

Author, Year Country Study Design Sample Size	Study Characteristics	Results
(Hwang et al., 2017) South Korea Observational N=131	<p>Population: Mean age: 33.4 ±6.1 yr; Gender: males=84, females=47; Mean time since injury: 19.5 ±7.0 yr; Level of injury: paraplegia=54, tetraplegia=77; Severity of injury: incomplete=31, complete=100..</p> <p>No Intervention: Longitudinal cohort survey. Follow-up occurred annually for a total of 466 interviews, with most participants (75%) contributing to at least 3 consecutive interviews.</p> <p>Outcome Measures: Type and evacuation time of bowel management programs, Satisfaction with Life Scale (SWLS), Patient Health Questionnaire-9 (PHQ-9), SF-12v2™ Health Survey (SF-12v2), Craig Handicap Assessment and Recording Technique (CHART)</p>	<ol style="list-style-type: none"> 1. At first interview, rectal suppository/enema use was most common (51%). 2. Over time, the likelihood of using manual evacuation (OR, 1.077; 95% C.I., 1.023-1.134; p=.005), oral laxatives (OR, 1.052; 95% C.I., 1.001-1.107; p=.047), and colostomy (OR, 1.071; 95% C.I., 20 1.001-1.147; p=.047) increased, whereas the odds of rectal suppository use decreased (OR, .933; 21 95% C.I., .896-.973; p=.001). 3. Bowel evacuation times were likely to decrease over time in participants using manual evacuation (OR, .499; 95% C.I., .256-.974; p=.042) and digital rectal stimulation (OR, .490; 95% C.I., .274-.881; p=.017), but increase for rectal suppository/enema use (OR, 1.871; 95% C.I., 1.264-2.771; p=.002). 4. Controlling for level of injury, participants using manual evacuation and digital rectal stimulation were more likely to have increases in community participation scores (p<.05).
(Midrio et al., 2016) Italy Observational N=78, N=37 SCI	<p>Population: <i>Patients with anorectal malformation (ARM; N=41) or spinal cord lesion (SCL; N=37): Age: Group 1 (N=46): 6-11 yr, Group 2 (N=32): 12-17 yr.</i></p> <p>Intervention: Patients were trained to use the Peristeen transanal irrigation (PTAI) for 3 mo. The volume of water used was 10/20 ml/kg every day for the first week and then three times a week, increasing the amount of water as needed to a maximum of 1L.</p> <p>Outcome Measures: Bristol Stool Scale, questionnaire assessing bowel function, Child Health Questionnaire, Short Form Survey.</p>	<ol style="list-style-type: none"> 1. Stool consistency was improved after 3 mo treatment with PTAI in both ARM and SCL patients. 2. Before treatment, 47.5% of patients with ARM and 77.5% with SCL presented with hard lumpy stools (types 1 and 2), whereas only 30% with ARM and 2.5% with SCL presented with type 4 and 5 stools. 3. After treatment, hard stools were recorded in 0% in ARM and 2.5% in SCL (types 1 and 2), and soft stools increased to 87% in ARM and 82% in SCL (types 4 and 5). 4. The most common form of bowel dysfunction before treatment was constipation in 69% and 92.7% in ARM and SCL respectively and faecal incontinence in 50% and 39%. 5. After treatment, constipation was reduced in ARM from 69% to 25.6% and in SCL from 92.7% to 41.5%, faecal incontinence in ARM from 50% to 18.6% and in SCL from 39% to 9.8%, and flatus incontinence in ARM from 20.9% to 9.8% and in SCL from 31.7% to 10%.
(Johnston et al., 2005) USA Post Test N=3	<p>Population: Age: 17-21 yr; Gender: males=3; Time since injury: 1.0-1.5 yr; Level and Severity of Injury: Motor complete T3-T8.</p> <p>Intervention: Praxis system consists of a 22-channel implant stimulator, extension leads and epineural electrodes. Leads emanating from the stimulator are configured in three tresses: two tresses of nine leads each for stimulation of lower extremity muscles and one tress of four leads for stimulation for bladder and bowel function (parameters: 0.2–8 mA amplitude, 25–600 ms pulse</p>	<ol style="list-style-type: none"> 1. Acute testing demonstrated that low-frequency electrical stimulation (20 Hz, 350 ms, 8 mA) of S3 bilaterally in subject 2 caused a significant increase in both rectal pressure and anal sphincter pressure. 2. High-frequency stimulation alone (500 Hz, 350 ms, 8 mA) appeared to have no effect on rectal pressure and produced a reduced pressure in the anal sphincter as compared to low-frequency stimulation alone. 3. A combination of low- and high-frequency (500 Hz, 350 ms, 8 mA) stimulation appeared to increase rectal and anal sphincter pressures, but to a level less than that caused by low-frequency stimulation alone.

