

Author Year; Country Score Research Design Total Sample Size	Methods	Outcome
<p>Zhang et al. 2018b China RCT Level 1 (PEDro=6) N=184</p>	<p>Objective: To study the effect of quantitative assessment-based nursing intervention on the bowel function and life quality of patients with neurogenic bowel dysfunction after spinal cord injury.</p> <p>Population: N=184 (92 in observational, 92 in control) (127 completed full treatment) Level: 73 complete, 58 lumbosacral, 40 cervical, 13 thoracic Age: range 35-70 years % Female: 38.6%</p> <p>Treatment: Quantitative assessment-based nursing intervention using a multifaceted approach to identify the most urgent care needs, reduce complications, and promote the rehabilitation of the disease. Compared regular nursing which included disease health education, psychological care, dietary guidance, and promoting bowel patency</p> <p>Outcome Measures: Recovery of bowel function, QoL and satisfaction</p>	<ol style="list-style-type: none"> 1. Compared with the control group, the observational group had higher scores for QoL (including physical function, general health, social functioning, role-emotional, mental health) (p<0.001). 2. Compared with the control group, the observational group had lower scores for bowel function (including bloating, constipation, prolonged defecation, defecation drug dependence, and fecal incontinence) (p<0.05). 3. Higher satisfaction rates were recorded for the observational group (95.56% vs. 83.7%, p<0.01).
<p>Coggrave & Norton 2010 UK RCT Level 1 (PEDro=7) N=68</p>	<p>Objective: High-quality evidence for interventions in bowel management (BM) after spinal cord injury (SCI) is lacking and BM programs are developed empirically.</p>	<ol style="list-style-type: none"> 1. There was no difference between the groups in the level of intervention at which bowel evacuation was completed (p=0.4-0.1). There were also no significant differences between

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	<p>This randomized, controlled trial compared usual care with a stepwise protocol based on earlier published work to examine whether systematic use of less invasive interventions could reduce the need for oral laxatives and invasive interventions such as manual evacuation, and improve BM outcomes in individuals with chronic SCI.</p> <p>Population: Experimental group: 24M 11F; Median age = 49.5yrs; 17 AIS-A, 5 AIS-B, 4 AIS-C, 9 AIS-D. Control group: 21M 12F; Median age = 47 yrs; 19 AIS-A, 3 AIS-B, 2 AIS-C, 9 AIS-D.</p> <p>Treatment: 6-week, 8-stepwise protocol designed by Badiali et al. (1997) 1) simulation of gastro-colic reflex 20 min before starting bowel care followed by: 2) abdominal massage; 3) perianal digitation; 4) anorectal digitation; 5) glycerin suppositories; 6) rectal stimulants; 7) manual evacuation; 8) stimulant oral laxative. The control group maintained their usual bowel routine to achieve evacuation.</p> <p>Outcome Measures: duration of bowel movement and level of the 8-stepwise</p>	<p>experimental and control group re: time to first stool, percentage of BM episodes were stool was passed, stool consistency or diet and fluid intake.</p> <ol style="list-style-type: none"> 2. Less invasive interventions (i.e., steps 1-5) did not reduce the need for more invasive interventions (i.e., steps 6-8). 3. Though bowel care was longer in the experimental group (weekly mean 48 to 67 min) vs. control group (weekly mean 32 to 37 min), it was only significant in week 6 (p=0.05) 4. Significantly more participants dropped out of the study from the experimental group, raising questions re: bias of results.

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	<p>protocol reached to attain consistent evacuation.</p>	
<p>Ozisler et al. 2015 Turkey Prospective controlled trial Level 2 N=55</p>	<p>Objective: Determine gastrointestinal problems associated with neurogenic bowel dysfunction in spinal cord injury patients and to assess the efficacy of bowel program on gastrointestinal problems and the severity of neurogenic bowel dysfunction. Population: N=55 (42M/13F) patients with Mean (SD) age 33.01 (12.25) Mean (SD) time since SCI 162.0 (110.1) days 37 complete SCI, 18 incomplete SCI Treatment: 2 bowel programs administered depending on upper (UMN) or lower (LMN) motor neuron bowel dysfunction classification. Unique to UMN program: oral medication, glycerin suppository Common between programs: enema, digital stimulation, sit on toilet or lie on side in bed, diet & fluid regulation Outcome Measures: GI problems, method of bowel management, NBD Score</p>	<ol style="list-style-type: none"> 1. Significantly decreased % of motor complete SCI patients after treatment with constipation (-16%), abdominal distension (-25%), and abdominal pain (-16%). 2. No significant change in % of patients with gastrointestinal problems in motor incomplete SCI patients. 3. Significantly decreased use of oral medication, enema, and manual evacuation after treatment. 4. Significant decreases in NBD scores in both motor complete (17.45±6.37 to 11.4±3.58) and incomplete patients (8.44±9.39 to 5.22±6.38) after treatment. 5. Mean NBD score significantly higher in motor complete patients than in motor incomplete patients both before and after treatment.
<p>Correa & Rotter 2000 Chile</p>	<p>Objective: To assess the state of the neurological bowel in spinal cord injured</p>	<ol style="list-style-type: none"> 1. At onset of study, there were significant differences between DIE scores in participants who

