Neurogenic Bowel and Bladder

Matthias Linke DO, ABPMR SCIM
Director of Inpatient Spinal Cord Injury Rehabilitation
Barrow Neurological Institute
St. Joseph’s Hospital
Phoenix, Arizona
Medical Director Rehab Without Walls, AZ
Valley Physical Medicine & Rehabilitation LLC
Lecturer for Creighton Medical School, Phoenix and HonorHealth PM&R
residency in Scottsdale Arizona
Disclosures

I have no relevant financial relationships

We will be discussing topics related to both male and female genitalia, be aware of where you are viewing this presentation
Presentation originally created and presented by
Thomas N Bryce MD
Professor of Physical Medicine and Rehabilitation
SCI director
Icahn School of Medicine at Mount Sinai
New York, NY
SCI Causes Abnormal Urinary Function

- The general term for the consequence of SCI on urinary function has been historically called “Neurogenic Bladder”.

- However the consequence is more accurately labeled Neurogenic Lower Urinary Tract Dysfunction (NLUTD). The term “Neurogenic Bladder” is misleading, because the dysfunction may involve not only the bladder but also the urethral sphincter.

A Brief Review of lower urinary tract function and dysfunction as it relates to SCI ...
Normal Urine Storage (no NLUTD)

- Bladder filling rate: 20-100 mL/hour (1 mL/minute)
- Urethral pressure > Bladder pressure, thus maintaining continence
- Low bladder pressure during filling (0-20 cm H2O)
- Low bladder pressure during voiding (=/< 40-50 cm H2O)
- Bladder capacity: 400-500 ml
- Individual is continent, aware when full
- Voiding initiated voluntarily
Normal Bladder Emptying (no NLUTD)

- Voluntary relaxation of external sphincter
- Involuntary relaxation of internal sphincter
- Contraction of bladder detrusor muscle
- No obstruction to flow
Key neurological components related to neuro-urological function

**Brain**: controls voluntary aspect of urination

**Brain stem**: controls coordination of function, so that sphincters open at the same time as bladder contracts

**Lumbar sympathetics (T10 - L2)**: increase ability of bladder to store urine by increasing contraction of internal sphincter and bladder neck

**Sacral parasympathetics (S2 - S4)**: increase ability of bladder to empty by causing contraction of bladder muscle (detrusor)

**Sacral somatics (S2 - S4)**: increase ability of bladder to store urine by contracting the external sphincter. Also carry sensory information (e.g. pain, flow)
Spinal Cord and Cauda Equina

Slide content developed by William Waring, Ronald Reeves, William Scelza, and Ralph Marino through InSTeP. [www.asialearningcenter.com](http://www.asialearningcenter.com) Medical illustrations by Sheila Macomber of MOVCO Media.
Abnormal Function after SCI

Any lesion (Cervical, Thoracic, Lumbar, Sacral) leads to loss of voluntary control of voiding due to interrupted input from the brain.

- Any lesion (Cervical, Thoracic, Lumbar, Sacral) leads to loss of coordination of sphincter and bladder due to interrupted input from the coordination center in the brainstem (Pons).

- Any lesion prevents sensation of bladder fullness due to interruption of afferent pathways.

- Bladder function in sacral lesions is different from that in suprasacral lesions.
Suprapontine lesion
- No significant post void residual
- Detrusor overactivity (DO)

Upper Motor Neuron (UMN) Bladder

Spinal (infrapontine-suprasacral) lesion
- Elevated post void residual
- Detrusor overactivity (DO) + detrusor-external sphincter dyssynergia (DSD)

Lower Motor Neuron (LMN) Bladder

Sacral/infrasacral lesion
- Elevated post void residual
- Hypocontractile or acontractile detrusor

Adapted from: Panicker JN. Lower urinary tract dysfunction in the neurological patient: clinical assessment and management. The Lancet Neurology 2015
There is a reflex contraction of the detrusor with impaired cerebral regulation and central inhibition and usually synergistic voiding (bladder emptying).

