

TELE-REHABILITATION GUIDELINE

Neurogenic Bowel

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I. Definition, assessment, and diagnosis

A. Definition: Neurogenic Bowel

1. Impairment of gastrointestinal and anorectal function resulting from impaired input from the central nervous system as the result of a spinal cord injury (SCI)ⁱ
 - a. Complications include but are not limited to ileus, gastric ulcers, gastroesophageal reflux disease (GERD), autonomic dysreflexia (AD), hemorrhoids, abdominal distention, diverticulosis, nausea, appetite loss, bowel impaction, constipation, delayed evacuation and unplanned evacuation.
 - b. The most likely cause of hospitalization due to complications of a neurogenic bowel is bowel impaction and/or an Ileus.
 - c. The complications due to neurogenic bowel can cause major physical and psychological problems in SCI persons and therefore must be managed in a proactive manner by the patient, the family/care giver and the health care provider.
2. Neurogenic bowel can be classified as Upper Motor Neuron (UMN) or Lower Motor Neuron (LMN) bowel dysfunction.ⁱⁱ
 - a. UMN: Injury above the conus medullaris
 - i. Hyperreflexic bowel characterized by increased colonic wall and anal tones
 - ii. Voluntary control of the external anal sphincter is disrupted, and the sphincter remains tight, thus promoting retention of stool. However, nerve connection between the spinal cord and colon remain intact, with preserved reflex coordination and stool propulsion.
 - iii. Stool evacuation can be achieved by eliciting reflex activity from introducing a stimulus into the rectum, such as an irritant or digital stimulation.
 - iv. The goal is to maintain soft yet firm stool, evacuate on a routine basis (at least 3 times per week) and prevent accidents.
 - b. LMN: Injury at the conus medullaris and cauda equina
 - v. Areflexic bowel characterized by loss of centrally mediated spinal cord peristalsis and slow stool propulsion
 - vi. Damage at or below T12 will inhibit the spinal cord mediated reflex defecation and will not respond to stimulation.
 - vii. Commonly associated with constipation and significant risk of incontinence because of the atonic external anal sphincter and lack of control over the levator ani muscle
 - viii. The goal is to maintain well-formed stool, maintain clear rectal vault and prevent accidents.
3. The colon is supplied with both autonomic (parasympathetic and sympathetic) and somatic (ie, sensory and motor) pathways.ⁱⁱⁱ Balance between these distinct neural pathways is controlled by higher centers in the brain and spinal cord.^{iv}
 - a. Parasympathetic innervation of the colon is responsible for colonic contractions and motility. The right and proximal transverse colon is innervated through the

- vagus nerve, whereas the left colon and rectum receives neural input from spinal segments S2-S4 via the pelvic nerve or nervi erigentes.
- b. Sympathetic supply comes through the lumbar splanchnic nerves and is the major pathway for carrying the sensations to and from the colon. The neuromuscular innervation of the colon is coordinated to produce both non-propulsive segmental contractions and high amplitude propagating contractions. Various neurotransmitters including acetylcholine, catecholamines, and serotonin have been shown to regulate colonic motility, although the principal autonomic neurotransmitter is acetylcholine.^v
4. Neurogenic bowel awareness and function is effected by whether the patient is a complete or incomplete SCI.
 - a. Those with incomplete injury may retain the sensation of rectal fullness and the ability to evacuate bowels, so no specific bowel program may be required.
 - b. Those with a complete injury may or may not function in a similar pattern in regards to constipation and incontinence to those with an incomplete injury. This depends on whether or not the reflex arc is maintained.
- B. Assessment and diagnosis ¹
1. A systemic, comprehensive evaluation of bowel function, impairment, and possible problems should be completed at the onset of SCI and at least annually.
 2. Patient history should include:
 - a. Premorbid gastrointestinal function and general medical conditions
 - b. Current bowel program
 - c. Current symptoms including abdominal distention, respiratory compromise, early satiety, nausea, evacuation difficulty, unplanned evacuations, rectal bleeding, diarrhea, constipation and pain
 - d. Defecation or bowel care frequency, duration and characteristics of stool
 3. A physical examination should be completed at onset of SCI and annually throughout care and should include:
 - a. Complete abdominal assessment including palpation along the colon
 - b. Rectal examination
 - c. Assessment of anal sphincter tone
 - d. Testing for anocutaneous and bulbocavernous reflexes to differentiate UMN vs. LMN bowel
 - e. Stool testing for occult blood or colonoscopy screening beginning at age 50, as the incidence of colon cancer is very similar to the non-disabled population.^{vi vii}
 4. Assessment of knowledge, cognition, function and performance should be conducted in order to determine an individual's ability to independently perform bowel program or direct a caregiver safely and effectively. This assessment should include the patient's:
 - a. Ability to learn
 - b. Ability to direct others
 - c. Sitting tolerance, angle and balance
 - d. Upper extremity strength and proprioception
 - e. Hand and arm function
 - f. Spasticity
 - g. Transfer capabilities
 - h. Actual and potential risks to skin
 - i. Home accessibility and equipment needs

