ORIGINAL ARTICLE

# Bowel Dysfunction in Spinal Cord Injury

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**SUMMARY**

**Bowel Dysfunction is one of the least looked at problems in Spinal Cord Injury (SCI). The goals of this study are to understand bowel dysfunction in SCI and its effects on quality of life (QOL). Cross-sectional study based on interview and assessment of 41 clients. A majority of them were dissatisfied. Bowel opening time was long in about 65% while 76.6% were incontinent. Socially, approximately half refrained from outings even though 90.3% of them carried out bowel evacuation before going out. Attention to bowel education is necessary to improve social continence.**

**KEY WORDS:**
*Bowel Dysfunction, Bowel care programme, Incontinence, QOL, Spinal cord injury*

## INTRODUCTION

Traumatic spinal cord injury (SCI) affects multiple organ systems, including the gastro-intestinal system[1]. There has been little research about bowel programs because impairments of gastro-intestinal system are less life threatening than impairments to other organ systems. Bowel dysfunction in patients with SCI has significant impact on quality of life, so much so that difficulty in bowel management have been rated as high as problems associated with loss of mobility in previous studies[2,3,4]. In the initial years emphasis is directed towards ambulation while awareness and need to manage bowel related problems are only carried out five years post–injury[5]. The aim of this study is to establish the incidence of bowel dysfunction amongst our SCI population, the methods of evacuation used, and the impact of bowel dysfunction on their everyday life.

## MATERIALS AND METHODS

Forty one spinal cord injured patients consented to participate in this study. They came from varied living backgrounds, most of whom were in independent living homes while some were on their own. Patients were interviewed to obtain their perception of their bowel problem pre and post injury, following which a clinical neurological examination was conducted to determine level and completeness of injury and also a per rectal examination to determine the anal sphincter function using the ASIA Neurological Scale[6].

The questionnaire consists of demographic details, whether they received formal or informal bowel education, and their functional abilities in carrying out activities of daily living (ADL). Bowel function assessment looked at pre and post-injury function. Although it is known that most will not be exact in their information regarding pre-injury, it is believed that if a bowel programme is carried out regularly, any gross abnormality or deviation from the regular pattern will be remembered if significant.

The study population was made up of those with traumatic SCI. Those with SCI due to infection, tumour, progressive illness or associated head injury or cognitive impairment were excluded. The SPSS system of data analysis was used. The Chi–test was used to analyze characteristics of pre and post bowel habits.

## RESULTS

### Demographic Data

Forty one patients took part in this study. Their mean age was 34 years (ranging from 19-65 years). There were 33 (80.5%) men and eight women. The mean time since injury was 10.2 years (ranging from four months to 38.6 years). Sixty-one percent had been injured for more than five years.

All were hospitalized post injury with the average length of stay of 5.1 months (ranging from 2 weeks – 4 years). Of these 85.4% were admitted to public hospitals while the rest were in private institutions. More than half (51.2%) of them admitted to receiving some sort of formal or informal education regarding bowel dysfunction and its management from the hospital staff (Table I).

It was noted that 46.4% were living with family and relatives and 51.2% were living with other disabled colleagues in accessible or modified homes (Figure 1). Interestingly 61% were gainfully employed.

### Functional activities

A vast majority (93.7%) were wheel chair dependent while the remaining were ambulant with/without aids. In personal ADL about 89.2% of them were independent in various activities, while a comparable 73.2% were independent in domestic ADL. 68.3% had means for independent long-distance mobility either through the use of their own or via public transport.

### Bowel Function Assessment

This assessment was done in comparison to their pre- SCI state (Figure 2). Various parameters were assessed.

**Frequency of bowel opening:** in the post-SCI state 87.7% managed to conduct bowel opening between 2-7 times per

*This article was accepted: 18 March 2008*
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week. Only a very small percentage carried it out less than twice a week.

**Time taken for evacuation:** as expected 92.5% averaged 5 minutes or less in the pre-SCI state, whereas in post SCI State 65% of them averaged 10-45 minutes.

**Successful evacuation:** 97.6% of these patients claimed to have no bowel problems prior to injury however now only 63% had satisfactory bowel evacuations. The rest had varying degrees of failures depending on number of times attempted.

Sensation of rectal fullness: 100% had full rectal sensation prior to injury, while only 46.3% had it post SCI.

**Differentiating between wind and bowel opening:** Only 43.9% could differentiate between the two after SCI.

Perianal sensation: after SCI only 36.6% appeared to have intact sensation.

**Complications following bowel dysfunction:** the commonest complication was constipation (48.8%), followed by stomach pain, sweating, nausea, vomiting and diarrhoea.

Continence: in the post-SCI state, only 24.4% could maintain social continence. Of the remaining, the majority averaged 2 episodes of faecal soiling/month, while a smaller percentage had 3 – 4 episodes / month. More than half of them had formed stools while 34% had hard stools.