**Suprapontine lesion**
- No significant post void residual
- Detrusor overactivity (DO)

**Upper Motor Neuron (UMN) Bladder**

Neurogenic detrusor overactivity (DO) is characterized by involuntary detrusor contractions during bladder filling which may be spontaneous or provoked.

Adapted from: Panicker JN. Lower urinary tract dysfunction in the neurological patient: clinical assessment and management. The Lancet Neurology 2015

Spinal (infrapontine-suprasacral) lesion

- Elevated post void residual
  Urethral sphincter tone is high preventing complete emptying
- Detrusor overactivity (DO) – tone (UMN)
- Detrusor-external sphincter dyssynergia (DSD)
  detrusor contraction concurrent with an involuntary contraction of the urethral and/or periurethral striated muscle.

Pontine micturition center normally coordinates bladder contraction and sphincter relaxation, cord lesion causes a failure of the sphincter to relax
Upper Motor Neuron (UMN) Bladder

Spinal (infrapontine-suprasacral) lesion

DSD often results in a significant post void residual (PVR) and “high pressures” within the bladder and occasionally prevents all urine flow.

Up to 95% of those with a supraconal SCI have DO and DSD.

**Lower Motor Neuron (LMN) Bladder**

**Sacral/infrasacral lesion**
- Elevated post void residual
- Hypocontractile or acontractile detrusor

Findings include acontractile detrusor with or without decreased bladder compliance and usually with impaired sphincter activity.
Sacral/infrasacral lesion

- Elevated post void residual
- Hypocontractile or acontractile detrusor

Lower Motor Neuron (LMN) Bladder

- There is a loss of parasympathetic control of the detrusor and a somatic denervation of the external urethral sphincter.

- Sensory impairment is typically associated with a complete lesion.

- Some afferent pathways remain intact due to potential preservation of hypogastric afferents. Some patients may have stress urinary incontinence (SUI) due to sphincter deficiency (loss of Onuf's nuclei).

**Sacral/infrasacral lesion**

- Elevated post void residual
- Hypocontractile or acontractile detrusor
Complications of Neurogenic Lower Urinary Tract Dysfunction (LUTD) …
Detrusor-Sphincter Dyssynergia (DSD)

- Can lead to a hypertrophied low capacity poorly compliant bladder
- “Flea bitten” or “Christmas tree” bladder
- Characterized by bladder wall thickening and trabeculations
Upper Motor Neuron (UMN) infrapontine-suprasacral spinal lesion

High pressures within the bladder

→

Reflux of urine to kidneys

Hydronephrosis

→

Renal failure
Other Complications stemming from DSD

- **Bladder and kidney stones** due to incomplete bladder emptying
- **Bladder and kidney infection** due to incomplete bladder emptying
- **Autonomic dysreflexia (AD)** (lesions =/> T6)
DSD can lead to autonomic dysreflexia (AD)

A noxious stimulus (distended bladder) activates nociceptors below the neurological level of injury (NLI) setting off a barrage of afferent impulses

↓

Sympathetic neurons are activated in the spinal cord below the NLI producing a generalized sympathetic response

↓

Sympathetic response generates increased peripheral resistance, circulating blood volume, and an elevation in blood pressure
Clinical Features of AD

- Pounding headache
- Hypertension
- Profuse sweating and flushing above the level of injury
- Blurry vision
- Sudden rise in BP generally greater than 20 mmHg
- Bradycardia
How high a pressure within the bladder is too high and can predispose to upper tract injury?

- Based on McGuire's often quoted study from 1981 on 42 myelodysplastic children, a sustained detrusor pressure (leak point pressure) of 40 cm H2O or more has been a recognized cut-off value causing renal deterioration.

- The reported value of damaging voiding detrusor pressures has been reported to vary from 75 to 115 cm H2O in other studies.


It is probably not just the high pressure but the duration of that high pressure that leads to upper tract deterioration however

- Duration of detrusor contractions longer than one third of the total duration of cystometry is associated with an increased risk of renal deterioration after SCI.

