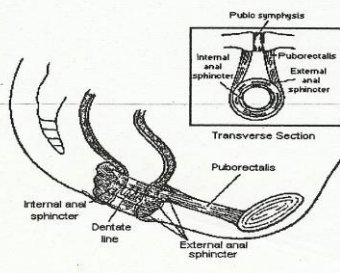


Fig. 1. Sagittal view of the rectum, anal canal, and surrounding muscles.

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Sequence of events and intervals in bowel care

Bowel care events separate the total period into discrete intervals.

- Pharmacologically or mechanically initiated bowel care begins with insertion of rectal medication or digital-rectal stimulation which acts as an **initializing stimulus**.
- **First Flatus** ends the **Interval time to Flatus** (initializing stimulus until first gas is passed)
- **Begin Stool Flow** ends the second interval, termed **Flatus to Stool Flow**, and begins **the Defecation Period**.
- **End Stool Flow** represents the time when defecation has immediately ceased.
- The time **Transfer off Toilet** ends the **Wait until Transfer** period, which represents the time spent to insure that defecation is complete. The time of **Transfer off Toilet** ends the bowel care procedure.

Colorectal compliance & Motility after SCI

- Decreased colonic compliance
- Rectal compliance(συμμόρφωση) effect is variable
- Slowing of transmit time: left colon and rectum

Anal Sphincter Function

- Resting pressures and reflex relaxation

Neurogenic Bowel

The above term relates colon dysfunction (such as constipation, incontinence and discoordination of defecation) to lack of nervous control.

Functional results of SCI

- **Reflexic bowel:**
Upper motor-neuron injury (above the sacral segments of the spinal cord)
- **Areflexic bowel:**
Lower motor-neuron injury (of the sacral segments or cauda equina)πππουρίδα

Reflexic Bowel

- Defecation is not initiated by "voluntary" external anal sphincter (E.A.S.) relaxation
- Reflex coordination of stool propulsion is preserved (σώζεται-διατηρείται)
- The external anal sphincter (E.A.S.) may be spastic, causing stool retention

Areflexic Bowel

- No (spinal cord mediated-διαμεσού νμ) reflex peristalsis
- Myenteric-plexus: slower stool propulsion which results in dryer, rounder stools
- Hypotonic anal sphincter: high risk of fecal incontinence-ακράτεια

Baseline Medical History for Neurogenic Bowel

- **Premorbid History:** Daily fluid intake, diet(fiber, meal frequency, spice preferences, amounts), bowel movements(frequency, duration, difficulties), stool(consistency, color, mucus, blood), medications
- **Current Status:** Injury level, daily fluid intake, diet, medications, patient's understanding of effect of SCI on elimination, bowel care(frequency, duration, digital stimulation frequency/technique), bowel incontinence (time of day, frequency, relationship to eating)
- **Lifestyle Goals:** Schedules for work or school, availability of assistance if needed, amount of time needed to complete bowel care regimen
- **After Chronic SCI:** hemorrhoids, abdominal distention, autonomic dysreflexia, difficult evacuation, poorly localized abdominal pain, fecal impaction, rectal bleeding

PHYSICAL EXAMINATION

- **Palpation** along the course of the colon
- **Rectal examination: DO IT GENTLY!**
- a) Occult blood
- b) Hemorrhoids
- c) Masses
- d) Neurological rectal examination (perianal pin sensation, proprioception, voluntary contraction, elicitation of anocutaneous and bulbocavernosus reflexes to determine if the patient has upper motor neuron or lower motor neuron bowel)
- e) Symptoms of dysreflexia

Assesment of Function (Disability)

- Ability to learn, to direct others
- Sitting tolerance and angle, sitting balance
- Upper extremity strength and proprioception
- Hand and arm function
- Spasticity
- Transfer skills
- Actual and potential risks to skin
- Anthropometric characteristics
- Home accessibility and equipment needs

The Ideal Management

- The program fits the patient's life
- Predictable & effective elimination (<60 min.)
- Minimize unplanned bowel movements
- Choose appropriate rectal stimulant
- Fluids, diet and activity
- Optimal frequency, schedule and position
- Evaluate medications that promote or inhibit bowel function

Fluid Intake

- The amount of fluid needed to promote optimal stool consistency needs to be balanced with the amount needed for bladder management. Fluid intake should be approximately 500 ml/day greater than the standard guidelines used to estimate the needs of the general public (National Research Council,1989)
- Standard guidelines indicate that adult fluid needs can be estimated by either of the following formulas:
1 ml fluid/ Kcal of energy needs + 500 ml daily
or 40 ml fluid/ kg of body weight + 500 ml daily

Dietary Influences

- Dairy foods and high-fat meal slow transit of stool
 - Natural laxatives: caffeinated beverages, prune juice and apricot nectar
 - Dietary fiber accelerates and lubricates transit:
 - a) soluble (e.g. pectin)
 - b) insoluble (e.g. cellulose)
- SOURCES: whole grain, cereals, fruits and vegetables