**Satisfaction with evacuation method:** 87.1% were unsatisfied with their evacuation method (NS).

### Methods of evacuation

Most patients used a combination of two or more methods to achieve evacuation (Figure 3). Anal stimulation (61%) and digital evacuation were more commonly carried out with a larger number of them making use of one of these two methods in addition to the others such as high fibre diet, suppositories, enemas and laxatives. Interestingly it was noted that a very small percentage of them used water gushing out from a flexible pipe which was inserted into the anal opening, some sort of a retrograde wash out as an effective method.

### General

63.4% stated that they realised the importance of carrying out a good bowel program between seven months to two years post injury. While a majority of them claimed that such a realisation was brought about by their own interest, 29.3% say that medical personnel had aided this education.

### Satisfaction with present method of bowel evacuation and control

The majority (82.9%) were dissatisfied with their present method of bowel evacuation and control. Among the reasons commonly cited were prolonged time taken to evacuate and inadequate toileting facilities/modifications. Furthermore difficulty with transfers and expenses involved in suppositories/enemas were also reasons for dissatisfaction.

### Effect of bowel dysfunction on patient

As expected, attending social functions or going to public places was a source of distress in those having poor bowel control. Poor access and unavailability of appropriate toileting facilities accounted for 43.9% of them preferring to remain indoors. Surprisingly 51.2% could still enjoy a fairly active social life interacting with their friends and going out shopping. This may be explained by the fact that although 73.2% of the sample was incontinent, 96.8% always planned before leaving (Chi Square, P=0.013).

### Employment

As for jobs, 61% were in current employment of whom 34% were self-employed in some home craft work / direct selling, which permitted flexible working hours.

### Clinical review

a) Levels of injury were (Figure 4): cervical 22% (complete 7, incomplete 2), thoracic 58.5% (complete 14, incomplete 10), lumbar 19.5%.
b) Perianal examination revealed that 82.9% had no voluntary anal contractions and 61% had no anal sensation. The spastic anal tone in 56.1% of them contributed to 48% having problems of constipation.

## DISCUSSION

SCI not only affects a person's ability to control the elimination of stool and urine, but the co-existing immobility limits alternatives for self-management. Disability that limits wilful continence, voluntary defecation and perineal hygiene are difficult to remedy. Much of this morbidity has been linked to effects of autonomic nervous system (ANS) dysfunction such as delayed gastric emptying, slowed transit time and poor colonic motility. Patients are at risk for secondary colonic disorders as a result of prolonged use of anthroquinones, cathartics, enema, suppositories and manual evacuation[7]. The options for independent self management of neurogenic bowel dysfunction are limited and attendant care is costly. Indeed for many, bowel dysfunction is a source of continuing inconvenience, frustration and expense.

Fear of bowel accidents is a commonly stressed reason why persons with SCI do not engage in activities outside of the home or travel away from home [4], and so the impact of poor bowel management has far reaching effects.

Stone and associates observed that 29% of people with complex SCI reported bowel related problems and symptom frequency increased in subjects who have had cord injury for more than five years[5]. Unfortunately, these recurrent symptoms may just be the tip of the iceberg. Furthermore clinical recognition of acute intra–abdominal pathology is hampered by diminished visceral sensitivity.

After SCI the bowel loses part of its autonomic innervation. Normal function of sacral parasympathetic supply seems crucial to the maintenance of colonic function and normal defecation. Patients with SCI have slowed colonic transit especially in the left colon and rectum and this coupled with reduced patient mobility, contributes to impaired function. Incidence of fecal incontinence in SCI patients is more common than the general population[8].

Early bowel training and regular evacuation has met with success towards attaining continence. Regular daily toileting at specific times have been reported to yield 50%-75% success. Most patients achieve adequate bowel management strategies, but the issues of time, dependency and unpredictability of episodes of fecal incontinence remains1. Techniques for inducing a bowel movement at a desired time have been variable and compliance has been a considerable issue. The importance of teaching the proper technique to patients and family has been emphasized in the literature though outcome of treatment techniques are sparse. Whilst

**Table I: Demographic data**

| Patient Profile | |
|---|---|
| Total number of patients | 41 |
| Mean duration since injury | 10.2 years |
| Hospitalisation post-injury | 100% |
| Mean length of stay | 5.1 months |
| Informal / Formal bowel education | 51.2% |