- The length of uninhibited detrusor contractions is significantly associated with dilatation of the upper urinary tract in reflex voiders.


It is probably not just the high pressure but the duration of that high pressure that leads to upper tract deterioration however

- A single short-lasting detrusor contraction during filling with a high maximum detrusor pressure will not necessarily cause renal damage if the remaining filling phase is characterized by a low vesical pressure without detrusor contractions.

Other complications related to management

<table>
<thead>
<tr>
<th>Lowest risk</th>
<th>Highest risk</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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</tbody>
</table>

**Urinary tract infection**

*IC*......<.....*External catheter*............*SPT/Transurethral indwelling*

**Urethral erosions**

*IC/External catheter/SPT ......<....... Transurethral indwelling*

**Bladder cancer (squamous cell)**

*IC/External catheter…..<……SPT/Transurethral indwelling*

**Bladder stones**

*IC……<…..*External catheter………..*SPT/Transurethral indwelling*

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The two main goals of urological management after SCI are:

- Prevention of complications, especially kidney function deterioration and infection
- Implementing bladder management that optimizes quality of life
Is it an UMN Bladder?

Spinal (infrapontine-suprascal lesion)

Physical Examination

- UMN signs including hyperreflexia, spasticity
- Intact bulbocavernosus reflex and anocutaneous reflex (anal reflex or anal wink)
Is it a LMN Bladder?
Sacral/infrasacral lesion

Physical Examination

- LMN signs (muscle atrophy, depressed or absent deep tendon reflexes)
- Absent bulbocavernosus reflex and anocutaneous reflex (anal reflex or anal wink)
- Lower abdominal distention with palpable firm bladder
Is it an UMN Bladder?

Spinal (infrapontine-suprascal lesion)

**Testing**
- Post void residual (PVR) urine measurement
- Urodynamic study (UDS)

Is it an LMN Bladder?
Sacral/infrasacral lesion

Testing

- High post void residual (PVR) urine measurement
- Urodynamic study
What are the various bladder management options?

<table>
<thead>
<tr>
<th>Bladder emptying:</th>
<th>Main</th>
<th>Supplementary</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Normal voiding</strong> (Voluntary initiation of micturition without reflex stimulation or compression of the bladder. This does not presume entirely normal function)</td>
<td>[]</td>
<td>[]</td>
</tr>
<tr>
<td><strong>Bladder reflex triggering</strong></td>
<td>[]</td>
<td>[]</td>
</tr>
<tr>
<td>Voluntary (tapping, scratching, anal stretch, etc.)</td>
<td>[]</td>
<td>[]</td>
</tr>
<tr>
<td>Involuntary</td>
<td>[]</td>
<td>[]</td>
</tr>
<tr>
<td><strong>Bladder expression</strong></td>
<td>[]</td>
<td>[]</td>
</tr>
<tr>
<td>Straining (abdominal straining, Valsalva’s manoeuvre)</td>
<td>[]</td>
<td>[]</td>
</tr>
<tr>
<td>External compression (Credé manoeuvre)</td>
<td>[]</td>
<td>[]</td>
</tr>
<tr>
<td><strong>Intermittent catheterisation</strong></td>
<td>[]</td>
<td>[]</td>
</tr>
<tr>
<td>Self-catheterisation</td>
<td>[]</td>
<td>[]</td>
</tr>
<tr>
<td>Catheterisation by attendant</td>
<td>[]</td>
<td>[]</td>
</tr>
<tr>
<td><strong>Indwelling catheter</strong></td>
<td>[]</td>
<td>[]</td>
</tr>
<tr>
<td>Transurethral</td>
<td>[]</td>
<td>[]</td>
</tr>
<tr>
<td>Suprapubic</td>
<td>[]</td>
<td>[]</td>
</tr>
<tr>
<td><strong>Non-continent urinary diversion/ostomy</strong></td>
<td>[]</td>
<td>[]</td>
</tr>
<tr>
<td>Other method, specify_______________________</td>
<td>[]</td>
<td>[]</td>
</tr>
<tr>
<td>[ ] Unknown</td>
<td>[]</td>
<td>[]</td>
</tr>
</tbody>
</table>
External catheter as sole method of management (reflex triggering)- who is a candidate?