Rectal Stimulation

Mechanical methods:

- Digital stimulation (gentle circular motion for 60 sec or less relaxes EAS and triggers peristalsis)
- Manual evacuation (one or two fingers to break up or hook stool and pull it out- may inhibit bowel reflexes)

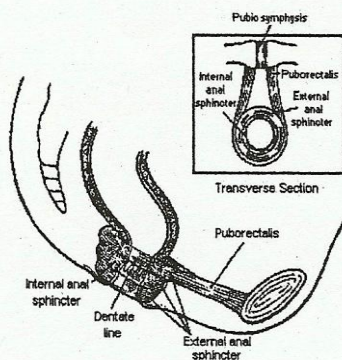
Chemical methods:

- Glycerine suppositories (mild local stimulation, lubrication)
- Bisacodyl suppositories (contact irritant: peristalsis of entire colon, e.g. Dulcolax)
- CO2 generating suppositories (trigger defecation with colonic dilatation, eg Ceo-Two)

Enemas: mini-enemas (eg Therevac) or large volume enemas for left colon impactions

Fig. 1. Sagittal view of the rectum, anal canal, and muscles.

"Anal Dilatation"



Patient's position

- **Reflexic Bowel:** Upright or side-lying, insert chemical stimulant, then wait, rectal stimulation. Repeat until rectum is empty. Maintain soft formed stool. Frequency: every day or every other day
- **Areflexic Bowel:** Upright or side-lying, Valsava=manual evacuation. Maintain firm stool. Frequency: every day or twice a day

Oral Medications

- **Bulking forming agents:** psyllium (eg Metamucil, Perdiem, Konsyl)
- **Stool softeners:** docusate sodium (eg Colace, Surfak) or potassium (eg Dialose), mineral oils, seed oils(croton and arachis) or liquid paraffin
- **Laxatives:**
 - a) **Contact stimulant:** senna(eg Senokot), cascara, aloe, bisacodyl (eg Dulcolax), phenophthalein (eg Ex-Lax),
 - b) **Saline:** magnesium citrate (eg Milk of Magnesia), sodium phosphate/biphosphate (Fleet's Phosphosoda oral solution or enema)
 - c) **Osmotic:** lactulose, sorbitol, polyethylene glycol electrolyte solution (eg Colyte, GoLyteLy)
- **Prokinetic agents:** cisapride (eg Propulsid), metoclopramide (eg Reglan)

Fiber

- Recommendation: 30 gr/day for risk reduction for cardiac disease and cancer in able-bodied persons
- Higher fiber intake increases the frequency of bowel program
- High fiber diet may actually slow colonic transit time in persons with SCI
- Individualize the fiber intake according to the person's pre-SCI habit

Other Recommendations

- **Assistive devices:**
 - a) seating devices: bowel care/shower chairs
 - b) elevated toilet seats
 - c) suppository inserter or stimulator
- **Safety concerns:**
 - a) sitting balance and tolerance
 - b) pressure sore risk
 - c) rectal trauma

Monitoring Program Effectiveness

- Date and time of day
- Total time
- Stimulating agent(s)
- Position
- Color, consistency and amount of stool
- Adverse reactions
- Unplanned evacuations

When bowel problems arise: re-schedule, check diet, fluid intake, activity, medication side-effects, infections, frequency of bowel care, position, type of rectal stimulant, oral medications, alternative treatment methods.

KEEP GOOD RECORDS & RECORD EFFECT OF CHANGE OF TREATMENT

Alternative approaches

- **Non-surgical:** transanal colonic irrigation (TAI)
- **Surgery:**
 - a) Colostomy (rectosigmoid inertia, fecal incontinence)
 - b) Ileostomy (total colonic inertia)
 - c) Stoma placement
 - d) Postoperative patient education
- **Patient/Family/Staff Education**

Outcomes, Equipment & Devices by level of injury

Injury Level	Potential Functional Outcome	Equipment Options	Assistive Devices
C1-5	Independent: verbal instruction Dependent: clothes, performance & transfers	Perform in bed Shower/commode chair	Mechanical Breathing
C6	Independent: verbal instructions, Assist with clothes and transfers Independent performance	Perform in bed Shower/commode chair or bench	Digital stimulator Suppository inserter Transfer board Adapted clothing
C7	Independent all components	Perform in bed Shower/commode chair or bench	Digital stimulator Suppository inserter Transfer board
C8-T1	Independent all components	Shower/commode chair or bench Raised toilet seat	Digital stimulator Suppository inserter Transfer board
T2-T6	Independent all components	Shower/commode chair or bench Raised toilet seat Puddled commode seat	Transfer board
T7-L2	Independent all components	Raised toilet seat Puddled commode seat	Transfer board