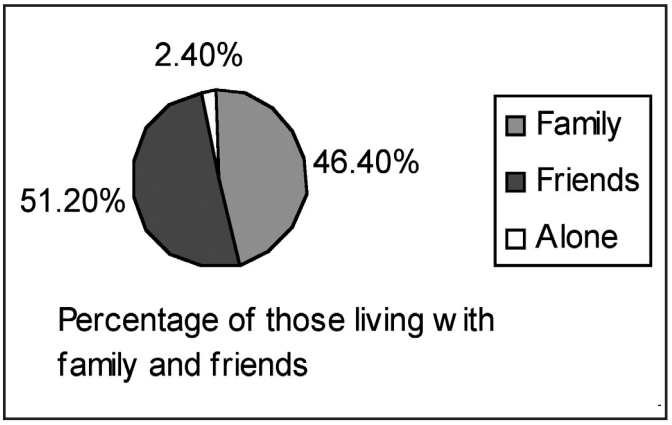


**Fig. 1:** Percentage of patients living alone or with carers

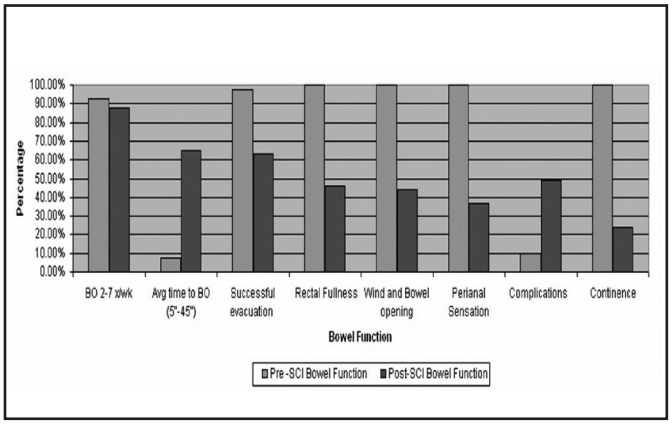


**Fig. 2:** Comparison of Bowel function Pre and Post SCI

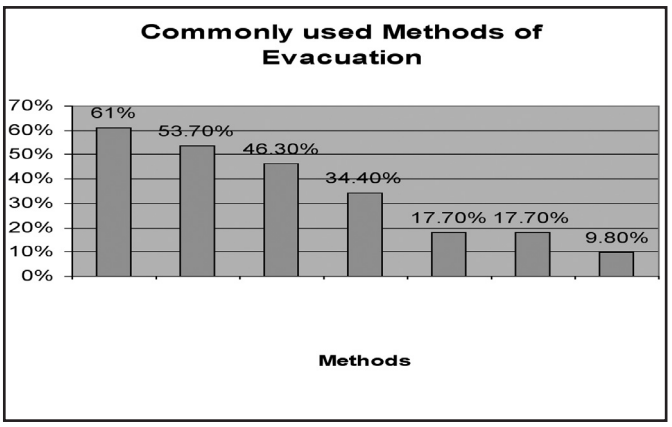


**Fig. 3:** Commonly used methods of Evacuation

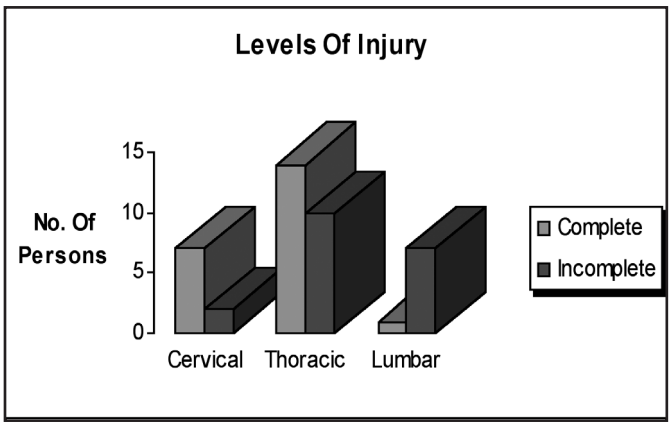


**Fig. 4:** Levels of Injury

alternative methods such as biofeedback and behavioral modification are being tried, surgical procedures have not gained wide acceptance.

In this study a majority of them were dissatisfied with their bowel function. This is in keeping with a high percentage of them being incontinent in between stools, although constipation was the major complaint. A possible explanation for this could be that in this sample almost 80% consisted of thoracic and cervical levels of injury with spastic anal tone. In an upper motor neuron bowel spasticity of the anal tone and increased colonic transit time leads to constipation. Therefore the incontinence suffered by these constipated patients is probably due to overflow secondary to chronic colonic distension.[1,3,4], which is brought about by incomplete bowel evacuation.

The other issue noticed here is that though a high percentage claimed to be dissatisfied with their bowel function, 63% of them had a 100% success rate of bowel evacuation at each attempt. What actually appears to be a stress on them is the length of time taken to initiate and complete the bowel program. Inadequate toileting facilities, difficulties with transfers, expenditure involved in purchasing laxatives and stimulants were also a source of discontentment.