Absolute requirements (‘balanced bladder’):

(1) Penis present and size/shape is adequate to maintain an external catheter
(2) Post void residuals are low (<200mL?)
(3) Bladder pressures are <40 cm H20 on UDS
(4) No autonomic dysreflexia during voiding
(5) Availability and motivation for regular surveillance

Relative Requirements: Unable to perform IC

Ideal candidates: Men with tetraplegia
External catheter as sole method of management

What if there is urinary retention (PVR >200mL) and/or high bladder pressures (>40 cm H2O)?

Add anti-alpha-adrenergic medication to relax sphincter
Goal- bladder expression- who is candidate?

Absolute requirements:

- Empty bladder without undue strain
- Low detrusor pressure- LMN Bladder
- Low post-expression residual

Relative requirements:

- Continent between attempted expressions
Goal - bladder expression only

What if there is still leaking in between expressions?

- Step 1 – wear pads or incontinence undergarments
- Step 2 - Consider artificial sphincter for men
Intermittent catheterization

• Self-catheterization
• Catheterization by attendant
Different types of Intermittent Catheterization (IC)

An International Continence Society (ICS) report on the terminology for adult neurogenic lower urinary tract dysfunction

- **Sterile IC:** Complete sterile setting, including genital skin antisepsis, sterile gloves, forceps, gown and mask.

- **Clean IC (CIC):** Use of a clean technique. This implies ordinary hand and genitals washing techniques and use of disposable or cleansed reusable catheters.

- **Aseptic IC:** This implies genital antiseptic preparation and the use of sterile (single-use) catheters and instruments/gloves in a designated clean area.

- **No-touch technique IC:** This was introduced as an easier way for the patient to perform self-intermittent catheterization with a ready-to-use catheter (pre-lubricated catheter, usually a hydrophilic catheter). A pull-in aid or special packages are used to handle the catheter without directly touching the sliding surface of the hydrophilic catheter.


file:///H:/DATA/Junk%20Scan/ICS_report_on_the_terminology_for_adult_neurogenic_lower Urinary_tract_dysfunction_ANLUTD.pdf
Intermittent catheterization (IC) – who is a candidate?

Relative requirements:

Persons who can perform IC or who have caregivers who can perform IC

Ideal candidates:

Men and women who are unable to empty their bladder normally
A continent urinary diversion (Mitrofanoff procedure) with an abdominal stoma placed for bladder access can allow a woman to catheterize herself independently.

Continuous drainage with a catheter is the most common bladder management option for women with C6 level of injury.

A continent urinary diversion (Mitrofanoff procedure) with an abdominal stoma placed for bladder access can allow a woman to catheterize herself independently.
Bladder Management C6-7 Motor Level without functional motor zone of partial preservation

For men intermittent catheterization is preferred, but continuous catheter drainage, or reflex voiding with condom catheter drainage (if balanced) are options if IC not possible.

Men (and women through a stoma) can be independent with intermittent catheterization or inserting indwelling urinary catheters using assistive devices.
Bladder Management C6-7 Motor Level without functional motor zone of partial preservation

Men can be independent with intermittent catheterization using assistive devices.

For women, independent self catheterization is possible, but it is technically difficult and time consuming and is generally not practical.
Bladder Management
C8 and below Motor Level

Intermittent catheterization
Goal- IC without leaking in between catheterizations

What if there is leaking in between catheterizations?

- Step 1- Limit fluid intake to 1800-2000 mL/day
- Step 2- Increase frequency of catheterization from e.g., 4x/day to 6x/day
Goal: IC without leaking in between catheterizations

What if there is still leaking in between catheterizations?

- Step 3: Add anticholinergic medication or Beta 3 adrenergic agonist (mirabegron) to relax detrusor
Goal - IC without leaking in between catheterizations

What if there is still leaking in between catheterizations?