II. Management and treatment recommendations

A. Management/treatment

1. Designing a good bowel program requires appropriate hydration, diet, activity, and choice of rectal stimulant to trigger defecation. Bowel program is initially daily but can be changed to every other day or 3x a week. It is important to individualize programs to find the optimal schedule, body position (in the bed, on the toilet, or over a bedside commode) and appropriate assistive techniques. Evaluate medications for adverse effects on the bowels.
2. Whenever possible, bowel care initiated for evacuation should be performed in either the normal position or in the left lateral position^{viii}. This allows use of gravity and facilitates fecal expulsion. Digital rectal stimulation is also useful for promoting bowel evacuation.^{ix x}
3. Two methods of rectal stimulation may be necessary and can be used either individually or in combination.
 - a. Mechanical methods
 - 1) Digital stimulation: Increases peristalsis and relaxes the external anal sphincter in UMN bowel. It is done by inserting a lubricated gloved finger into the rectum and rotating in a circular manner. Should be done for 15-20 seconds, with stimulation longer than 1 minute usually being unnecessary.
 - 2) Manual evacuation involves the insertion of one or two lubricated gloved fingers into the rectum to unhook stool and is the method of choice for patients with LMN bowel.
 - b. Chemical methods
 - 1) Glycerin suppositories act as a mild local stimulant and lubricating agent. Use in patients who experience adverse reactions to bisacodyl suppositories, fast reactions to bisacodyl or are attempting to make a transition from suppository to mechanical stimulation.
 - 2) Bisacodyl suppository is a contact irritant, acting directly on the mucosa and elicits peristalsis along the entire colon. The Polyethylene based bisacodyl suppositories (Magic bullet) are known to melt faster and work more quickly than the hydrogenated vegetable oil-based bisacodyl suppositories (dulcolax suppository)
 - 3) Mini-enemas are a 4 mL liquid suppository composed of liquid docusate and glycerin. They trigger reflex mediated peristalsis by acting as a mucosal stimulant and by providing lubrication.
 - 4) Mini-enemas with 3-5 ml liquid soap or shampoo with a 5 cc syringe made as a home preparation can be successful and cheaper.
 - c. The goal of the bowel program is to minimize or avoid unplanned bowel evacuations. Thus, the program should be predictable, scheduled and provide effective elimination to avoid colonic distention and fecal impaction.
 - d. A bowel program will require frequent adjustments throughout an individual's lifetime. During the acute phase of care, the spinal cord is in shock with impairment of the reflex arcs. There will be a need for more vigorous rectal stimulation and/or manual evacuation during the first few days of injury. As the individual's activity level increases and they experiment with different positioning, fluid amounts and diet, the patient will need to make further adjustments. In an incomplete SCI full recovery of bowel function may return and the necessity of the bowel program may resolve.
 - e. Consider also the use of assistive techniques that increase abdominal pressure: such as body push-ups; abdominal massage in a clockwise manner (starting the right lower abdominal quadrant moving up the ascending colon, across the transverse colon, and down the descending colon); the Valsalva maneuver; deep

breathing; ingestion of warm fluids; and/or a seated, forward leaning position to aid in bowel emptying.

- f. Knowledge of complications due to inadequate bowel program are necessary for prompt diagnosis as patients with SCI often have diminished visceral sensations and other clinical/physical signs which are usually relied on for a correct diagnosis. For instance, individuals with injuries above T6 may present with signs or symptoms of autonomic dysreflexia, vague non-localized discomfort, increased spasticity and a distended and taut abdomen. Keep in mind that the most common complaint in SCI patients with abdominal pathology is anorexia +/- autonomic dysreflexia (if level of SCI at or above T6) and +/- pain.
- g. Constipation in patients with SCI manifests with unusually long bowel care periods, abdominal distention, increased belching and small amounts of hard and dry stools. Management of chronic constipation begins with investigation of diet, fluid and fiber intake, daily activity and minimization of medications that can contribute to constipation. If proper evacuation is not obtained in 24 hours after a regular bowel program then a trial of one or more of lubricants, osmotic laxatives and stimulant cathartics should be attempted. If this is a chronic problem addition of a routine laxative such as polyethylene glycol (miralax), oral magnesium supplement, lubiporstone (Amitiza), or linaclotide (Linzess) can be helpful.
- h. Colostomies should not be considered as a failure of bowel program, but rather viewed as a safe, effective method at managing severe and chronic gastrointestinal problems.^{xi} Colostomies have been shown to reduce the number of hours spent on a bowel program, simplify bowel care, reduce the number of hospitalizations as a result of bowel care complaints, and to improve the quality of life. A Colostomy can be used to decrease bacterial count and contamination of a pressure sore and aid in the healing of a pressure sore.^{xii} If colostomy is decided upon, a permanent stoma is the best option.
- i. Anterior cecostomies are routinely used in Spina bifida patients and placed at a young age and can help with good bowel control in a predominantly lower motor neuron bowel population. It is not routinely used in spinal cord injuries as a large population of these patients have an upper motor neuron bowel, but it is also a viable option if the bowel program is impairing the quality of life in a patient with a spinal cord injury. Malone antegrade continence enema or Chait cecostomy button, which are increasingly performed in a minimally invasive fashion can be used to improve bowel care in more severe cases.^{xiii}

