

Background

Bowel function features as one of the highest priorities for people who have suffered a spinal cord injury (SCI). While a well-managed bowel programme is an essential part of daily life, the misery of constipation is frequently reported (in 42-95% cases). Available treatments can be ineffective and uncomfortably intrusive. Early scoping studies have suggested that functional electrical stimulation to the abdomen (ABFES) can reduce the overall time spent during bowel management and resultant bowel movements can become both easier and more comfortable while reducing instances of constipation. ABFES also appears to offer improvements in respiratory function. Respiratory complications are the most common cause of death after high spinal breaks in the neck (Tetraplegia). Potentially therefore BOWMAN offers benefits in treating bowel disorders in all cases of SCI and higher respiratory issues after high lesions in the neck. Both are based on the premise that the two are linked to degradation of abdominal nerve function after spinal injury. The COVID-19 pandemic has added greater urgency making RESFES a particular priority.

Our Proposed Study

Our research team proposes to invite 36 adults (over 18 years) with a complete or incomplete T12 (lower back) injury at least 1 year after their injury. **ABFES** is relatively easy as we are able to conduct the study remotely using secure video-conference calling or by post. Half the participants will receive ABFES and the other half will receive low dose ABFES. A bowel diary will be monitored for each individual over a 12 week period to identify the differences in these treatments. Our additional sub-study **RESFES**, led by Dr Aram Fard, Consultant in Spinal Cord Injuries will focus on associated respiratory measures linked to the weakness in abdominal muscles.

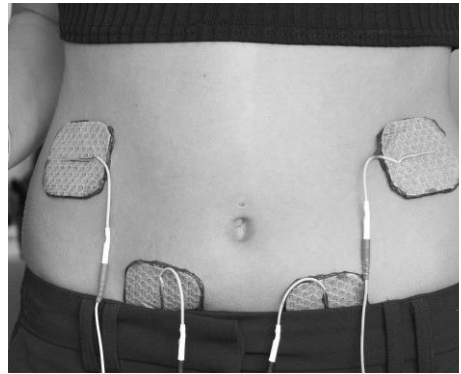


Above: Dr Tamsyn Street checks electrical engineering progress with Medical Engineer Dr Steven Crook

'To any outsider, paralysis and the inability to walk may appear to be one of the most frustrating and obvious aspects of living with a spinal cord injury. However, our project BOWMAN relates to 'unseen' and routine complications with daily bowel and bladder management, amongst the most tiresome and debilitating issues that have to be overcome during long periods of rehabilitation and thereafter. In our extended planning due to the Coronavirus pandemic, we have been able to expand our research to include respiratory issues, arguably the most dangerous aspects and certainly the most common cause of death after SCI'

Dr Tamsyn Street
Principal Investigator
Project BOWMAN

BOWMAN in outline. ABFES is a non-invasive treatment that uses adequate electrical impulses to activate weak or paralysed muscles. These work by exciting the nerves connected to the muscles. Self-adhesive patches (electrodes) are placed on the skin close to the nerve supplying the muscle **(Right)**. Leads connect the electrodes to a stimulator which produces the required impulses. **RESFES** will determine the relationship of impairment in the abdominal muscle structure with respiratory complications in tetraplegics. Electrical stimulation produces a tingling 'pins and needles' sensation most people can easily tolerate with no discomfort.



The Benefits to the Spinal Injured Community? Potentially, **ABFES** will lead to reduced time required for bowel emptying which will improve quality of life for the disabled. The discomfort associated with other interventions will also be addressed leading to greater independence and control over bowel movements with reduced dependency on invasive medication. We envisage a more complete bowel movement programme with potential, long-term therapeutic benefit including reduced bowel incontinence linked to incomplete bowel emptying. In some cases of tetraplegia, **RESFES** may also facilitate improved respiratory function.

Our world class Research Team

Dr Tamsyn Street, Principal Investigator Salisbury NHS Trust (SDH)
Dr Aram Fard, Spinal Consultant, DCSTC, Salisbury
Dr Chalil Vinod, Spinal Consultant, DCSTC, Salisbury
Ms Sen Peralta, Specialist SCI nurse, DCSTC, Salisbury
Dr Steve Crook, Medical Engineer, SDH
Dr Aram Fard, Spinal Consultant, DCSTC, Salisbury
Dr Anton Emmanuel, Neurogastro Consultant, UCL



Supporting Advisory Panel

Dr Rupert Earl, SCI PPA, **(Right)** Spinal Injuries Association
Dr Sean Doherty, SCI PPA, University College London (UCL)
Dr Paul Strike, National Institute for Health Research
Dr Samir Vyas, Gastro Consultant, SDH

*SCI PPA - Spinal Cord Injured - Patient Perspective Advisor

How much how long and when? The total budget for this pioneering and urgently needed study is **£163,806** which will cover all core costs consumables, patient travel, copyright licences, software, dissemination, publishing and essential specialist salaries. Delayed by 12 months but now commencing in May 2021, this 36 month project will take place at Salisbury NHS Foundation Trust (SDH), the home of the Duke of Cornwall Spinal Treatment Centre (DCSTC), one of the UK's eleven specialist spinal injuries units.

www.inspire-foundation.org.uk

PROJECT BOWMAN BUDGET

Item	Year 1	Year 2	Year 3	Total
Specialists' Salaries (1)	33,546	35,655	25,872	95,073
Equipment	3,441	50	50	3,541
Consumables	604	604	0	1,208
Travel	962	1,800	900	3,662
Training	580	0	0	580
NHS Sponsorship costs	1,000	1,000	1,000	3,000
Charity Overheads (2)	21,270	20,727	14,745	56,766
Total	61,403	59,836	42,567	163,806

(1) Employment of project subject matter experts. For project BOWMAN it has been necessary to recruit and employ a part time temporary post-doctoral researcher and a clinical trials assistant; these individuals are neither permanent employees of the INSPIRE Foundation's or the Salisbury NHS Trust. While their skills do exist within the NHS, we have to buy them in, as beyond clinical care, there is no direct Government or NHS funding for SCI rehabilitation research. Capital expenditure would not normally include the remuneration of dedicated subject matter experts, but we believe this is within the spirit of our charity's fundraising strategy and ask grant making trusts to give consideration accordingly.

(2) A varying amount set annually by our auditors according to income generated and forecast of the 5 year research programme