- Step 4 - Inject detrusor with botulinum toxin
Goal- IC without leaking in between catheterizations

What if there is still leaking in between catheterizations?

- Step 5- Consider augmentation cystoplasty
Indwelling catheter
Transurethral
Suprapubic
An indwelling catheter- who is a candidate?

Absolute requirements:

Persons who have sustained high bladder pressures or high post void residuals and cannot IC

Relative requirements:

Persons who cannot IC and are not candidates for bladder reflex triggering (those without balanced bladder)

Ideal candidates:

Men and women with higher level tetraplegia
Bladder Management C1-5 Motor Level without functional motor zone of partial preservation

If there is no one available who can perform IC-continuous drainage with indwelling suprapubic or transurethral catheter or reflex triggering with condom catheter
### Prevalence of bladder management options post injury- SCI Model Systems

<table>
<thead>
<tr>
<th>Years post Injury</th>
<th># Voiding (%)</th>
<th># Indwelling Catheter (%)</th>
<th># Condom Catheter (%)</th>
<th># CIC (%)</th>
<th># Urinary Diversion (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>1,733 (13)</td>
<td>3,009 (23)</td>
<td>1,969 (15)</td>
<td>5,954 (46)</td>
<td>2 (0.02)</td>
</tr>
<tr>
<td>5</td>
<td>1,733 (18)</td>
<td>2,447 (26)</td>
<td>2,148 (23)</td>
<td>2,455 (26)</td>
<td>49 (1)</td>
</tr>
<tr>
<td>10</td>
<td>660 (14)</td>
<td>1,463 (32)</td>
<td>1,066 (23)</td>
<td>1,154 (25)</td>
<td>50 (1)</td>
</tr>
<tr>
<td>20</td>
<td>308 (15)</td>
<td>890 (43)</td>
<td>331 (16)</td>
<td>430 (21)</td>
<td>31 (2)</td>
</tr>
<tr>
<td>30</td>
<td>35 (13)</td>
<td>123 (45)</td>
<td>50 (18)</td>
<td>39 (14)</td>
<td>7 (3)</td>
</tr>
</tbody>
</table>

Resources for NLUTD Assessment/Treatment


Neurogenic Bowel

Innervation of the Bowel

Parasympathetic innervation
- esophagus to the splenic flexure of the colon
- Vagus nerve

Sympathetic innervation
- descending colon and rectum
- pelvic nerve (S2-S4)

Somatic Innervation
- pudendal nerve (S2-S4)
- innervates the external anal sphincter (EAS) and pelvic floor musculature.
Upper Motor Neuron (UMN) Neurogenic Bowel

• Supra-sacral segment damage
• Defecation cannot be initiated by voluntary relaxation of the external anal sphincter
• Reflex mediated colonic peristalsis

Lower Motor Neuron (LMN) Neurogenic Bowel

• S2-S4 anterior horn cell or cauda equina damage
• No reflex mediated colonic peristalsis
• Slow stool propulsion coordinated by the intrinsically innervated myenteric plexus
• Anal sphincter is typically atonic and prone to stool leakage
GI Reflexes important for SCI

- **Gastrocolic**
  - Increase in colonic activity after a meal
  - Distention of the stomach stimulates evacuation of the colon
  - Blunted, but still useful after SCI

- **Enterogastric**
  - Distention and irritation of the small intestine results in suppression of secretion and motor activity in the stomach

- **Colocolonic**
  - Propels stool caudally by proximal muscle constriction and distal dilatation
  - Mediated by myenteric plexus

- **Rectocolic**
  - Colonic peristalsis due to stimulation of rectum
  - Mediated by pelvic nerve
A treatment plan for managing a neurogenic bowel with the goal of allowing effective and efficient colonic evacuation while preventing incontinence and constipation.
### Bowel Program