B. Restrictions

1. Caution should be used to avoid AD with digital stimulation (a pain stimulating maneuver) in patients with spinal cord lesions at or above T6. In individuals who experience AD with a bowel program, consider using a topical anesthetic gel or ointment when conducting the digital stimulation to reduce this risk or premedicate with sublingual or topical nitroglycerin (avoid in patients who are using PDE5 inhibitors medication, such as Viagra) prior to the digital stimulation to avoid the hypertension associated with AD.
2. Due to loss of sensation, use of bedpans should be strictly prohibited due to significant risks of skin breakdown and pressure ulcer formation. If bowel care on a commode or toilet is not possible, the patient should be placed in bed with appropriate padding under his/her buttocks.
3. Colorectal cancer must be ruled out in patients with positive fecal occult blood testing or in patients who are over the age of 50 and experience a change in bowel function that does not respond to corrective measures.

Tele-Rehabilitation Interventions through University-based Medicine for Prevention and Health

4. Major outcomes: An adequate bowel program in acute care should be designed so that the patient can easily replicate it at home to minimize unplanned evacuations.

III. Prevention and education

- A. Prevention: Diet plays a large role in a successful bowel program. Certain foods make stool hard/soft, make stool loose or produce flatulence. Monitor accordingly and consider consult with a nutritionist/dietician.
 1. Caution must be taken when adding fiber to the diet as fiber alone does not necessarily improve bowel function. Patient's previous fiber intake should be taken into consideration. The recommended starting dose is 15 g fiber/day with plans to increase slowly and combine with 2-3 L of fluid to prevent developing a bowel impaction^{xiv}. Additional fiber in the diet can slow down the colon transit time and if not enough fluid is consumed cause constipation^{xv}.
 2. Food intake increases gut motility in non-disabled persons. Postprandial colonic response to food in subjects with SCI was demonstrated in two studies^{xvi} postprandial colonic response in SCI is present but is suboptimal and confined to the descending colon.^{xvii}, but in several studies this phenomenon was not demonstrated^{xviii xix xx}.
 3. The amount of fluid needed to promote optimal stool consistency must balance the amount needed for appropriate bladder management.
 4. Recommended fluid intake is 500 ml/day greater than the general public. Calculated as 40 ml/kg body weight + 500 ml/day.
- B. Education
 1. Educational programs for bowel management should be structured and comprehensive. Education should be directed at all health care providers, patients and caregivers. Program timing and content will depend on medical stability, readiness to learn, safety awareness and other related factors. Educational training should include information on:
 - a. Anatomy
 - b. Process of defecation
 - c. Effect of SCI on bowel function
 - d. Description, goals and rationale of successful bowel programs
 - e. Factors that promote successful bowel programs
 - f. Role of regularity, timing and positioning in successful programs
 - g. Safe and effective use of assistive devices and adaptive equipment
 - h. Techniques for manual evacuation, digital stimulation and suppository insert
 - i. Effect of prescription and non-prescription medications on bowel function
 - j. Prevention and treatment of common bowel problems, including constipation, impaction, diarrhea, hemorrhoids, incontinence and autonomic dysreflexia
 - k. When/how to make changes in medications and medication schedules to optimize the bowel program
 - l. Management of unplanned bowel movements and how to prepare for/adjust bowel programs for natural disasters and emergencies.
 2. Patient and caregiver knowledge of bowel program management should be assessed at each of the follow-up visits.

This guideline was developed to improve health care access in Arkansas and to aid health care providers in making decisions about appropriate patient care. The needs of the individual patient, resources available, and limitations unique to the institution or type of practice may warrant variations.