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	<p>duration, 2–500 Hz pulse frequency per channel). After implantation and immobilization participants completed exercise phase (FES strengthening) followed by lower extremity conditioning, standing and upright mobility training (13 wk).</p> <p>Outcome Measures: Completion of eight upright mobility activities, scored based on completion time and level of independence: donning, stand and reach, high transfer, bathroom, floor to stand, 6m walk, stair ascent, stair descent.</p>	<ol style="list-style-type: none"> 4. The daily use of electrical stimulation appeared to cause a reduction in the time to complete defecation by 40% with the first stimulation strategy and by 60% with the second strategy. 5. As compared to bowel management without stimulation, with stimulation there was also a reduction in the proportion of days the subject failed to defecate and greater satisfaction with bowel management overall.
<p>(Vogel et al., 2002b) USA Observational N=216</p>	<p>Population: Age at injury: 14.1±4.0 yr; Age at interview: 28.6±3.4 yr; Gender: males=150, females=66; Time since injury: 14.2±4.6 yr; Level of injury: tetraplegia=123, paraplegia=93. Severity of injury: C1-4 ABC=41, C5-8 ABC=67, T1-S5 ABC=82, tetra/para D=26.</p> <p>Intervention: None. Survey.</p> <p>Outcome Measures: Prevalence of urinary tract infections (UTI), hospitalizations, urinary stones, orchitis or epididymitis, bladder incontinence, dysreflexia.</p>	<ol style="list-style-type: none"> 1. Bowel accidents were experienced by 135 subjects, with 19 having incontinence more frequently than once a month. 2. The subjects who experienced bowel incontinence were older at interview ($p=0.038$) and exhibited significantly lower ASIA Motor ($p<0.001$), FIM total ($p=0.002$) and motor scores ($p=0.003$). 3. 55 individuals complained of constipation, 37 experienced diarrhea and 73 complained of hemorrhoids or rectal bleeding. 4. Individuals with bowel programs >60 min were significantly older at follow-up ($p=0.001$) and had a longer duration of injury ($p=0.005$). 5. Prolonged bowel programs were experienced by 42% of those with tetraplegia compared with 18% of those with paraplegia ($p=0.002$). 6. Those with prolonged bowel programs also had a lower mean ASIA Motor score ($p=0.009$). 7. Prolonged bowel programs were associated with significantly lower motor ($p=0.002$) and total FIM scores ($p=0.002$).
<p>(Goetz et al., 1998) USA Observational N=31</p>	<p>Population: Mean age: Gender: males=15, females=16; Mean time since injury: 3.9yr; Level of injury: paraplegia=14, tetraplegia=17; Severity of injury: ASIA A=24, ASIA D=7</p> <p>No Intervention: Surveys were sent to all persons under age 19 with a diagnosis of SCI who had received care at a medical center since 1985.</p> <p>Outcome Measures: Individual patterns of bowel management and use of medications, levels of satisfaction with bowel management, incidence of incontinence, subject/caregiver perceptions regarding the impact of the bowel program on social functioning</p>	<ol style="list-style-type: none"> 1. A bowel management program, including medications or manual manipulation, was required for 81% of the subjects; only two were independent in their bowel management. 2. There was an association between being able to walk, even for short distances, and having normal bowel function ($p<0.01$). 3. Over half of the subjects performed evening bowel care and over half performed their care daily. 4. Digital stimulation tended to be used more commonly by younger children. 5. Medications, either oral, rectal, or both, were used by 88% of the subjects. 6. Sixty percent of the subjects reported they were completely or very satisfied with their bowel management. 7. About half the subjects had limited freedom because of their bowel programs, which caused some dissatisfaction.

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		<ul style="list-style-type: none"> 8. Sixty-eight percent reported occasional or frequent interference with school activities because of their bowel programs. 9. almost 84% of the children reported at least rare accidents. 10. No correlation was found between bowel accidents and satisfaction with bowel management,