<table>
<thead>
<tr>
<th>Interventions</th>
<th>Reflexic Bowel (UMN)</th>
<th>Areflexic Bowel (LMN)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Time of routine</strong></td>
<td>30 – 60 minutes after meals (to use gastrocolic response).</td>
<td>30 – 60 minutes after meals.</td>
</tr>
<tr>
<td><strong>Frequency</strong></td>
<td>Daily preferred.</td>
<td>Daily or multiple times per day if needed.</td>
</tr>
<tr>
<td></td>
<td>A program greater than every 2-3 days may lead to chronic colorectal overdistention.</td>
<td></td>
</tr>
</tbody>
</table>

## UMN Bowel Program

<table>
<thead>
<tr>
<th>Interventions</th>
<th>Reflexic Bowel (UMN)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Digital stimulation</strong></td>
<td>Digital stimulation is performed by inserting a gloved, lubricated finger into the rectum and slowly rotating the finger in a circular movement until relaxation of the bowel wall is felt, flatus passes, or stool passes (usually within one minute).</td>
</tr>
<tr>
<td>Dependent on preservation of sacral reflex arcs</td>
<td>Digital stimulation is repeated every 10 minutes until there is cessation of stool flow, palpable internal sphincter closure, or the absence of stool results from the last two digital stimulations.</td>
</tr>
<tr>
<td></td>
<td>Abdominal wall massage starting in the right lower quadrant and progressing along the course of colon.</td>
</tr>
</tbody>
</table>

### LMN Bowel Program

<table>
<thead>
<tr>
<th>Interventions</th>
<th>Areflexic Bowel (LMN)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Digital evacuation</td>
<td>Digital evacuation is performed by inserting a gloved, lubricated finger into the rectum to break up or hook stool and pull it out.</td>
</tr>
<tr>
<td></td>
<td>Abdominal wall massage starting in the right lower quadrant and progressing along the course of colon is a useful adjunct for attempting to move stool along the colon.</td>
</tr>
</tbody>
</table>

# Bowel Program

<table>
<thead>
<tr>
<th>Interventions</th>
<th>Reflexic Bowel (UMN)</th>
<th>Areflexic Bowel (LMN)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Medications – oral</strong></td>
<td>Stool softeners and Bulking agents. Stimulant agents and Osmotic agents taken 8-12 hrs before the evacuation.</td>
<td>Bulking agents (fiber) help produce a bulky formed stool.</td>
</tr>
<tr>
<td><strong>Medications – rectal</strong></td>
<td>Stimulant suppositories or mini-enemas trigger a reflex evacuation of the colon/rectum.</td>
<td>Suppositories or minienemas are <strong>not</strong> helpful.</td>
</tr>
</tbody>
</table>

# Bowel Medications - 1st Line

<table>
<thead>
<tr>
<th>Class of Med</th>
<th>Mechanism of Action</th>
<th>Examples</th>
</tr>
</thead>
</table>
| Stool softeners   | ▪ Emulsify fat in GI tract and decrease reabsorption of water  
▪ Increase water content of stool | Docusate (Colace, Surfac)                                                            |
| Bulking agents    | Absorb water in intestine to form viscous liquid that promotes peristalsis and reduces transit time | Wheat bran, Corn fiber, Calcium polycarbophil (Fibercon), Psyllium (ispaghula husk, Metamucil, Fiberall, and others) |
| Stimulant agents  | Direct stimulation of colonic mucosa to produce peristalsis.                          | Senna (Senokot), bisacodyl (Dulcolax (PO or PR), Magic Bullet (PR)), castor oil, and the plant cascara sagrada |
| Osmotic agents    | Not absorbed and continue to hold water by osmotic action within the small bowel and the colon. | Polyethylene Glycol (MiraLax), Lactulose |
## Bowel Medications - 2nd Line

<table>
<thead>
<tr>
<th>Class of Med</th>
<th>Mechanism of Action</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Other agents</td>
<td>A locally acting chloride channel activator increases chloride ion transport into the intestinal lumen → fluid secretion into the bowels → increased fecal transit</td>
<td>Lubiprostone (amitiza)</td>
</tr>
<tr>
<td></td>
<td>A guanylate cyclase agonist acting locally on the luminal surface of the intestinal epithelium → increased cyclic guanosine monophosphate (cGMP) → secretion of chloride and bicarbonate into the intestinal lumen → fluid secretion into the bowels → increased fecal transit</td>
<td>Linaclotide (linzess)</td>
</tr>
</tbody>
</table>
Effect of diet

<table>
<thead>
<tr>
<th>Interventions</th>
<th>Reflexic Bowel (UMN)</th>
<th>Areflexic Bowel (LMN)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diet</td>
<td>High in fiber as tolerated</td>
<td>High in fiber as tolerated</td>
</tr>
</tbody>
</table>

Certain foods may make the stool hard, soft, loose, or produce flatulence.