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Pre-post Level 4 N=38	<p>(SCI) patients, design and apply a program for the comprehensive management of neurogenic bowel and evaluate outcome.</p> <p>Population: Age: range 19-71 yrs; 21 participants with complete injuries (2 with tetraplegia and 19 with paraplegia), 10 with incomplete injuries, 7 with conus medullaris and cauda equina; Duration of injury: range 5 months -16 yrs.</p> <p>Treatment: Intestinal program administration with 6-month follow-up. The program involved monthly evaluations of the patient's intestinal function, symptoms, and complications. Patients were educated on inadequate practices of evacuation and medications were changed when appropriate.</p> <p>Outcome Measures: Difficult Intestinal Evacuation (DIE) scale; colonic transit time; anorectal manometry; recto-colonoscopy; GI symptoms.</p>	<p>had a regular bowel habit and those who did not (p=.01) and between those who took constipation inducing medication and those who did not (p=.004).</p> <ol style="list-style-type: none"> 2. Measures of DIE that decreased significantly after using the bowel program were hard stools (26.5% to 2.9%; p=0.004) and evacuation time >45 min (26.5% to 11.8%; p=0.015). 3. Participants felt their DIE scores after their SCI worsened (from 2.6% to 26.3%) compared to before their SCI (based on subjective recall). 4. Gastrointestinal symptoms that decreased significantly before and after the program were abdominal distension (50% to 23.5%; p=.008), rectal bleeding (44.1% to 8.8%; p=.001), and fecal incontinence (50% to 17.6%; p=.001). 5. Bowel practices that reduced significantly before and after program were manual extraction (52.9% to 20.6%; p=.001) and use of non-recommended laxatives (23.5% to 0%; p=.003).
<p>Coggrave et al. 2006a UK Pre-post Level 4 N=17</p>	<p>Objective: Determine the effectiveness of use of laxatives in bowel management</p> <p>Population: 14M 3F; Age: mean 41.2 yrs, range 19-59yrs; 8 cervical, 8 thoracic, 1 conus</p>	<ol style="list-style-type: none"> 1. For 12 participants, use of the progressive protocol resulted in an increase in the number of successful bowel management episodes without the use of laxatives. 2. Total number of successful

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	<p>medullaris; all participants had motor complete SCI.</p> <p>Treatment: Baseline bowel management routine (2 weeks observation) was compared with bowel management following introduction of the modified progressive protocol (4 weeks of observation) designed by Badiali et al. (1997) with the addition of manual evacuation.</p> <p>Outcome Measures: Comparison of the number of bowel management episodes requiring laxative use at baseline and under the progressive protocol; duration of bowel management episodes.</p>	<p>bowel management episodes requiring laxative decreased significantly from 62.8% (baseline observation) to 23.1% (in protocol phase).</p> <ol style="list-style-type: none"> 3. In 3 participants, there were fewer successful bowel management episodes with use of the protocol. 4. Mean duration of bowel management episodes was less with use of the protocol than during baseline (51.8 vs. 73.5 minutes). 5. There was a significant decrease in proportion of the bowel management episodes requiring manual evacuation in the protocol phase than in the baseline phase (87.6% versus 27%).
<p>Badiali et al. 1997 Italy Pre-post Level 4 N=10</p>	<p>Objective: Determine the effects of different therapies used to treat chronic severe constipation</p> <p>Population: 5M 5F; Age: mean 33yrs, range 20-60yrs; Level of injury: C3 to L4</p> <p>Treatment: Multifaceted intervention including diet, water intake, and evacuation schedule (15g/day fibre, 1500ml/24hr water)</p> <p>Outcome Measures: Bowel movement frequency, bowel habit (regular intestinal schedule), total and segmental large-bowel transit time.</p>	<ol style="list-style-type: none"> 1. Bowel frequency was reported to have increased at the end of training. 2. By the end of the study period the total GI transit time was significantly reduced (146+/-45 before vs 93+/-49 h).