Guideline Developers

Guideline developed by Gladys G Kamanga-Sollo, MD, in collaboration with the TRIUMPH team led by Thomas S Kiser, MD, and Rani H Lindberg, MD.

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Selected References

- ⁱ Consortium for Spinal Cord Medicine. (1998). *Neurogenic Bowel Management in Adults with Spinal Cord Injury*. Consortium for Spinal Cord Medicine. Washington, D.C.: Paralyzed Veterans of America.
- ⁱⁱ Krassioukov, A., Eng., J.J., Claxton, G., Sakakibara, B.M., & Shum, S. (2010). Neurogenic bowel management after spinal cord injury: A systematic review of the evidence. *Spinal Cord*, 48, 718-33.
- ⁱⁱⁱ Adams RD, Victor M. Diseases of the spinal cord, peripheral nerve, and muscle. In: Adams RD, Victor M, eds. *Principles of Neurology*. New York: McGraw-Hill Publishers; 1993:1178-1180.
- ^{iv} Bauman WA, Korsten MA, Radulovic M, Schilero GJ, Wecht JM, Spungen AM. 31st G. Heiner Sell Lectureship: Secondary Medical Consequences of Spinal Cord Injury. *Top Spinal Cord Inj Rehabil* 2012;18(4):354–378.
- ^v Cook IJ, Brookes SJ. Motility of large intestine. In: Feldman M, Friedman LS, Sleisenger MH, eds. *Gastrointestinal and Liver Disease: Pathophysiology, Diagnosis and Management*. Philadelphia: Elsevier Saunders; 2002:1679-1690.
- ^{vi} Soo Jeong Han, Chung Mi Kim, Jeong Eun Lee, Tae Hoon Lee, Colonoscopic Lesions in Patients with Spinal Cord Injury. *J Spinal Cord Med*. August 2009;32(4):404–407
- ^{vii} Zauber AG, Winawer SJ, O'Brien MJ, et al. Colonoscopic polypectomy and long-term prevention of colorectal-cancer deaths. *N Engl J Med*. 2012;366(8):687-696
- ^{viii} American Association of Spinal Cord Injury Nurses. American Association of Spinal Cord Injury Nurses Standards of practice--revised 2003-2004. *SCI Nurs*. 2004;21(4):228-232.
- ^{ix} Shafik A, El-Sibai D, Shafik I. Physiologic basis of digital rectal stimulation for bowel evacuation in patients with spinal cord injury: identification of an anorectal excitatory reflex. *J Spinal Cord Med*. 2000;23:270-275.
- ^x Korsten MA, Monga A, Chaparala G, et al. Digital rectal stimulation causes increased left sided colonic motility in patients with SCI. *Gastroenterology*. 2003;124:A115.
- ^{xi} Saltzstein RJ, Romano J. The efficacy of colostomy as a bowel management alternative in selected spinal cord injury patients. *J Am Paraplegia Soc*. 1990;13:9-13.
- ^{xii} Stone JM, Wolfe VA, Nino-Murcia M, et al. Colostomy as treatment for complications of spinal cord injury. *Arch Phys Med Rehabil*. 1990;71:514-518.
- ^{xiii} Gora RA, Katorskib JR, Elliott SP. Medical and surgical management of neurogenic bowel. *Curr Opin Urol* 2016, 26:369–375.
- ^{xiv} Nelson A, Malassigne P, Amerson T, et al. Descriptive study of bowel care practices and equipment in spinal cord injury. *SCI Nursing*. 1993;10:65-67.
- ^{xv} Cameron KJ, Nyulasi IB, Cllier GR, et al. Assesment of the effect of increased dietary fiber intake on bowel function in patients with spinal cord injury. *Spinal Cord* 1996;34:277-283.
- ^{xvi} Connell A, Frankel H, Guttman L. The motility of the pelvic colon following complete lesions of the spinal cord. *Paraplegia* 1963;1:98–115.
- ^{xvii} Fajardo NR, vic Pasilliao R, Duncan RM, Creasey G, Bauman WA, Korsten MA. Decreased Colonic Motility in Persons with Chronic Spinal Cord Injury. *American Journal of Gastroenterolgy*. Vol. 98, No. 1, 2003..
- ^{xviii} Glick M, Meshkinpour H, Haldeman S, et al. Colonic dysfunction in patients with thoracic spinal cord injury. *Gastroenterology* 1984;86:287–94.
- ^{xix} Bruninga K, Camilleri M. Colonic motility and tone after spinal cord and cauda equina injury. *Am J Gastroenterol* 1997;92:891–4.
- ^{xx} Aaronson M, Freed M, Burakoff R. Colonic myoelectric activity in persons with spinal cord injury. *Dig Dis Sci* 1985; 30:295–300.