High fiber foods provide enough bulk to help form normal consistency stools, some examples of high fiber foods are:

**Grains:**
- Bran (Bran cereals/muffins/breads)
- Whole wheat (bread/rolls/cereals)
- Oat (Oatmeal/cereals/cookies/muffins)
- Rice (whole-grain unbleached)

**Fruits:**
- apples
- apricots
- bananas
- oranges
- peaches
- plums
- prunes
- raisins

**Vegetables:**
- beans*
- turnips*
- mustard greens*
- cauliflower*
- cabbage*
- broccoli
- peas
- plantains
- potatoes
- tomatoes
- yams
- mushrooms
- green peppers
- beets
- celery
- yucca
- cucumber
- onion
- lentils

* These foods are gas formers, large amounts are not good.
### Troubleshooting Bowel Program Problems

<table>
<thead>
<tr>
<th>Problem</th>
<th>Differential Diagnosis</th>
</tr>
</thead>
</table>
| **Bowel Accidents** | • Ineffective bowel routine  
• Too much stool softener  
• Diet  
• Impaction  
• Presence of intestinal infection (C. Diff) |
| **Constipation** | • Diet, insufficient fluid intake, insufficient fiber  
• Not doing prescribed bowel regimen  
• Medications (e.g., anticholinergics, opioids) |

Neurogenic Bowel: What You Should Know.  
## Troubleshooting Bowel Program Problems

<table>
<thead>
<tr>
<th>Problem</th>
<th>Possible Cause</th>
<th>Intervention</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hemorrhoids</td>
<td>• Stool too hard&lt;br&gt;• Too vigorous digital stimulation</td>
<td>• Increase stool softener&lt;br&gt;• Modify diet and increase fiber&lt;br&gt;• Use gentle digital stimulation&lt;br&gt;• Use larger volume enema without digital stimulation until healed</td>
</tr>
<tr>
<td>Anal fissures</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Autonomic dysreflexia</td>
<td>• Presence of stool in rectum, impaction&lt;br&gt;• Hypersensitive to any stimulation below level of impairment</td>
<td>• Perform manual removal of stool or digital stimulation after applying topical anesthetic gel to anus/rectum.&lt;br&gt;• Modify bowel routine, as needed.&lt;br&gt;• Increase frequency of evacuations to decrease stool load</td>
</tr>
</tbody>
</table>

External devices for enema administration

Rectal irrigation catheters

Fecal incontinence:
- Effective emptying prevents incontinence

Constipation:
- More efficient emptying
Rectal irrigation catheters

How to use:

• Step 1 - fill bag body temp water
• Step 2 - connect tubes place controller on w/c
• Step 3 - connect catheter and wet catheter
• Step 4 - insert catheter into anus
• Step 5 - inflate catheter balloon
• Step 6 - pump in water
• Step 7 - remove catheter
Surgical options - Anterograde Continence Enema (ACE)

Anterograde Continence Enema (ACE)

- water: 1000-1200 ml
- 45 min. (30-60)
- each day / every third day

Mini-ACE

- [https://www.appliedmedical.net/enteral/miniace/](https://www.appliedmedical.net/enteral/miniace/)
Surgical options- colostomy

- UMN or LMN type bowel
- Reduced time for bowel management
- Less fecal incontinence
- Improved quality of life

Randell N et al. Spinal Cord 2001
Questions

• Matthias.linke@commonspirit.org
• mlinke@vpmr.net