The most widely used method of evacuation was anal stimulation, followed by manual evacuation, high fibre diet, enemas and laxatives. Interestingly 14% preferred to wait for bowel evacuation as and when it happened.

Most managed to open bowels within 45 minutes and took about an hour to complete the procedure. These statistics are comparable to the ones from the west[1,3,4].

Incontinence occurred in a large number of these SCI patients but averaged 1-2 episodes / month. Though this appears infrequent its unpredictability is a major handicap, especially if hand dexterity, mobility as well as accessible toilet facilities are limited. The decreased ability to discriminate between gas and stools for complete SCI makes it even more difficult to remain continent[1]. Diarrhoea produced by laxatives and its resultant incontinence may explain why only 9.8% still continued to use them.

Disordered bowel function has a major impact on lifestyle. Completeness of injury seems to have a greater effect on bowel function than level of injury, perhaps due to greater difficulty associated with toileting and the need for assistance[2]. It was noted that almost half of this group were distressed about attending social functions or going to public places because of their poor bowel function. Inappropriate toilet access and poor adaptations were of concern. However, the other half were socially active, enjoyed going out with friends and going shopping and were even unafraid of holding a job with irregular timings. Although no significant relationship was found between those leading an active lifestyle and having incontinence, (chi square p=0.158), what was significant was that those who were incontinent always planned their trips out before hand.

Thus it can be inferred that though a majority of SCI patients have bowel dysfunction, they continue to try and maintain a reasonable lifestyle of employment, socialisation and independence in daily living skills. This they achieve by planning ahead their daily schedule while carrying out their bowel programme in such a way that it doesn't interfere with their activities.

### Limitations of this study

This study has several limitations that the authors are aware of. It is a questionnaire based study in which due to language difficulties, there may have been some inaccuracies in the understanding of the question and in turn in their reply. All reasonable efforts has been taken to overcome this problem.

The study relied on patient's memories of pre and post injury bowel function data as opposed to recorded data. The element of recall bias may have been there, however the author believes this effect is negligible and unlikely to account for major differences obtained in pre and post injury data.

A study done by Manning *et al.* showed that recalled and recorded data for frequency of evacuation agreed fairly closely[9]. Furthermore the author believes that since bowel function is a regular and significant part of the SCI patient's life, this bias has limited impact on the study results.

The other limitation is that the population sample was from the capital city Kuala Lumpur and the neighbouring state of Selangor. In keeping with economic growth there could be more awareness, tolerance as well as developmental and architectural advances towards the welfare of disabled people as compared to more remote areas. The better accessibility, education, and accommodation facilities may have contributed to the better lifestyle and coping skills this group of patients seem to enjoy in spite of their existing bowel dysfunction.

Whether this does or does not reflect the extent of problems faced by the SCI population in remote areas where education and accommodation facilities are limited is not immediately known. A more extensive study will need to be undertaken sometime at a later date to look into that.

## CONCLUSION

The authors conclude that this study did establish the existence of bowel dysfunction in this sample population and most were associated with defecation difficulties of which increased bowel opening time and constipation were cited as main concerns. Anal stimulation and manual evacuation were commonly used for want of a more effective and socially acceptable method.

In spite of issues of constipation and incontinence patients appeared to be managing well in the light of a good number of them holding jobs and also continuing to lead a fairly active social life. This was probably due to peer and family support and their own sense of motivation to plan ahead prior to engaging in outside activities so as to reduce the incidence of a catastrophic bowel event. A reasonable number of them felt that workplace toileting facilities and modifications were lacking and provision of these will go a long way in encouraging more of them to get employed.

As stated earlier SCI produces a wave of repercussions that affect many organ systems and subsequently the life activities of the patients. Understanding of the pathophysiological changes in bowel function is important when trying to formulate an effective bowel evacuation program. Treatment plan should be focussed on making the bowel event a predictable, regular, thorough, effective and efficient colonic evacuation, without recurrence of incontinence and prevention of complications. Proper design of the bowel program should take into consideration diet, physical activity, equipment, oral or rectal medication. Scheduling of bowel care, availability of care giver assistance, activity or lifestyle changes and return to school or work should also be taken into account.

This study highlights the need to form appropriate interventions to include derivation and implementation of individualised person–centered bowel program which may include diet, oral or rectal medication, equipment and scheduling of Bowel Care. Optional surgical procedures such as Colostomy, Appendicostomies (with usage of ante grade enemas),[10] and neuroprosthetic devices for control of defecation - like Functional Electrical Stimulation (FES) and Sacral Anterior Root Stimulation implants (Brindley stimulator)[11,12] - should be looked at in the near future. There should also be emphasis on bowel education to all new SCI patients as well as more systematic monitoring of bowel dysfunction in SCI patients by the medical professionals.

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